Field research



Scientific papers, abstracts and posters from cooperation activities in Africa – 2019



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Doctors with Africa CUAMM

Via San Francesco, 126 - 35121 Padua - tel +39 049 8751279 www.mediciconlafrica.org cuamm@cuamm.org c/c postale 17101353

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«Medical staff able to match a deep sense of compassion with a **sustained commitment to research** can provide invaluable support [to needy communities]».

«Il personale medico darà un aiuto insostituibile se saprà unire ad uno spirito di profonda pietà una volontà decisa ad affermarsi attraverso lo **studio** e la **ricerca costante**».

Francesco Canova, 1938

CLIMATE EMERGENCIES, AFRICA, HEALTH AND RESEARCH: THE NEED TO KEEP MOVING FORWARD

It has been said that we are living not in an era of change, but in a change of era. We at CUAMM are deeply concerned, both as individuals and as an organization, not only by the changing climate but also, of course, by the Covid-19 pandemic now ravaging the globe and highlighting the critical importance of public health as we face one of the most difficult periods since. As underscored by Pope Francis in his encyclical *Laudato Sì*, it is a phenomenon that brings us face to face with profound ethical issues.

According to the World Bank, the average person in sub-Saharan Africa produces around 0.8 metric tons of CO2 per year versus the approximately 6.4 of the average European and 16.5 of the average American. Yet according to reports from the Intergovernmental Panel on Climate Change (IPCC), it is the African continent that will be hit hardest by the most dire consequences of climate change. Over the past twenty years, Southern Africa, the Horn of Africa and the Sahel have been severely affected by drought, while Central and Western Africa have been struck by major flooding. Every year countries in Southeastern Africa must face the cyclone and storm season, and the future is destined to bring further water shortages, drops in food productivity, the worsening of chronic malnutrition and infectious diseases including malaria, falling GDP levels, and growing political and social instability. And, as pointed out in the 2019 report of The Lancet Countdown on health and climate change, the worst affected vis-à-vis the phenomenon's impact on public health are the nations that are already the most vulnerable, and their children.

We at CUAMM experience these emergencies firsthand alongside our partner communities – direct witnesses, for example, to the drought in Angola, cyclones in Mozambique, and the chronic nature of armed conflict in many of Africa's most fragile states, including South Sudan and the Central African Republic. We intend to tackle the issue of climate change the same way we have always tackled issues: keeping abreast of things, studying the data through a critical lens, stimulating dialogue and debate and – most importantly – carrying out our work with commitment and resolve in and alongside the most vulnerable and needy African communities.

A special focus on research, scientific partnerships and engagement with young European and African researchers

This is precisely what we did in Mozambique in 2019, during the terrible days of Cyclone Idai and in its aftermath, responding to the emergency on the ground while continuing to ensure the daily health care and services required by local communities. **Two experiences are especially worthy of mention here: our work with community networks and with newborns at Beira Hospital**, both the focus of CUAMM's research and analysis in partnership with the Chelsea and Westminster Hospital NHS Foundation Trust (UK) and the University of Padua. The findings from each will soon be published in *The Lancet* and in *JAMA Pediatrics*,

EMERGENZE CLIMATICHE, AFRICA, SALUTE E RICERCA: NON RESTARE IMMOBILI

È stato detto che viviamo non in un'epoca di cambiamenti ma in un cambiamento d'epoca. L'ambiente sta mutando, stiamo attraversando una delle fasi più difficili dal Dopoguerra, dove tocchiamo con mano il senso stesso di salute globale, alle prese con la pandemia Covid-19 e questo non può non interrogarci, come persone e come organizzazione. Sono interrogativi di natura etica, come sottolinea Papa Francesco nella sua enciclica sull'ambiente, Laudato Sii.

Secondo la Banca Mondiale, una persona che vive nell'Africa sub-sahariana produce in media 0,8 tonnellate di CO2 contro le 6.4 di un cittadino europeo e le 16.5 di un cittadino americano. Eppure, secondo i rapporti dell'Intergovernmental Panel on Climate Change (IPCC), gli effetti negativi più gravi dei cambiamenti climatici si faranno sentire soprattutto nel continente africano. Negli ultimi vent'anni, le regioni del Sud, il Corno d'Africa e il Sahel sono stati colpiti in particolar modo dalla siccità; l'Africa centrale e occidentale invece dalle alluvioni. I paesi dell'Africa sud-orientale affrontano ogni anno una stagione di cicloni e tempeste e per il futuro si prevedono penuria d'acqua, riduzione della produzione di cibo, deterioramento della malnutrizione cronica e riacutizzazione della malaria e delle malattie infettive, perdite del PIL e instabilità sociale e politica. In termini di impatto sulla salute saranno soprattutto i paesi fragili e i bambini a portarne il peso maggiore come ci ricorda, dati alla mano, il recente The 2019 report of The Lancet Countdown on health and climate change.

Anche noi, come Cuamm, siamo testimoni diretti di queste emergenze che tocchiamo con mano: ne sono un esempio la siccità in Angola, i cicloni in Mozambico e la cronicizzazione dei conflitti armati che si registrano nei paesi fragili di questo continente come il Sud Sudan e la Repubblica Centrale Africana. Affronteremo pertanto il tema delle emergenze climatiche come siamo stati abituati: tenendoci aggiornati, leggendo criticamente i dati di contesto, animando il dibattito e il confronto con tutti e, in particolare, continuando a svolgere con determinazione il nostro lavoro in Africa e con l'Africa nelle situazioni più critiche e bisognose.

Un'attenzione particolare sarà assegnata alla ricerca, al coinvolgimento di giovani ricercatori, europei e africani, e ai partenariati scientifici.

Lo abbiamo fatto in Mozambico proprio in questo 2019: nei terribili giorni del ciclone Idai e nel periodo successivo abbiamo da un lato risposto all'emergenza, dall'altro continuato a garantire l'assistenza e le cure sanitarie di cui la popolazione giorno dopo giorno ha bisogno. **Due esperienze, in particolare, quella delle reti comunitarie e quella dei neonati dell'ospedale di Beira**, sono state oggetto di studio e analisi in collaborazione con il Chelsea and Westminster Hospital NHS Foundation Trust in UK e l'Università di Padova. I risultati saranno pubblicati a breve su Lancet e Jama Pediatrics come contributo all'identificazione dei fattori di rischio e delle possibili risposte da considerare per rendere comunità e sistemi sanitari più resilienti agli eventi metereologici estremi. helping to identify risk factors and potential solutions to help communities and health systems become more resilient in the face of extreme weather events.

In 2020 we will also focus on **strengthening epidemiological surveillance systems for vector-borne infectious diseases** such as **malaria** that are impacted by climate change. One example is CUAMM's collaborative project in Ethiopia with the health authorities in the West Shoa Zone, which will draw on the Bruno Kessler Foundation's expertise in computational epidemiology and predictive

modelling – know-how already put to use with great success during the Ebola outbreak. Another malaria-focused research project will be carried out in South Sudan in cooperation with the University of Pisa.

Emergency health systems will be a further area of

research. In Sierra Leone, an innovative national emergency management system (NEMS) involving 80 ambulances and launched over a year ago will provide invaluable data and appraisals vis-à-vis the functioning of the pre-hospitalization network. Here we will be supported by the Eastern Piedmont University's Research Center in Emergency and Disaster Medicine (CRIMEDIM) in Novara. Yet another research focus in 2020 will be the **management of critically ill patients in low-resource settings.** Here, too, CUAMM will take advantage of the expertise of scientific partners including the Academic Medical Center and the University of Amsterdam. Ever mindful of how indifference and inaction intensify not only climate emergency-related problems, but also injustice and inequities, CUAMM counts these among our primary objectives for the coming year. Sempre in ambito di ricerca ed emergenze, il 2020 avrà un focus particolare sul **rafforzamento dei sistemi di sorveglianza epidemiologica per patologie infettive da vettori, come la malaria**, molto sensibili ai cambiamenti climatici. È il caso della collaborazione in Etiopia tra le autorità sanitarie della regione del West Shoa e il CUAMM che si avvarrà delle competenze in materia di epidemiologia computazionale e modelli predittivi della Fondazione Bruno Kessler, già positivamente sperimentate nell'epidemia di Ebola mentre un altro progetto di ricerca, sempre sulla malaria, sarà realizzato in Sud Sudan stavolta con l'Università di Pisa.

Un'altra area di studio e ricerca sarà guella del sistema sanitario di emergenza. In Sierra Leone, l'avvio da oltre un anno di un innovativo sistema nazionale di emergenza medica (NEMS) basato sull'utilizzo di 80 ambulanze fornirà evidenze e valutazioni preziose sul funzionamento della rete di preospedalizzazione. In questo studio ci aiuterà il consorzio CRIMEDIM dell'Università Piemonte Orientale di Novara. Altro aspetto che si affronterà con la ricerca sarà la gestione del malato critico in contesti di risorse limitate. Anche in questo caso ci si avvarrà di partner scientifici tra cui l'Academic Medical Center and University of Amsterdam. Questo è quello che ci proponiamo di fare consapevoli che l'inazione e l'incoscienza non soltanto determinano un peggioramento dei problemi che sono legati alle emergenze climatiche ma ne accrescono anche le ingiustizie e le disuguaglianze.

don Dante Carraro Director, Doctors with Africa CUAMM

Giovanni Putoto Head of planning and operational research, Doctors with Africa CUAMM don Dante Carraro Direttore Medici con l'Africa Cuamm

Giovanni Putoto Responsabile della programmazione e della ricerca operativa, Medici con l'Africa Cuamm

OUR SCIENTIFIC OUTPUT IN 2019 AND WHAT LIES AHEAD IN 2020

As we at CUAMM review our **operational research in 2019** – some **31 publications in international medical journals** including *The Lancet* and *The British Medical Journal (BMJ)* – we are heartened to note the continuing upward trend in terms of our organization's scientific output. This uptick has been steady, in fact, ever since we set up a dedicated research division in 2015. CUAMM also produced **16 other scientific contributions** this year, including **oral speeches and poster presentations** at medical conferences in Italy, Africa and elsewhere around the world.

These numbers not only confirm the trend of the past few years; they also underscore CUAMM's ongoing resolve to **make research an integral part of our work on the ground**. Firm in our belief that the most vulnerable countries need not just health coverage but also services of *quality*, in fact, we have begun to include a research component in more and more of our operational projects in Africa. Indeed, as Cavallin et al demonstrate in their article here – "Changes in maternal and neonatal care after a quality improvement intervention in a sub-Saharan setting", a qualitative study to measure the impact of our work in Tanzania prior to and after the Mothers and Children First program – analysis, assessment and implementation can play a role in generating better quality healthcare.

But there are also other types of research here including **case reports** analyzing specific interventions in fragile African settings and **editorials** such as the one published by Marotta et al in *BMJ Opinion* to denounce the exploitation of migrant agricultural workers in the Apulia region's "ghetti". Or the piece by Putoto et al – *Preserving Maternal and Child Health Care in Sierra Leone During the Time of Ebola: The Experiences of Doctors with Africa* – published by Springer in *Pregnant in Time of Ebola,* a **multiauthored volume** where public health specialists and researchers together delve into the problems and potential solutions found during past outbreaks of the virus, with important implications for the future.

2019 also saw CUAMM's launch of an **annual residential training course** held at our Padua-based offices: four days spent learning about **operational research in limitedresource settings**, with different experts offering an in-depth look at what it means to conduct analysis and assessment in fragile countries, reflecting on the role that this sort of research can play, and providing **essential knowhow and tools** for conducting what is known as **"frugal research"**. An unexpectedly high number of participants – 60, most of them young people – took part in the course, further confirmation that partnerships between universities and organizations active on the ground are a vital way to integrate expertise into training opportunities.

2020 promises to be a year of further growth, one in which CUAMM will intensify its efforts to bring together research and project implementation and **increasingly engage our community of health workers with our international research center and university partners.** We will also

RISULTATI DEL 2019, SGUARDI SUL 2020

Se guardiamo alla **ricerca operativa di Cuamm nel 2019** non possiamo che scorgere un ulteriore balzo in avanti rispetto agli anni precedenti: **31 ricerche pubblicate su riviste scientifiche internazionali** come Lancet o BMJ – British Medical Journal, che confermano una crescita costante dal 2015 a oggi, da quando cioè all'interno dell'organizzazione si è costituita e andata sistematizzando un'unità di lavoro dedicata alla ricerca. A queste si aggiungono poi i **16 contributi, come oral speech o poster presentation** durante congressi scientifici in Italia, in Africa e internazionali.

È un risultato che conferma il trend degli anni precedenti e soprattutto è indicatore delle scelte sempre più consistenti da parte di Cuamm di "leggere" e **concepire la ricerca come parte integrante del lavoro sul campo**: sempre di più sono i progetti operativi in Africa nei quali è integrata una componente di studio, nella ferma convinzione che nei paesi fragili c'è bisogno non solo di copertura sanitaria ma anche di qualità dei servizi offerti. E la qualità passa dal lavoro di analisi, valutazione, implementazione. Ne è un esempio l'articolo di Cavallin "Changes in maternal and neonatal care after a quality improvement intervention in a sub-Saharan setting" una ricerca di tipo qualitativo che ha misurato l'intervento in Tanzania prima e dopo il programma Cuamm Prima le mamme e i bambini.

Non mancano d'altro canto anche esempi di ricerche di tipo diverso: **case reports** che analizzano casi specifici di intervento nel contesto fragile africano, **editoriali** come quello di Marotta pubblicato su BMJ Opinion che denuncia la situazione dei migranti nei ghetti pugliesi, o ancora il contributo a firma di Putoto Preserving Maternal and Child Health Care in Sierra Leone During the Time of Ebola: The Experiences of Doctors with Africa sul tema del mantenimento dei servizi sanitari in Sierra Leone ai tempi di Ebola, pubblicato da Springer nel **volume collettivo** Pregnant in time of Ebola. Un modo, se vogliamo, di fare rete tra professionisti e studiosi per leggere l'epidemia di Ebola e le soluzioni adottate affinchè ne resti traccia per eventuali futuri casi analoghi.

Nel 2019 inoltre si è deciso di avviare un **nuovo corso di formazione residenziale** nella sede Cuamm di Padova, che avrà d'ora in poi cadenza annuale: quattro giornate interamente dedicate alla **ricerca operativa nei paesi a risorse limitate**, nel corso delle quali si sono alternate voci differenti per approfondire cosa significhi fare analisi e valutazione in paesi fragili, riflettere sull'impatto che questo tipo di ricerca può avere, fornire strumenti e conoscenze di base per la cosiddetta ricerca frugale. 60 sono stati i partecipanti, largamente al di sopra delle aspettative, la maggioranza dei quali giovani e giovanissimi, a conferma ulteriore del valore della collaborazione tra organizzazioni attive sul campo ed atenei per integrare le competenze e le proposte formative.

Il 2020 si prospetta dunque come anno di ulteriore crescita, in cui con ancora maggiore forza desideriamo fare convergere la dimensione della ricerca con quella di work to disseminate our research findings more widely, moving beyond the scientific and institutional community to include the broader interested public as well. 2020, in fact, will see the launch of a **quarterly bulletin** aimed at a more general audience and focused on **CUAMM's ongoing implementation research in Africa**.

Finally, the year 2020 will also be a symbolic date for **CUAMM: the 70th anniversary** of our founding, which we plan to celebrate by investing even further in the values we have held dear from the start, including the centrality of research. It was way back in 1938, in fact, when CUAMM was still but an idea in the visionary mind of Francesco Canova, its founder, that he wrote the following to Giovanni Battista Montini: *«Medical staff able to match a deep sense of compassion with a sustained commitment to research* can *provide invaluable support [to needy communities]»*. It is that same spirit that continues to inspire us today. implementazione, **coinvolgendo sempre di più la comunità dei nostri cooperanti accanto alle università e centri di ricerca internazionali** con cui collaboriamo. Faremo un passo ulteriore nella disseminazione della nostra ricerca, finora concentrata soprattutto sulla comunità scientifica e istituzionale: prenderà avvio infatti nel 2020 un'iniziativa di comunicazione rivolta a chi è interessato ai nostri temi, un bollettino quadrimestrale di aggiornamento sulla implementation research in Africa.

Sarà un anno anche dal valore simbolico il 2020, perché il **Cuamm compie 70 anni** e desidera festeggiarli investendo ancora di più nei valori in cui da sempre crede. E di sicuro la ricerca è uno di questi. D'altronde, era il 1938 e il Cuamm ancora era soltanto un'idea nella mente visionaria di chi poi lo avrebbe fondato, quando Francesco Canova scriveva a Giovanni Battista Montini: «il personale medico darà un aiuto insostituibile se saprà unire ad uno spirito di profonda pietà una volontà decisa ad affermarsi attraverso lo **studio** e la **ricerca** costante». Questo è lo spirito con cui desideriamo continuare.

Doctors with Africa CUAMM Medici con l'Africa Cuamm



Doctors with Africa CUAMM is the largest Italian NGO working to **improve the health of vulnerable communities in Sub-Saharan Africa**. CUAMM carries out **long-term projects in 8 countries** in the region and partners with **universities and research centers** in Italy and abroad to raise awareness about people's right to health care. CUAMM also organizes **courses on global health** for medical students and health professionals and conducts **research** with international partners, convinced that such endeavors are vital to developing **quality international healthcare programs**.

Medici con l'Africa Cuamm è la più grande organizzazione italiana per la **promozione e la tutela della salute delle popolazioni africane**. Medici con l'Africa Cuamm realizza **progetti a lungo termine in 8 paesi** dell'Africa Sub-sahariana e collabora con **università e centri di ricerca in Italia e in Europa**. Organizza inoltre **corsi di Salute Globale** per studenti di Medicina e professionisti sanitari e lavora con partner internazionali a **progetti di ricerca**, nella convinzione che questi sforzi siano necessari per lo sviluppo di **programmi sanitari internazionali di qualità**. Doctors with Africa CUAMM currently operates in Angola, Central African Republic, Ethiopia, Mozambique, Sierra Leone, South Sudan, Tanzania and Uganda. / Medici con l'Africa Cuamm attualmente lavora in Angola, Etiopia, Mozambico, Repubblica Centrafricana, Sierra Leone, Sud Sudan, Tanzania e Uganda attraverso:

23

hospitals / ospedali

80

districts (for public health activities, mother-child care, the fight against HIV/AIDS, tuberculosis and malaria, training) / distretti (iniziative per la salute pubblica, assistenza e cure per la salute materna e infantile, lotta contro l'HIV/AID, la tubercolosi e la malaria)

3

nursing schools / scuole per infermieri e ostetriche

1

university (Mozambique) / università (Mozambico)

2,915

staff members, including / collaboratori sanitari, che includono:

444 African professionals / professionisti africani

331 European professionals / professionisti europei

Operational research in 2019 Ricerca operativa nel 2019

5 main thematic areas, **31 published studies**, **11 posters** and **5 oral presentations** shared at conferences in Italy and abroad. Operational field research carried out with over 30 Italian, African and other international partners to **improve the quality of our interventions** on the ground and help **develop effective health policies** even in countries with limited resources.

5 aree tematiche principali, **31 ricerche pubblicate**, **11 poster** e **5 presentazioni orali** a congressi nazionali e internazionali. Una ricerca operativa sul campo con oltre 30 partner italiani, africani e internazionali per **migliorare Ia qualità degli interventi** di cooperazione e **sviluppare politiche sanitarie efficaci** anche nei paesi a risorse limitate. Maternal and child health Salute materna e infantile



Infectious and tropical diseases Malattie infettive e tropicali



Universal coverage and equity Copertura sanitaria universale ed equità



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241	10 D Multi-Countries Pizzol D., Diabetes Mellitus in Elderly in <i>Encyclopedia of Biomedical Gerentology</i>





Preserving Maternal and Child Health Care in Sierra Leone During the Time of Ebola: The Experiences of Doctors with Africa

PAPER

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Preserving Maternal and Child Health Care in Sierra Leone During the Time of Ebola: The Experiences of Doctors with Africa

Giovanni Putoto, Francesco Di Gennaro, Alessandro Bertoldo, GianLuca Quaglio, and Damiano Pizzol

25.1 Introduction

The recent outbreak of Ebola virus disease (EVD) in West Africa resulted in very high rates of infection and deaths both among patients and health care workers. The direct effects of EVD in Sierra Leone include over 14,122 infected persons, resulting in 3955 deaths, among them 221 were health care workers (World Health Organization 2015). Prior to the outbreak and following over 10 years of civil war, the high level of poverty, demolished infrastructure and extremely weak state of the health care system in Sierra Leone were striking. For example, the density of physicians per 1000 population was 0.022 (in comparison Belgium has 2.9 doctors per 1000 population) (World Health Organization 2017). Sierra Leone was also among the poorest countries in the world, ranking 183 out of 187 countries on the United Nations Development Programme (UNDP) Human Development Report. The Ebola crisis exacerbated problems that had persisted for decades in the affected area.

One of the major consequences of the Ebola outbreak has been its impact on maternal health, since the priority was to stop disease transmission and to prevent Ebola spread. During delivery or miscarriage, health workers are exposed to serious risks, and many times, pregnant women were denied hospital car and turned away, thereby convincing other pregnant women to avoid prenatal visits and assisted delivery (Hayden 2015). Sierra Leone's neonatal mortality rate of 35 per 1000 live births was one of the highest in the world in 2015 (UNICEF 2015a), and the lifetime risk of maternal death is one of the world's highest at 1 in 21 (UNICEF 2015b). In addition, 7% of Sierra Leonean are underweight and only 54% are put to the breast within 1 hour of birth (Statistics Sierra Leone 2014). Maternal and neonatal health in Sierra

G. Putoto (⊠) · D. Pizzol Doctors with Africa CUAMM, Padova, Italy e-mail: g.putoto@cuamm.org

F. Di Gennaro Clinic of Infectious Diseases, University of Bari, Bari, Italy

A. Bertoldo Zerouno Procreazione, Centro di Medicina, Venezia Mestre (VE), Italy

G. Quaglio

Directorate-General for Parliamentary Research Services, European Parliament, Brussels, Belgium

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g.putoto@cuamm.org



Changes in maternal and neonatal care after a quality improvement intervention in a sub-Saharan setting

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Changes in maternal and neonatal care after a quality improvement intervention in a sub-Saharan setting

Francesco Cavallin, Donald Maziku, Rosalia Mkolomi, Gaetano Azzimonti, Fabio Manenti, Giovanni Putoto & Daniele Trevisanuto

Changes in maternal and neonatal care after a quality improvement intervention in a sub-Saharan setting

Francesco Cavallin^a, Donald Maziku^b, Rosalia Mkolomi^b, Gaetano Azzimonti^c, Fabio Manenti^d, Giovanni Putoto^d and Daniele Trevisanuto^e

^aIndependent Statistician, Solagna, Italy; ^bDepartment of Pediatrics, Tosamaganga Council Designated Hospital, Iringa, Tanzania; ^cDoctors with Africa CUAMM, Tosamaganga Council Designated Hospital, Iringa, Tanzania; ^dDepartment of Pediatrics, Doctors with Africa CUAMM, Padova, Italy; ^eDepartment of Woman's and Child's Health, University of Padova, Padova, Italy

ABSTRACT

Aim: Quality improvement approaches have been integrated into routine health care in highresource settings, but not in low-resource settings. We aimed to report the achievements in maternal and neonatal care after a quality improvement intervention in a sub-Saharan setting. **Methods:** After a first quality assessment in 2012 at Tosamaganga hospital in Tanzania, main areas of intervention were identified and a quality improvement program was implemented. In 2016, a second quality assessment was conducted by the same assessment team by using the World Health Organization's maternal and neonatal quality of hospital care assessment tool. Some hospital indicators were also collected during the same period.

Results: Access to hospital care, maternity ward and management of maternal complications improved from inadequate to substandard care, alongside with an increment of deliveries from 2145 to 2838 and a substantially stable rate of complicated deliveries (21–26%). The improvements in the maternity ward, maternal complications and emergency care coupled with the reduction of direct obstetric case fatality rate obstetric mortality that dropped from 2.9 to 0.27%. Some neonatal areas (neonatal ward, routine neonatal care, sick newborn care, monitoring, and follow-up) improved from poor to substandard care, while others (infection control and supportive care, emergency care, guidelines protocols, and audit) showed only limited improvements. These changes coupled with a decrease in the perinatal mortality rate from 5.8 to 2.9%. **Conclusion:** The quality improvement program resulted in substantial progress in most aspects of quality care, which coupled with a decrease in obstetric and perinatal mortality. Nevertheless, the overall quality of care remained substandard with the limited effect of the intervention on some areas, which require further efforts in order to achieve an acceptable level of care.

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CASE REPORT

Giant ovarian fibroma with associated Meigs syndrome in low resources setting

Mario Antunes¹, Damiano Pizzol^{2,*}, Mattia Zambon³, and Anna Claudia Colangelo^{2,3}

¹Department of Surgery, Central Hospital of Beira, Beira, Mozambique, ²Operational Research Unit, Doctors with Africa Cuamm, Mozambique, and ³Department of Surgery and Organ Transplantation, University of Padua, Padua, Italy

*Correspondence address. Operational Research Unit, Doctors with Africa CUAMM, Rua Fernao Mendes Pinto 165, Ponta Gea 1363 Beira. Tel: (+39) 3668731237; E-mail: d.pizzol@cuamm.org

Abstract

Meigs' syndrome is a rare condition characterized by the presence of a benign fibroma of the ovary, ascites and pleural effusion. It very uncommon and diagnosis is made difficult by symptoms that usually mimic disseminated malignancy. The gold standard treatment is laparotomy and, by definition of the syndrome, after tumor removal, the symptoms resolves and the patients become asymptomatic. We presented a giant ovarian fibroma with associated Meigs syndrome, successfully managed in a low resources setting.

INTRODUCTION

Meigs' syndrome is a rare condition defined by the presence of a benign fibroma (or a fibroma-like tumor) of the ovary, ascites and pleural effusion [1]. If just ascites or pleural effusion is present, it is defined as incomplete or pseudo Meigs' syndrome [1]. The peculiar characteristic is the reabsorption of the excess fluid after the surgical resection [2]. It is very uncommon before the third decade and the incidence progressively increases with age with a peak in the seventh decade with a prevalence of about 1% of ovarian tumors [3]. Our knowledge on Meigs' Syndrome comes mainly from case reports and according to Krenke et al. is it possible to identify five patterns of the disease: Classic Meig's syndrome, nonclassic and demons-Meig's syndrome, pseudo Meigs' syndrome, Pseudo-Pseudo Meigs' syndrome, Atypical or incomplete Meigs' syndrome [4]. All the patterns are characterized by ascites, pleural effusions and the resolution of both ascites and hydrothorax after tumor removal. Each pattern, well described by Krenke and colleagues, has a

specific type of tumor that allows the differentiation from the other ones [5]. In particular, patients without a known prior diagnosis of systemic lupus erythematosus often present the combination of mild to moderate ascites, pleural effusion and elevated serum carbohydrate antigen 125 concentration; the onset is gradual and painless [5, 6].

We presented a giant ovarian fibroma with associated Meigs syndrome, successfully managed in a low resources setting.

CASE PRESENTATION, MANAGEMENT AND OUTCOME

A 41-year-old woman presented in Beira Central Hospital, Mozambique, with a giant abdominal mass, evolved over about four years (Fig. 1A and B). The patient presented with pain and abdominal distension, feeling of weight, discomfort and slight weight loss. She reported four pregnancies including three regular and one stillborn. She was HIV positive, on ART with tenofivir/lamivudine/efavirenz from four years. Four years before, at the beginning of the disease, she underwent an

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Figure 1: Giant incomplete Meigs' syndrome at presentation (A and B) and the excised mass (C and D).

explorative laparotomy. In that occasion, colleagues decided to not remove the mass and just a bioptic specimen was collected and the histological diagnosis was suggestive for an ovarian cyst. One year before other colleagues decided to perform a second biopsy and it was suggestive for calcific fibroma. Finally, we decide to remove the whole mass. Her general condition was good, and she had normal vital parameters. Hepatic and renal functions were normal and blood test showed Hb 9g/dl Ht 33.4% PLT 405 \times 10 3 CD4 233 cell/ul. We performed a transversal supra-umbilical laparotomy removing an abdominal mass of about 10 kg $(27 \times 30 \times 20 \text{ cm})$ (Fig. 1C and D) and 10 liters of free fluid liquid like ascites. The abdominal mass originated from the ovary and was strictly adherent to the bowel thus necessitating to perform bilateral hysteroadnexiectomy and enbloc resection of more or less 60 cm of bowel, including ileocecal valve, with termino-terminal ileotransverse anastomosis. During surgery, there was an important blood loss that required three unit of blood and three unit of plasma due to anemia with hemoglobin of 3.5 g/dl. During post-operative course, it was also necessary to transfuse other three unit of blood and fluid infusion. Histological diagnosis was ovarian fibroma and leiomyoma uteri. During the post-surgical course, we administrated antibiotics and analgesic treatment. She was discharged in 15 days and after 2 years post-surgery the patient is alive, apparently with no sequela.

DISCUSSION

Meigs' syndrome pathophysiology, both in terms of ascites and hydrothorax formation, is still unknown and among several theories, two received major consensus. One suggests that the

filtration of interstitial liquid into the peritoneum through the ovarian tumor capsule with an imbalance between the blood supply to a large tumor leading to edema and transudation [4]. Thus, liquid moves from peritoneum to pleural cavity both through diaphragmatic defects or lymphatic channels causing pleural effusion [3, 7]. The other suggests a fluid accumulation caused by proteins such as vascular endothelial growth factor raising capillary permeability [8]. The most common presenting symptoms are dyspnea (due to pleural effusion), fatigue and weight loss and most of the patients initially referred to the general practitioner or chest physicians [5, 9]. However, considering that the ovarian pathology is the benign disease, symptoms usually strongly mimic disseminated malignancy. The treatment of choice of Meigs' Syndrome is exploratory laparotomy and, by definition of the syndrome, after tumor removal, the symptoms resolve and the patients become asymptomatic [1, 10]. Paracentesis and thoracentesis are a possible treatment for ascites and pleural effusion [3]. Life expectancy of patients after surgical removal of the tumor is the same as the general population [3]

Usually, in low- and middle-income countries extreme presentations of late-stage diseases occur due to the weaknesses of healthcare systems and also due to cultural and economic reasons. Besides the belated presentation of the patient, a big issue was to perform a correct diagnosis. In fact, the two main diagnostic tools, computed tomography, and oncological markers are not available at our hospital. Moreover, X-ray was not performed and we are not able to confirm if it was an ovarian fibroma with associated complete or incomplete Meigs' syndrome. Again, due to the lack of specialized health workers and equipment, in this case, the lady underwent two surgical



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biopsies before the radical intervention. However, despite the low-resource setting and the extreme disease condition, a surgical procedure was performed successfully. The second crucial issue is related to follow-up that should be regular especially for oncologic patients. However, due to the difficult access to the hospital, the important role of traditional healers and the lack of health education, it is rare to follow-up patients. In our case, we know that the patient is still alive after about two years because we meet her out of work, but we don't know if she has some recurrence of ascites or abdominal mass.

Our case reports a very rare syndrome case and highlights the weakness of the health system of low-income countries. It is mandatory to strengthen the health system, both in terms of healthcare and prevention.

CONFLICT OF INTEREST STATEMENT

The authors have not conflict of interest to declare for this work. $% \left({{{\bf{n}}_{{\rm{s}}}}} \right)$

COMPLIANCE WITH ETHICAL STANDARDS

Written informed consent was obtained from the patients for publication of this case report and any accompanying images.

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Cervical cancer in Tosamaganga Hospital, Tanzania: difficulties and challenges in a low resource country setting

PAPER

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Focus country Tanzania



Corners of the World

Cervical cancer in Tosamaganga Hospital, Tanzania: difficulties and challenges in a low resource country setting

Edoardo Cola, Roma, Italy; Donald Maziku, Tosamaganga, United Republic of Tanzania; Giovanni F Torelli, Tosamaganga, United Republic of Tanzania and Anna Fagotti, Rome, Italy

Cervical cancer is the second most common cancer among women and nearly 90% of deaths fr cervical cancer occur among women living in low and middle income countries.¹² The primary cause of such high disease prevalence is the increasing incidence of high-risk human papillomavirus and HIV infection. In Eastern Africa, Watson-Jones et al reported a 74% frequency of human papillomavirus among 142 sexually active healthy young African females in Tanzania.3

Our setting is the Tosamaganga District Designated Hospital (figure 1) situated in the District of Iringa DC, region of Iringa, Tanzania. It is a rural area 500 km southwest of Dar es Salaam, which has undergone fast socio-economical changes in the last years. Nevertheless, health indicators are still alarming. The incidence of HIV is approximately 13%.

We see an average of 80 patients with cervical cancer per year in our small hospital. Secondary prevention (Pap smear, colposcopy) is not routinely undertaken for women, even though we offer free screening in our hospital. The primary reason for this is the lack of awareness across the region. As a result, patients are often diagnosed with locally advanced cervical cancer at the time of initial presentation, and access to appropriate treatment is very limited. Currently, chemotherapy and radiotherapy are available only in the cities of Dodoma and Dar es Salaam. Traveling to Dar es Salaam takes approximately 10 hours by bus from Tosamaganga, and the cost required for women is prohibitive. The government has started a program for primary prevention of cervical cancer in secondary school, vaccinating girls up to 16 years of age for human papillomavirus since 2017, and results are expected for 2025.



Figure 1 The main entrance of Tosamaganga Hospital.

Doctors with Africa CUAMM (Collegio Universitario Aspiranti Medici Missionari. University College for Missionary Doctors) have supported Tosamaganga District Designated Hospital for more than 30 years. It is a non-government organization founded in 1950, working for the promotion and protection of health in Africa. The chances of receiving surgical treatment for cervical cancer in Tosamaganga are limited by several factors. The majority of patients come to the hospital with locally advanced disease, and surgery is not the indicated treatment. Even in the setting when radical treatment is appropriate, it is not performed because of inadequate anesthesia and surgery (figure 2). Typically, if a patient requires anesthesia for more than 2 hours 30 min then it is not considered safe. Given the fact that radical hysterectomies are not performed secondary to lack of expertise in performing such procedures, as an alternative, nurses and other related healthcare personnel perform only cryosurgery in patients with early-stage cervical cancer.

In conclusion, primary and secondary prevention must be implemented by an effective information campaign aimed at reducing cervical cancer in Africa. However, those women affected by early-stage and locally advanced cervical cancer should have access to safe surgery and/or radiotherapy. An exchange of skills with specialized surgeons and anesthesiologists would help us to provide an opportunity to treat these patients.

Currently CUAMM is implementing a program of primary prevention by supporting an educational campaign on the issue, and secondary prevention by introducing colposcopy and free screening. The next step would be to develop exchange programs for the local staff of rural hospitals



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Figure 2 Dr Cola and Dr Maziku performing a simple hysterectomy in the main operating theater at Tosamaganga Hospital.

in order to guarantee safe and appropriate surgery.

Correspondence to Dr Edoardo Cola, Department of Obstretics and Gynecology, Universita Cattolica del Sacro Cuore, Rome 00168, Italy; dodocola89@gmail. com **Collaborators** Torelli GF, MD, PhD, Maziku D, MD: Doctors with Africa CUAMM, Tosamaganga Hospital, Iringa, Tanzania.

Contributors This paper aims to underline the difficulties in treating cervical cancer in low resource countries.

Corners of the World

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Vescicovaginal fistula management in lowincome setting: a complicated case report

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Focus country Mozambique





Journal of Surgical Case Reports, 2019;00, 1–3

³⁰ Abstract

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Obstetric vescicovaginal (VVF) fistulas, most of all as consequences of prolonged neglected obstructed labor, occurs mainly in low-income countries. Considering the limited resources, both of trained specialists and equipments, fistulas have a devastating impact on affected women and their families from physical, social and economic point of view. However, also in low-income settings, fistulas prevalence and consequences could be reduced with focused interventions addressed to preg-

nant women during antenatal visits and to surgeons which face of these particular diseases. We report a case of obstetric VVF, related to a prolonged labor, treated by surgery and managed with satisfying results in a low-income setting.

INTRODUCTION

Genitourinary fistulas are abnormal communications extending between the urinary and the genital tract and can be acquired or congenital, with involuntary escape of urine into the vagina.

- 45 There are many types of fistulas: vesicovaginal (VVF), vesicourethrovaginal, vesicouterine, vesicocervical, urethrovaginal, ure terovaginal, ureterouterine, and ureterocervical [1]. VVF is the most common type and, in low-income setting, it mainly results from neglected prolonged obstructed labor, which is
- associated with tissue ischemia, due to prolonged compression of the bladder and vagina by the fetus presenting part against the bony pelvis [2]. It affects more than 2 million women worldwide, with at least 50,000–100,000 new cases occurring annually
 [3].
- The main symptom is the uncontrolled passage of urine through the vagina, purulent, foul-smelling vaginal discharge, dyspareunia, perineal pain, vaginal irritation and recurrent

genitourinary tract infections. The most common management of VVF is to perform a 'delayed' surgical closure following a period of prolonged catheter drainage, a process, which allows necrotic and inflammatory material to slough and for local inflammatory responses to subside. Using this approach, a small proportion of fistula may close spontaneously as a result of catheter drainage alone, while those that do not heal can be treated surgically [4].

Obstetric fistulas have a devastating impact on affected women and their families from physical, social and economicpoint of view [5]. We report a case of obstetric VVF, related to a prolonged labor, treated by surgery and managed with satisfying results in a low-income setting.

CASE REPORT

A 26-year-old black woman was admitted to the Maputo Central Hospital with a VVF with anal sphincter rupture, 120

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60 Received: April 16, 2019. Accepted: June 4, 2019

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perineal laceration and necrosis of inferior 1/3 of the bladder and cervix. Before arriving to medical attention, she underwent to 13 hours of obstructed labor resulting with an 11 months dead male fetus weighing 4600 g in a district hospital ended with cesarean section.

She underwent a necrectomy 1/3 inferior wall of the bladder and a lateral colostomy of the descending colon. After 4 weeks she was discharged with a stoma bag. After 2 weeks, she was admitted to Maputo Central Hospital to perform a complex

- 10 reconstruction of bladder, vagina and anal sphincter. At the same time, we decided to close the colostomy. A hysterectomy of the remaining uterus after the necrectomy was done as the remaining uttering tissue was insufficient for uterine implantation. A sigmoid neobladder was created by removing a
- 15 30–35 cm sigmoid segment which was detubularized along the antimesenteric border. Then it was sutured to form a cylinder and after closure of the posterior and anterior walls the reservoir was rotated upside-down and 180° horizontally. A seromuscular window was cut and the mucosa was everted to
- 20 create a neobladder neck. Then ureters are pulled through the sigmoid mesentery and anastomosis of ureter to the reservoir was performed creating a submucosal tunnel. Finally the upper wall of the reservoir was closed and anastomosis of the neobladder to the urethra was performed. Second step of the surgi-
- 25 cal procedure was the reconstruction of neovagina using descending colon with the closure of the posterior wall as there was no cervix or uterine connection. A segment of 10 cm long descending colon was transected preserving vascularization. The segment was rotated into the antiperistaltic position to
- 30 reach the vaginal introitus. The proximal end of colon was pulled through the vaginal introitus and a prolapse of colon protruding more or less 3 cm out of the introitus was created and sutures were placed between the colonic wall and introitus. Third step of the procedure was an overlapping anal
- 35 sphincteroplasty in order to reconstruct sphincter and perineal laceration. We mobilized the anoderm from the underlying sphincter mechanism and scar area. The sphincter was then isolated from its bed paying attention to preserve the branches of pudendal nerve. The sphincter mechanism was sectioned
- 40 transversely through the middle of the scar and overlapped to snug up the anal aperture. Mattress sutures were carefully placed to maintain the desired opening size and the anoderm was carefully sutured over the sphincter with interrupted sutures. Finally the reconstruction of the colon continuity with
- 45 a colon-rectal end to end manual anastomosis was performed In Fig. 1 are reported four steps of the complicated surgery. She was discharged after 21 days. On the fifth month, the patient developed an intermittent overflow incontinence with neobladder capacity of up to 1100 ml. Auto catheterization was
- 50 opted for and is now being used by the woman to void her bladder from time to time with high fluid consumption to avoid bladder stones due to stasis. This has been so far the only complication.

55 DISCUSSION

The successful management of VVF depends most of all from the fistula characteristics and from early presentation and management. We presented a particular and extreme case of

60 VVF as a result of the absence of antenatal visits and the consequent presentation of a pathological fetus, and the weakness of local health system that impeded an adequate and properly management. Nevertheless, during the intervention and the follow-up, no complication occurred, except a pressure



Figure 1: (A) VVF with perineal body (almost inexistent) laceration; (B) Perineal body excision; (C) Rectal exam on anal sphincter; (D) Closed VVF, restructured anal sphincter and perineal body.

90 incontinence of the new bladder. This represents the only limitation of the intervention, persisting to date after almost 2 years of follow-up. The patient voiding is therefore through auto-catheterization. The retention seems to be caused by either, a highly placed pubo-vaginal sling, a stenotic urethra or 95 a neurogenic bladder. The patient during retention experiences pain in both flanks and auto-catheterization helps reduce the pain. This gives the clinical suspect of hydronephrosis diagnosis. To correct this phenomenon, the patient would have to be re-operated. With auto-catheterization, the patient feels in con-100 trol and voids at her own convenience. The patient is psychologically traumatized against any more surgical interventions since the first surgery in the district hospital went wrong, losing her baby, urine and incontinent to feces. This case highlighted some crucial and dramatic health aspects: absence of 105 adequate prenatal visits, weakness of health care network, long distances to health facilities, transportation and connection limitation alongside extremely poor road conditions, low health worker capacity, especially in rural context due to poor training and lack of motivation in fistula operations. Thus, on one side 110 it is mandatory to fight many socio-cultural aspects as stigma, myths, superstitions and traditional healers that turn away patients from conventional medicine. On the other side, it is urgent to strengthen the health system in terms both of health care and prevention particularly, considering the high preva-115 lence of obstetric fistulas should be necessary to develop ad hoc and high-quality services able to face of these diseases in order to render women a good quality of life. In conclusion, community reintegration of fistula patients is of paramount importance in a way of curbing devastating stigma and pre-120 venting recurrence of the same. Moreover, motivating and frequent retraining rural health staff should be taken into consideration in prevention of obstetric fistula in high prevalence locations incidences.

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CONFLICT OF INTEREST STATEMENT

None declared

Vescicovaginal fistula in low-income setting | 3

ETHICS STATEMENT

Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

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20	85
25	90
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35	100
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Neonatal resuscitation using a supraglottic airway device for improved mortality and morbidity outcomes in a low-income country: study protocol for a randomized trial

PAPER

Authors

Pejovic N.J., Höök S.M., Byamugisha J., Alfvén T., Lubulwa C., Cavallin F., Nankunda J., Ersdal H., Segafredo G., Blennow M., Trevisanuto D., Tylleskär T.

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STUDY PROTOCOL

Trials

Open Access

Neonatal resuscitation using a supraglottic airway device for improved mortality and morbidity outcomes in a low-income country: study protocol for a randomized trial

Nicolas J. Pejovic^{1,2,3*}, Susanna Myrnerts Höök^{1,2,3}, Josaphat Byamugisha^{4,5}, Tobias Alfvén^{2,3}, Clare Lubulwa⁴, Francesco Cavallin⁶, Jolly Nankunda^{4,7}, Hege Ersdal^{8,9}, Giulia Segafredo¹⁰, Mats Blennow^{11,12}, Daniele Trevisanuto¹³ and Thorkild Tylleskär^{1,14}

Abstract

Background: Intrapartum-related death is the third leading cause of under-5 mortality. Effective ventilation during neonatal resuscitation has the potential to reduce 40% of these deaths. Face-mask ventilation performed by midwives is globally the most common method of resuscitating neonates. It requires considerable operator skills and continuous training because of its complexity. The i-gel[®] is a cuffless supraglottic airway which is easy to insert and provides an efficient seal that prevents air leakage; it has the potential to enhance performance in neonatal resuscitation. A pilot study in Uganda demonstrated that midwives could safely resuscitate newborns with the i-gel[®] after a short training session. The aim of the present trial is to investigate whether the use of a cuffless supraglottic airway device compared with face-mask ventilation during neonatal resuscitation can reduce mortality and morbidity in asphyxiated neonates.

Methods: A randomized phase III open-label superiority controlled clinical trial will be conducted at Mulago Hospital, Kampala, Uganda, in asphyxiated neonates in the delivery units. Prior to the intervention, health staff performing resuscitation will receive training in accordance with the Helping Babies Breathe curriculum with a special module for training on supraglottic airway insertion. A total of 1150 to 1240 babies (depending on cluster size) that need positive pressure ventilation and that have an expected gestational age of more than 34 weeks and an expected birth weight of more than 2000 g will be ventilated by daily unmasked randomization with a supraglottic airway device (i-gel[®]) (intervention group) or with a face mask (control group). The primary outcome will be a composite outcome of 7-day mortality and admission to neonatal intensive care unit (NICU) with neonatal encephalopathy.

(Continued on next page)

* Correspondence: njpejovic@live.se

¹Centre for International Health, University of Bergen, Årstadveien 21, Box 7804, 5020 Bergen, Norway

²Sachs' Children and Youth Hospital, Sjukhusbacken 10, 11883 Stockholm, Sweden

Full list of author information is available at the end of the article



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(Continued from previous page)

Discussion: Although indications for the beneficial effect of a supraglottic airway device in the context of neonatal resuscitation exist, so far no large studies powered to assess mortality and morbidity have been carried out. We hypothesize that effective ventilation will be easier to achieve with a supraglottic airway device than with a face mask, decreasing early neonatal mortality and brain injury from neonatal encephalopathy. The findings of this trial will be important for low and middle-resource settings where the majority of intrapartum-related events occur.

Trial registration: ClinicalTrials.gov. Identifier: NCT03133572. Registered April 28, 2017.

Keywords: Global health, Low-income country, Laryngeal mask, Supraglottic airway device, Positive pressure ventilation, Newborn infant, Resuscitation, Neonatal mortality, Asphyxia, Asphyxia neonatorum, Intrapartum-related complications

Background

Problem statement

Since 2015, after Millennium Development Goal number 4 (MDG-4), of globally reducing by two thirds the under-5 (years of age) mortality, was summarized, it has become evident that neonatal mortality does not decrease at the same pace as post-neonatal mortality [1].

Of the 140 million babies born in the world annually, 7–9 million will need resuscitation at birth. The latest estimates are that 662,000 deaths annually are caused by intrapartum-related events, commonly referred to as birth asphyxia, which is the third leading cause of under-5 mortality globally [2].

Key health indicators from Uganda in 2017 show that child (under-5) mortality decreased from 175 out of 1000 in 1990 to 53 out of 1000 in 2016 [3]. The rate of neonatal mortality, however, is estimated at 27 out of 1000 and remains unchanged despite the national roll-out of programs such as Helping Baby Breathe (HBB) [3, 4], a basic neonatal resuscitation curriculum for resource-limited settings aiming at improving skilled attendance at birth [5]. HBB implementation trials have demonstrated a reduction in fresh stillbirths and first-day neonatal mortality. However, recent studies in India, Kenya, and Nepal assessing long-term outcomes showed no change in overall 28-day neonatal mortality or perinatal mortality [6, 7].

Sustainable Development Goal number 3 (SDG-3) reemphasizes the need of accelerating the reduction of neonatal mortality; each country should aim for a neonatal mortality below 12 out of 1000 live births by 2030. Achieving this goal will be possible only if we improve existing neonatal resuscitation programs [8]. All birth attendants, including physicians, midwives, and nurses, should have the knowledge and skills required to perform effective neonatal resuscitation [9]. Innovative tools that can strengthen existing strategies will have to be rapidly implemented if we are to reach the 12 out of 1000 target of neonatal death by 2030.

Rationale

Providing positive pressure ventilation (PPV) is the single most important component of successful neonatal resuscitation [8, 9]. Yet the mortality of newborns needing face mask (FM) ventilation was as high as 10% in Tanzania [10].

Effective ventilation during neonatal resuscitation has the potential to reduce 40% of intrapartum-related deaths [11]. However, the delivery of proper tidal volume is a difficult technique to master. Mask leakage, airway blockage, and poor chest expansion have been reported during FM ventilation [12–14].

Ventilation is routinely initiated with FM followed by endotracheal intubation in case of FM ventilation failure or need for prolonged ventilatory support. Endotracheal intubation is the most difficult skill to master in neonatal resuscitation and performed only by experienced physicians [15]. The use of endotracheal tube (ETT) is not included in resuscitation guidelines aimed at lowresource settings [16].

The American Heart Association and the European Resuscitation Council guidelines have proposed the use of the laryngeal mask airway (LMA) to replace FM if ventilation is ineffective or as an alternative to ETT during resuscitation of the late-preterm and term infants (at least 34 weeks' gestation or birth weight of more than 2000 g or both) if intubation is unsuccessful [17].

Several publications, including a recent Cochrane review [18, 19], have shown that the LMA allowed effective PPV in most of the treated patients (range of 95– 99%) [20–24], reducing the need for intubation [25, 26]. In previous studies, an inflatable size 1 laryngeal mask was used [21, 23–27].

The i-gel^{\circ} (Intersurgical Ltd., Wokingham, Berkshire, UK) size 1 is a new model of cuffless supraglottic airway device that has recently been made available for newborns (2–5 kg). It is designed to provide an efficient seal to the larynx without the inflatable cuff used in the traditional LMA. Positioning is easy with a low risk of tissue



compression or dislodgement [28–30]. All of these characteristics make the i-gel^{*} a potentially useful alternative to FM and ETT, especially in settings where the staff skills in performing PPV are insufficient [25–27]. A prospective observational study of 50 children demonstrated a success ratio of 100% for the insertion of the i-gel^{*}. All devices were inserted on the first attempt. The study showed very few complications and concluded that it seems to be a safe and efficient device for pediatric airway management [31].

Task shifting the use of a cuffless supraglottic airway device to non-doctor or inexperienced health staff in resource-limited settings could be one way to improve outcome following newborn resuscitation. A manikin study in Uganda demonstrated that midwives could easily insert a cuffless supraglottic airway after brief on-the-job training: the i-gel[®] was also more effective than FM in establishing PPV in the manikin. In 2015, a phase II randomized controlled trial (RCT) on the same site demonstrated that midwives could effectively and safely perform resuscitation in neonates with the i-gel[®] [32, 33].

The effectiveness and safety of a supraglottic airway device compared with FM, as the primary interface for newborn resuscitation, are still identified as important knowledge gaps. The critical outcomes of mortality and indicators of brain damage also need to be assessed [34]. The proposed trial will follow the SPIRIT (Standard Protocol Items: Recommendations for Interventional Trials) guidelines [35] and provide evidence to determine whether use of a supraglottic airway device translates into better clinical outcomes and thus can be considered part of future guidelines for neonatal resuscitation in resource-limited settings (Additional file 1). The aim of the present trial will be to compare the effectiveness of two interfaces (i-gel versus FM) for administering PPV at birth in terms of 7-day mortality and neonatal encephalopathy.

Methods/design

Trial design

A randomized phase III open-label superiority controlled clinical trial will be conducted in neonates needing PPV at birth with two parallel groups (1:1 ratio): resuscitation with a supraglottic airway device (i-gel^{*}) compared to FM (standard of care).

Setting

This trial will be conducted in Uganda at the Delivery Unit and Operating Theatre of the Department of Obstetrics and Gynaecology at Mulago National Referral Hospital, Kampala, which has about 25,000 annual deliveries.

Inclusion criteria

Inborn infants fulfilling the following inclusion criteria will be eligible to participate in the trial:

- Inborn baby (i.e., born in the hospital)
- Estimated gestational age of at least 34 weeks
- Estimated birth weight of at least 2000 g
- Need for PPV at birth (based on HBB algorithm)
- Parental consent.

Exclusion criteria

- Major malformations (incompatible with sustained life or affecting the airways)
- Macerated stillbirth.

Primary outcome measures

A composite outcome of (a) 7-day mortality or (b) admission to neonatal intensive care unit (NICU) with neonatal encephalopathy (maximum Thompson score of 11 or above at day 1–5 during hospitalization) or both [36–38].

Secondary outcome measures

- Safety of i-gel^{*} in the hands of lower cadre (non-doctor) birth attendants: adverse events (AEs) and serious adverse events (SAEs)
- Time to initiate PPV
- Heart rate at 0, 60, 90, 120, 180, 240, and 300 s
- Advanced resuscitation (chest compressions, intubation, and drug delivery), including intervention by supervising physician
- Early neonatal death (<7 days)
- Very early neonatal death (<24 h)
- Neonatal encephalopathy: admission to NICU with a Thompson score of 11 or above during day 1–5 during hospitalization
- Neonatal encephalopathy: admission to NICU with a Thompson score of 7 or above at day 1–5 during hospitalization
- Any hospital admission during the first 7 days of life.

Procedures

Prior to interventions: training midwives

Two hundred members of the staff involved in neonatal resuscitation participated in a modified HBB (2nd edition) one-day course [5] during two weeks in November 2017. The course was held by two pediatricians familiar with the use of supraglottic airway devices and was facilitated by two or three local HBB instructors. It consisted of a review of the HBB action plan and practical hands-on skill stations. The HBB



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training includes simulation scenarios involving key procedures of the action plan (thermal loss prevention, stimulation, clinical assessment, airway management, etc.) and the use of the FM (Laerdal silicon resuscitator, Laerdal Medical, Stavanger, Norway). An additional module for training on the use of the i-gel (Intersurgical Ltd.) was added. A high-fidelity model (SimNewB Laerdal manikin, Laerdal Medical) was used to train the staff in the use of both devices (igel[°] and FM). SimNewB provides realistic airways and good feedback with chest rise when effective PPV is provided. The participants learned the insertion technique recommended by the manufacturer that is the same in the manikin and in the neonate [26, 32]. A silicon lubricant (not needed in newborn infants because of oral secretions) facilitated the procedure. Three successful i-gel^{*} insertions in the manikin were required to partake in the study. FM ventilation was taught in accordance with the HBB curriculum using the NeoNatalie manikin (Laerdal Medical) and included advanced corrective measures. In case of failed FM ventilation, the participants were instructed to

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apply the following measures before considering the alternative airway device: reapplication of the mask, repositioning of the head, and increase of the inspiratory pressure. The use of suctioning was de-emphasized in accordance with the latest guidelines.

Recruitment and implementation

Investigators and trained research assistants will participate in the enrollment of participants in accordance with the inclusion criteria (Fig. 1). Neonates will be recruited every day around the clock consecutively until sample size is reached. Data from babies will be used in the trial only after written parental consent is given. A senior investigator will be available at all times to discuss concerns raised by parents or clinicians during the course of the trial.

Tagging of newborns

All neonates enrolled in the trial and their mothers will be tagged with a trial bracelet with a unique trial ID number to facilitate matching and retrieval.





Randomization

Cluster randomization will be used, choosing day-by-day clusters. For practical reasons, individual randomization is not feasible, so all neonates enrolled in the same day (representing a cluster) will be randomly assigned to the same treatment. This approach randomly assigns daily groups of neonates rather than individual neonates, and neonates within any one day are likely to respond in a similar manner; hence, their data cannot be assumed to be independent. The clustering structure of the data was taken into account in sample size calculation and data analysis planning. A randomization list will be made by an independent statistician using block randomization with block sizes of 4-8. The allocation remains concealed until the actual trial day when the randomization envelope is opened by the surveillance officer on duty at 8 a.m. The midwives are informed at the beginning of each shift of the assigned treatment. The envelopes and assignment cards are discarded after use. The assigned procedure will then be performed until the next randomization. To provide proper PPV to the baby, the American Heart Association and European Resuscitation Council guidelines recommend switching to a supraglottic airway device if the resuscitator considers that the FM is failing [17]. We recommend the resuscitator to optimize the ventilation during 3 mins before considering switching ventilation option from FM to i-gel and vice versa, to keep contamination between arms low.

The intervention

Oral consent will be sought for all mothers admitted to the delivery unit, followed by deferred written informed consent as soon as practicable for mothers of babies eligible for the trial. HBB principles of the golden minute will be applied to all babies not crying at birth, including drying, stimulation, and assessment. A stopwatch will be started at the time of birth by a research assistant for all eligible participants. In the case of "baby is not breathing" after initial steps, the midwife will immediately (after cutting the cord) move the babies in need of PPV to the resuscitation area. Inflations will be administered with room air at a rate of 40 to 60/min with a 240-mL silicon self-inflating bag and a pop-off valve limit at 35 cm H₂O (Laerdal Medical). Silicone, round-shaped FM (size 1, Laerdal Medical) or i-gel (size 1) will be available at each delivery. The duration of resuscitation will be defined as the time period from start of ventilation to the establishment of spontaneous breathing. Heart rate will be registered with a dry-electrode electrocardiogram monitor (NeoBeat Newborn Heart Meter, Laerdal Global Health, Stavanger Norway) featuring fast signal acquisition [39]. All babies with a 5-min APGAR (Appearance, Pulse, Grimace, Activity and Respiration) score of less than 7, respiratory distress, hypothermia (axillary Page 5 of 9

temperature of less than 36.0 °C), or signs of encephalopathy will be transferred to the NICU. Resuscitation data, any contamination between arms, follow-up contact, and admission to the neonatal unit will be recorded by a research assistant. All interventions will be recorded on video to ensure quality assurance and data collection.

Management from supervising physician

Advanced resuscitation can be initiated in accordance with local hospital and International Liaison Committee on Resuscitation (ILCOR) guidelines [34], should a supervising physician be available. This can include use of alternative airways, including ETT, chest compressions, and drug administration.

Contamination between arms

Contamination between arms (switching to the alternative device) will be possible after 3 min of sustained PPV, should ventilation be deemed unsatisfactory. The alternative device will be accessible in an easily accessible box on the resuscitation table. This possible scenario will be practiced during the training. In all cases, a report specifying the reasons for switching to the alternative airway device will be filled out.

Masking

Health-care providers (midwives) performing resuscitation and the research assistant recording resuscitation data in the delivery ward cannot be masked to the allocation arm. However, the examiners assessing neonatal encephalopathy outcomes will be masked to the arm allocation. Outcome examiners will be exclusively working at the NICU, physically separated from where the resuscitations are performed. The arm allocation will not appear on the medical chart. Thus, arm allocation of admitted patients will not be identifiable by the outcome examiner. The independent data monitoring committee (IDMC) will have access to arm allocation when performing interim analysis and assessment of AEs/SAEs. The statistician who will perform data analysis will be masked to treatment allocation.

Sample size

Considering our previous phase II trial, we estimate that a reduction of 25% of adverse outcomes may be possible. A sample size of 954 participants (477 per arm) is required to have a 90% chance of detecting, as significant at the 5% level, a decrease in the primary outcome measure from 40% in the standard-of-care arm to 30% in the supraglottic-airway arm. The sample size is increased to 1150 or 1240 because of the day-by-day cluster randomization, assuming an intra-class correlation of 0.10 and an average daily enrollment of three or four participants, respectively.



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Enrollment	Allocation	Admission neon	atal intensive care unit	Follow-up
T-1	Day 0	Day 1	Day 2–5	Day 7
×				
×				
		×		
	×			
	×			
	×			
	×			
		×	×	
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Data collection and monitoring

Assessment and collection of outcomes

The primary outcome will be assessed in two parts. Mortality outcome will be collected daily at the NICU for admitted trial patients until day 7. Non-hospitalized participants will receive a scheduled appointment or phone call by a trial nurse with the mother at day 7 assessing the health of the baby. For all hospitalized participants, morbidity by neonatal encephalopathy will be assessed by a trial doctor masked to the arm allocation. This assessment will take place daytime on day 1, 2, 3, 4, and 5 or until discharge, using Thompson score (Table 1).

Data from the pre-coded case report form (CRF) will be entered into Open Data Kit (ODK) (https://opendatakit.org), an open-source suite of tools that helps researchers manage mobile data collection solutions. The data will be stored on an encrypted server and subsequently transferred to a statistical software package for analysis.

The CRFs will be pre-tested before the commencement of the trial. Data from the birth attendants' questionnaire and the CRFs will be filled in by the birth attendants and will be continuously entered into ODK.

Videos will be recorded as a quality control. The neonatal resuscitation algorithm will be put in place to ensure that all interventions are standardized. A proper light source is needed on the table. Headlamps will act as backup in case of a power shortage at night.

Independent data monitoring committee

An IDMC consisting of four members—a statistician, an obstetrician, and two pediatricians—was appointed. They are operating in accordance with the IDMC charter which is developed with the members.

The timing of the interim analysis will be carried out by the IDMC. It will be planned when about half of the events have occurred, following the DAMOCLES (Data Monitoring Committees: Lessons, Ethics, Statistics) group recommendations [40].

The IDMC will ensure that the trial protocol was followed and control the adequacy of enrollment and randomization. The interim data will also assess quality standards and adherence to ethical requirements.

The interim analysis will be performed by the IDMC statistician unmasked to the treatment allocation. Based on this, the IDMC will make recommendations on the continuation of the trial and its modifications or decide on potential termination in case of harm.

Statistical analysis

A detailed statistical analysis plan-based on the principles in this section-will be developed before the statistical analysis of the trial. Data analysis will be performed by using the statistical software packages Stata, SAS, and R. All tests will be two-sided, and a P value of less than 0.05 will be considered statistically significant. Missing data will be considered, and appropriate imputations will be discussed and performed when appropriate. Statistical analysis will include an unadjusted analysis followed by an adjusted analysis. The primary outcome will be compared between the two treatment arms by using the chi-squared test. The secondary outcomes will be compared by using the chi-squared test or Fisher's test (categorical outcomes) and using the Student's t test or Mann-Whitney test (continuous outcomes). Mixed-effect regression models will be estimated to evaluate the effect of the treatment on binary outcomes, adjusting for clusters (random effect) and clinically relevant confounders. Data analyses will be performed on an intention-to-treat (ITT) basis. However,



p. 41

since the trial is prone to some contamination (i.e., the person resuscitating may decide to shift to the other device) which can be limited by appropriate training but not entirely prevented, a per-protocol analysis and a contamination-adjusted ITT analysis will also be performed. These results will be considered along with the primary ITT analysis when drawing the conclusions of the trial. Subgroup analyses—per treatment center, time of the day (i.e., day/night), and per birth mode—will be carried out with exploratory purpose.

Safety

Resuscitations will be continuously monitored by video and observed by the attending midwife or physician and the researcher assistant in order to detect AEs and SAEs. Safety measures will include monitoring of SAEs and detection of unexpected changes in incidence of common neonatal complications. The AEs will be managed by the attending hospital physician/midwife/researcher and followed until resolution or until a stable clinical endpoint is reached by the clinician responsible for the care of the recruited patient.

If there is a reasonable suspected causal relationship with the intervention, SAEs will be reported to the Mulago Research and Ethics Committee (MREC) to guarantee the safety of the participants. Any suspected unexpected serious adverse reactions (SUSARs) with or without a reasonably plausible causal relationship with use of the supraglottic airway will also be reported to the MREC.

Ethical considerations

The protocol was approved by the institutional review board of Mulago National Referral Hospital, Uganda; the Uganda National Council of Science and Technology; the Director General from the Ministry of Health, Uganda (MREC 1168); and the Regional Committee for Medical and Health Research Ethics (REK South East reference number 2017/989) in Norway.

Extensive discussions with clinical experts and members of the ethical board were necessary to solve the problem of obtaining consent without delaying the intervention. A two-tier procedure for consent will be implement in this trial because it involves unexpected care of critically ill newborns. All mothers entering the labor ward irrespective of whether their baby is suspected of filling inclusion criteria will receive brief information of the trial after which oral consent will be sought. Mothers whose infants are found eligible at birth will be approached for full written deferred consent for continuing participation. All information, including informed consent and the material used in the trial, will be translated in English and Luganda in a clearly understandable form. A senior investigator will be available to discuss any additional questions regarding the trial.

Sustainability and scalability

A simplified neonatal resuscitation program that can reduce neonatal deaths due to perinatal asphyxia is the highest newborn global health research priority beyond 2015 [41]. This trial will try to demonstrate the first phase of scalability of an innovative approach to newborn resuscitation.

The training module for supraglottic airway use can easily be integrated to current neonatal resuscitation programs [33]. The cost-effectiveness of a supraglottic airway in a low-resource setting needs to be assessed. Such an investment can be justified only if there is a substantial difference between the supraglottic airway and FM. We estimate that a 25% reduction in adverse outcomes is a clinically significant difference large enough to have policy implications. A reusable cuffless device is already available but is still cost-prohibitive [29], so it will be crucial to explore how the unit cost can be reduced. A historical parallel could be the substantial drop in the cost of antiretroviral therapy against HIV over the last decades [42], allowing scale-up of treatment to a level that previously seemed impossible in low-resource settings.

Discussion

Newborn resuscitation training and simulation-based curriculum show mixed results in relation to their impact on newborn mortality [3, 4] and their effect on neurological morbidity remains unknown [43]. Further improvement of neonatal resuscitation performance is crucial.

This large trial is the first to assess the impact on mortality/morbidity of the use of a supraglottic airway device during neonatal resuscitation. It is powered to 90% and designed to add evidence lacking in this field. To the best of our knowledge, only four RCTs comparing LMA or supraglottic airway to FM ventilation including 636 patients have previously been published [18, 19, 25, 26, 32]. They have focused mainly on vital sign outcomes or successful resuscitation [34]. Safety and long-term outcomes remain important knowledge gaps. This task-shifting intervention involves midwives as they are the frontline health workers in many settings where newborn mortality is high. The burden of disease from intrapartum-related events can be reduced if simple and robust technologies for newborn resuscitation can be identified [44].

The trial will also monitor neonatal outcome data until day 7. We hypothesize that effective ventilation will be easier to perform with the supraglottic airway device and significantly decrease early neonatal mortality and brain damage from neonatal encephalopathy. Results from this large trial will contribute to provide evidence that can help define best practice advice for future guidelines.

Trial status

The trial started recruiting participants on May 8, 2018.



Additional file

Additional file 1: SPIRIT (Standard Protocol Items: Recommendations for Interventional Trials) guidelines. (DOCX 63 kb)

Abbreviations

AE: Adverse event; CRF: Case report form; ETT: Endotracheal tube; FM: Face mask; HBB: Helping Babies Breathe; IDMC: Independent data monitoring committee; ITT: Intention-to-treat; LMA: Laryngeal mask airway; MREC: Mulago Research and Ethics Committee; NICU: Neonatal intensive care unit; ODK: Open data kit; PPV: Positive pressure ventilation; RCT: Randomized controlled trial; SAE: Serious adverse event

Acknowledgments

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Authors' contributions

TT, NJP, SMH, JB, JN, CL, DT, GS, TA, HE, and MB initiated the trial design and helped with implementation. TT is grant holder. FC provided statistical expertise in clinical trial design and will conduct the primary statistical analysis. All authors contributed to refinement of the trial protocol and read and approved the final manuscript.

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Availability of data and materials

Not applicable.

Competing interests

The authors have no financial relationship relevant to this article to disclose. TT, NP, SMH and TA are co-founders of the non-profit organization tap4life. org, which produces the free application NeoTapLS, www.tap4life.org.

Author details

¹Centre for International Health, University of Bergen, Årstadveien 21, Box 7804, 5020 Bergen, Norway. ²⁵achs' Children and Youth Hospital, Sjukhusbacken 10, 11883 Stockholm, Sweden. ³Karolinska Institutet Department of Public Health Sciences, Tomtebodavägen 18A, 171 77 Stockholm, Sweden. ⁴Mulago National Referral Hospital, Box 7272, Kampala, Uganda. ⁵Department of Obstetrics and Gynaecology, College of Health Sciences, Makerere University, Box 7072, Kampala, Uganda. ⁵Department of Aublic Health Sciences, Makerere University, Box 7072, Kampala, Uganda. ⁸Department of Anaesthesiology and Intensive Care, Stavanger University Hospital, Gerd-Ragna Bloch Thorsens gate 8, 4019 Stavanger, Norway. ⁹Faculty of Health Sciences, University of Stavanger, Box 8600, 4036 Stavanger, Norway. ¹⁰Operational Research Unit, Doctors with Africa Cuamm, Via San Francesco 126, Padova, Italy. ¹¹Department of Neonatal Medicine, Karolinska University Hospital, Eugeniavägen 3, 171 76 Stockholm, Sweden. ¹²Karolinska University Hospital, Eugeniavägen 3, 171 76 Stockholm, Sweden, ¹³Department of Voman and Child Health, Padua University, Via Giustiniani, 3, 35128 Padua, Italy. ¹⁴Centre for Intervention Science in Maternal and Child Health, Centre for Intervention Science in Maternal and Child Health, Centre for Intervention Science in Maternal and Child Health, Centre Science, Norway.

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Gynecological Fistula: Epidemiology and Therapeutic Options in Mozambique

PAPER

Authors

Vaz I., Starforth L., Pizzol D., Di Gennaro F., Adile B., De Luca G.M., Colangelo A.C., Guaitoli E.

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International Journal of Case Reports & Short Reviews

Case Report

Gynecological Fistula: Epidemiology and Therapeutic Options in Mozambique - a

Igor Vaz¹, Lenny Starforth¹, Damiano Pizzol², Francesco Di Gennaro³,

Biagio Adile⁴, Giuseppe Massimiliano De Luca³, Anna C. Colangelo⁵

and Eeonora Guaitoli^{3*}

¹Department of Urology, Central Hospital of Maputo, Mozambique
²Operational Research Unit, Doctors with Africa Cuamm, Mozambique
³Societa Polispecialistica Italiana Giovani Chirurghi - SPIGC
⁴Unit of Urogynecology, Villa Sofia Cervello Hospital, Palermo, Italy
⁵Department of Surgery and Organ Transplantation, University of Padua, Padua, Italy

*Address for Correspondence: Eleonora Guaitoli, SPIGC General Surgeon, Via Michele Mercati 33, 00197 Rome, Tel: +393-471-172-959; E-Mail: eleonoraguaitoli@gmail.com

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ABSTRACT

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Introduction: Vescicovaginal fistulae, most of all as consequences of prolonged neglected obstructed labor, occur mainly in low income countries. Fistulas have a devastating impact on affected women and their families from physical, social and economic point of view.

Methods: We collected data of patients admitted to the Urology Department of Maputo Central Hospital from 2004 to 2013. We conducted a descriptive analysis of the collected data as yet available.

Results: We reported more than 250 fistulae, most of all vescicovaginal (72%) followed by urethro-vaginal (8%) and vescico-uterine (6.5%). Surgical approach was mainly the trans-vaginal repair, especially for the vesicovaginal.

Conclusion: Although prevention can dramatically reduce the prevalence of gynecological fistulae, in low-income countries, they represent an important public health issue. Surgical treatments and non-operative managements are possible and both with a high rate of success. We suggest surgeons to know as many techniques as possible in order to assure a tailored treatment for everyone.

Keywords: Obstetric fistula; Vescicovaginal fistula; Rectovaginal fistula; Mozambique; Low income countries; Surgery; Delivery

INTRODUCTION

Genital tract fistulae, after several attempts of classification, are actually divided into four main types, depending on the distance of the distal edge of the fistula from the external urinary meatus [1-10]. These four types are further sub-classified by the size of the fistula, associated scarring, vaginal length or special considerations, as follow:

- Type 1: Distal edge of fistula > 3.5 cm from external urinary meatus
- Type 2: Distal edge of fistula 2.5 3.5 cm from external urinary meatus
- Type 3: Distal edge of fistula 1.5 < 2.5 cm from external urinary meatus
- Type 4: Distal edge of fistula < 1.5 cm from external urinary meatus
- (a) Size < 1.5 cm, in the largest diameter
- (b) Size 1.5 3 cm, in the largest diameter
- (c) Size > 3 cm, in the largest diameter
- None or only mild fibrosis and/or vaginal length > 6 cm, normal capacity
- ii. Moderate or severe fibrosis and/or reduced vaginal length and/ or capacity
- iii. Special consideration e.g. post radiation, ureteric involvement, circumferential fistula, previous repair. (Same characteristics are described for ano-rectal fistula).

The really extent of obstetric fistulae in developing countries is unknown due to difficult access to the cure, but the incidence is reported as 124 per 100.000 deliveries, contrary to developed countries where is not more described [1].

Most of the patients are affected by obstetric fistula which is defined as a hole that forms between the bladder and vagina (Vesical Vaginal Fistula- VVF) or between the rectum and vagina (Recto Vaginal Fistula-RVF) during prolonged labor and obstructed labor. The constant pressure of the baby's head against the soft tissue around the vagina and the bladder and/or rectum cause an ischemic necrosis of tissue. In some cases, regarding the youngest girls, the etiology is related to gynecologic trauma as sexual abuse. A hole is then left, and urine and/or feces leak from the vagina [4]. Recto vaginal

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fistula may also develop 3rd or 4th degree perineal tears, disrupted repair of perineal tears, or episiotomy sites due to technical factors or infection [5]. Finally, iatrogenic fistulas can occur in women who faced emergency obstetric surgery, often related to ruptured uterus. Majority of women with iatrogenic fistulas had a history of previous cesarean section, suggesting that these women are at heightened risk for iatrogenic fistula during a subsequent surgery [6]. Fistula have heavy consequences both in physical and social terms. In fact, urine, feces and blood secretions cause severe burnt and wounds with consequent infections on the legs from the continuous dripping [7].

In Mozambique, the few data available suggest that the areas with high fistula reported rates are the provinces of Niassa, Tete, Zambezia, Nampula e Inhambane [3]. The high prevalence is due to the low coverage of assistance during childbirth, but also a higher incidence of cultural factors such as premature marriage [2].

We reported the 10 years' experience of a fistula centre of Maputo describing type and management of fistula we have treated.

MATERIALS AND METHODS

Maputo Central Hospital (HCM) is a public, university and the national referral hospital located in Maputo the capital city of Mozambique with population density estimates to about 3.5 million inhabitants. Maputo Central Hospital offers more than 20 medical and surgical specialties. The institution also offers out and in-patients consultations and has 1500 bed capacity for the hospitalization of patients.

Medical residents collected and reviewed all outpatient records of patients admitted to the Urology Department and admitted for surgery during the 2004-2013 period. The extracted data provided a database with information related to fistula type and surgery performed.

We conducted a descriptive analysis of the collected data as yet available.

RESULTS

In table 1 are summarized the main results. In ten years we have managed more than 250 fistulae most of all VVF (72%) followed by urethro-vaginal (8%) and vescico-uterine (6.5%).

In 90% of cases (225 patients) the aethiology was due to labor; 10 cases were post traumatic injuries and 15 cases post infective diseases.



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Table: Fistulas.							
Туре	N (%)	Age (mean)	Range Age			Surgery	
				Aethiology			
				Cause	N (%)	Туре	N (%)
				Obstetrical Injury	175 (97.2)	Transvaginal repair	162(90)
Vescicovaginal	180 (72)	26.7	14 - 67	Trauma, including previous surgeries	2 (1.1)	Abdominal access	18 (10)
				Infection/cryptoglandular abscess	3 (1.7)	Mainz Pouch II	0
Urethrovaginal		31	17 - 56	Obstetrical Injury	15 (75)	Transvaginal repair	8(42.9)
	20 (8)			Trauma, including previous surgeries	0	Abdominal access	10(47.6)
				Infection/cryptoglandular abscess	5 (25)	Mainz Pouch II	2(9.5)
				Obstetrical Injury	35 (70)	Transvaginal repair	30 (60)
Vescicouterine	50 (20)	34.6	17 - 49	Trauma, including previous surgeries	8 (16)	Abdominal access	15 (30)
	00 (20)	0110		Infection/cryptoglandular abscess	7 (14)	Non Operative management	5 (10)
				Obstetrical Injury	225 (90)	Transvaginal repair	200 (80)
Total	250 (100%)	27.7	May-67	Trauma, including previous surgeries	10 (4)	Abdominal access	43(17,2)
				Infection/cryptoglandular abscess	15 (6)	Others	7 (2.8)

Surgical approach was mainly the trans-vaginal repair, especially for the VVF (performed in more than 90% of cases) and the abdominal access. In few cases we have performed the Mainz Pouch II procedure.

Postsurgical fistula were diagnosed in 20% of cases (50 cases) during Hospital stay. All this patients were affected by vescico-uterine fistula and the diagnosis were performed before the discharge and in patients treated with cesarian section (13 cases) or prolonged labor (37 cases).

Others patients were evaluated and recognised by consultation.

Women referred passage of flatus or stool through the vagina, feculent odor, or recurrent vaginal mucosal inflammation.

The onset of symphtoms was difficult to evaluated, 75% of patients were multiparous and all of them referred at least one delivered at home or with a traditional birth attendant.

DISCUSSION

In our study, as in previous literature, the great majority were VVF. VVF repair depends on several factors, such as distance from ureteric orifice, patient's condition, accessibility from vagina and the type of fistula [11]. Most obstetric causes of VVF tend to be located near the bladder base, trigon, and urethra, since it results from impacted head and/or instrumental delivery. In case of VVF, vaginal repair is, in general, the preferred technique. In fact, it has demonstrated significantly shorter operative times, decreased blood loss, and shorter duration of hospitalization [12]. Vaginal approach is not always possible; limiting condition are: a small introitus, high or inaccessible fistulas, complex fistulas, a recurrent fistula after a failed prior repair attempt, fistulas with significant associated scarring, concomitant involvement of the uterus or bowel, or when the relative position of the ureters is seen as problematic or requires the need for ureteral re-implantation[13]. The two most commonly used repair techniques are the Latzko technique and the layered closure, performed with or without a fat pad or myocutaneous flap. The Latzko procedure has even been successfully utilized in patients with recurrent fistulas already treated in the same way [14].

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In the layered closure, the excision of the fistula is performed after separating the bladder from the vaginal mucosa and the underlying fascia for approximately. Is then excised the fistula and the bladder closed with detached points. The main difference with the Latzko procedure consists in the excision of the vesical mucosa during the layered closure. A catheter is then kept after surgery. Again, Martius flap is used for complex fistulas, including recurrent or large fistulas. The procedure involves the use of fat pad along the length of the labium majus which is tunneled subcutaneously into the vagina to act as an inter-positional vascular flap [15]. This flap is classically developed by making a vertical incision along the external surface of the labia majora. Finally, two abdominal approaches can be used: Pfannesteil or median laparotomy. The fistula must be found through a transvescical or extravescical approach. In the first one, like O'Conor and Sokol described, [16,17] a cystotomy of 4-5 cm is performed along the sagittal plane in the extraperitoneal portion of the bladder. The bladder incision is then extended down to the level of the fistulous tract. To identify the tract course of the fistula a smaller catheter can be used. During extravesical approach, first described by Von Dittel in 1803, [18,19] the fistulous tract is dissected in the vesicovaginal space. After surgical repair of fistula bladder should be drained, however, optimal duration of drainage is not clear. Longer duration of bladder catheterization increases the risk of urinary tract infections and other associated morbidities [20].

Urinary incontinence can occur after fistula repair, it depends on the function of the detrusor muscle due to prolonged VVF exposure. Dolan et al. report 16.1% of patients of urinary incontinence, [21] while Zambon et al. had no cases with the vaginal route but had 1 case (16.6%) with the abdominal route [22]. Amenorrhea is commonly reported in women presenting for Obstetric Fistulas repair at rates of 22-44% [23]. Possible causes include Sheehan's syndrome [24] or Asherman's syndrome, but it is often unexplained. The results of the surgical treatment for uro-vaginal fistula are classified according to: repaired; persistent incontinence; failed; attempt to close the fistula was not performed/urinary conduit or other surgery was performed/ other; and maternal death.

Referred to RVF Gottgens et al in 2014 concluded that the best





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surgical intervention could not be determined [25]. Obstetric RVFs have a lower risk of repair failure than those with non-obstetric etiologies, Tsia-Shu Lo reports, including conservative and surgical managements, a success rate of 45-70% after primary repair [26].

Doctors with Africa CUAMM

Persistent, recurrent or worsened fistulae are a consequence of poor wound healing or limited blood supply resulting from malnutrition, infection, early defecation and mobilized flap.

Conservative treatment involves urinary catheterisation for four to six weeks. Conservative management can be safe in women with a fistula present for three weeks or less and no larger than three cm in diameter. The catheter must be changed once weekly. Fistula closure can be assured with a dye test. If fistula closure is not achieved after four to six week of conservative treatment, early surgical repair should be done [27].

CONCLUSION

Obstetric fistulae are a real problem in developing countries and often the incidence is unknown. Surgical treatments and nonoperative managements, in selected cases, are possible and both with a high rate of success. The real problem in low resources country is to detect the pathology and to let women have the cure. Prevention is surely the best strategy to defeat the problem, not only identifying the patients who can benefit from a medicalization of the labor, but also with political strategies to prevent premature marriage and violence against children. We suggest surgeons to know as many techniques as possible in order to assure a tailored treatment for everyone.

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Effect of health education on birth preparedness and complication readiness on the use of maternal health services: A propensity score-matched analysis

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Authors

Izudi J., Akwang D.G., McCoy S.I., Bajunirwe F., Kadengye D.T.

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Effect of health education on birth preparedness and complication readiness on the use of maternal health services: A propensity score-matched analysis



Jonathan Izudi^{a,*}, Denise Grace Akwang^b, Sandra I. McCoy^c, Francis Bajunirwe^a, Damazo T. Kadengye^{a,d}

^a Department of Community Health, Faculty of Medicine, Mbarara University of Science and Technology, Box 1410, Mbarara, Uganda ^b Doctors without Borders (CUAMM), Western Equatorial State, South Sudan ^c Centre for Effective Global Action, Division of Epidemiology and Biostatistics, School of Public Health, University of California, Berkeley, USA ^d African Population and Health Research Center (APHRC), Nairobi, Kenya

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ABSTRACT

Objective: At 789 maternal deaths per 100,000 live births, South Sudan has one of the worst maternal mortality indicators in the world. Utilization of maternal health services namely antenatal care (ANC). skilled birth attendance (SBA), and early postnatal care (EPNC) is critical in reducing these deaths. We evaluated whether health education on birth preparedness and complication readiness (BPCR) has an impact on the utilization of skilled birth attendance and early postnatal care in Mundri East County, South Sudan. Design: We used observational data collected from antenatal clinics in South Sudan to perform a propensity score matched analysis. Treatment effects in both unmatched and matched cohorts were estimated using modified Poisson regression analysis with robust standard errors in prevalence risk ratios (PR) and 95% confidence intervals. Setting: 13 primary healthcare facilities. Participants: 385 postpartum mothers Interventions: Health education on BPCR. Measurements: Two outcomes were evaluated: (1) SBA measured as delivery in a health facility, and (2) EPNC use measured as use of postnatal care within 2-7 days of delivery. Findings: Data on 243 (67.9%) mothers who attended antenatal care were analyzed. 92 participants who received BPCR health education were matched with 92 who had never. In unmatched adjusted analysis, health education on BPCR significantly increased SBA (Adjusted PR (APR), 1.99; 95% confidence interval (CI), 1.99-3.65) but not EPNC use (APR, 1.78; 95% CI, 0.73-4.35). In propensity score-matched analysis, SBA significantly improved (PR, 2.64; 95% CI, 1.91-3.66) while the increase in EPNC use was insignificant

(PR, 1.14; 95% CI, 0.43–3.03). Conclusions: Health education on BPCR improves SBA but not EPNC use among mothers in Mundri East County, South Sudan.

Implication for practice: South Sudan's health systems should design new strategies to enhance EPNC use in order to significantly reduce maternal and newborn deaths in the earlier days of the postpartum period. In addition, a qualitative study is needed to identify barriers to EPNC use.

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Globally, 830 women die daily from preventable causes related

to pregnancy and childbirth, with 99% of the deaths occurring in developing countries (World Health Organization, 2018a). Despite a

44% drop in the maternal mortality ratio (MMR) between 1990 and

Introduction

* Corresponding author at: Department of Community Health, Faculty of Medicine, Mbarara University of Science and Technology, Box 1410, Mbarara, Uganda.

E-mail addresses: jonahzd@gmail.com (J. Izudi), smccoy@berkeley.edu (S.I. Mc-Coy).

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Maternal and child health

Analysis of Caesarean Section and neonatal outcome using the Robson classification in a rural district hospital in Tanzania

PAPER

Authors

Tognon F., Borghero A., Putoto G., Maziku D., Torelli G., Azzimonti G., Betran A.P.

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Original research

BMJ Open Analysis of caesarean section and neonatal outcome using the Robson classification in a rural district hospital in Tanzania: an observational retrospective study

Francesca Tognon ^{1,2} Angela Borghero,³ Giovanni Putoto,² Donald Maziku,⁴ Giovanni Fernando Torelli,³ Gaetano Azzimonti,³ Ana Pilar Betran⁵

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For numbered affiliations see end of article

Correspondence to Dr Francesca Tognon: francesca.tognon.1@phd. unipd.it

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ABSTRACT

Objective Caesarean section (CS) rates have increased

worldwide in recent decades. In 2015, the WHO proposed

the use of the 10-group Robson classification as a global

standard for assessing, monitoring and comparing CS

between them. The aim of this study was to assess the

Setting St. John of the Cross Tosamaganga Hospital, a

Tosamaganga Hospital from 1 January to 30 June 2014

Results The overall CS rate was 35.2%, and about 90%

of women admitted for labour were in Robson groups 1

through 5. More than 40% of the CS carried out in the

hospital were performed on nulliparous women at term with a single fetus in cephalic presentation (groups 1 and

3), and the most frequent indication for the procedure

was previous uterine scar (39.2%). The majority of severe

neonatal outcomes were observed in groups 1 (27.7%), 10

Conclusion We recorded a high CS rate in Tosamaganga

Hospital, particularly in low-risk patients groups (Robson

groups 1 and 3). Our analysis of Robson classification and

management at the hospital and to provide timely referrals

neonatal outcomes suggests the need to improve labour

in order to prevent women from arriving there in critical

pattern of CS rates according to the Robson classification

and describe maternal and perinatal outcomes by group at

rates both within healthcare facilities over time and

the Tosamaganga Hospital in rural Tanzania.

Design Observational retrospective study.

Participants 3012 women who gave birth in

and from 1 March to 30 November 2015.

referral centre in rural Tanzania

INTRODUCTION

(24.5%) and 3 (19.1%)

Caesarean section (CS) is a lifesaving procedure performed when an urgent obstetric condition precludes vaginal delivery.¹ The CS rate is widely considered an important global indicator for measuring access to obstetric services² and safe and timely care for mothers and newborns. Ensuring access to CS is an essential strategy to reduce maternal

Strengths and limitations of this study

- Our study used data from a rural setting, that can be compared with analogous data obtained in other settings in the country.
- The availability of outcome data, indication and data on who performed the caesarean section (CS) made possible a more contextualised interpretation of CS rates in each group.
- The combination of two different periods of 2014 and 2015 enlarged the sample size and allowed us to avoid seasonal bias.
- The data was collected from handwritten records, thus some of the information may not be accurate.
- Due to missing data, it was not possible to analyse the details of the CS decision-making process.

mortality³ in order to achieve the target of Sustainable Development Goal number, that is reducing the number of maternal deaths to less than 70 per 100 000 live births by 2030.⁴

As surgical procedure, CS is associated with increased risk of maternal morbidity, including postpartum haemorrhage, blood transfusion, hysterectomy and even death, while a uterine scar can increase the risk of uterine rupture, placenta previa or placenta accreta in subsequent pregnancies.^{5–7} These risks are higher in settings that lack access to safe surgery and/or the capacity to treat complications safely. Compared with vaginal delivery, CS also necessitates more health personnel and entails higher costs both for hospitals and for society.8 Nevertheless, over the past three decades CS rates have increased steadily in many countries, especially in middle-income and high-income ones, a phenomenon that has become a major public health concern.910 In 1985, the WHO stated that 'There is no justification for

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any region to have a caesarean section rate higher than 10%–15%'. This statement was justified based on review of data mainly from northern European countries which had achieved good maternal and perinatal outcomes with that CS rate.¹¹ Numerous studies have analysed the relationship between the CS rate and maternal and neonatal mortality, attempting to define the optimal limit/range associated with minimum maternal and perinatal risks,^{12–15} but the multiple limitations in each of these approaches have limited the interpretation of results.¹⁶ In 2015, a new WHO policy statement superseding the earlier one did not recommend any specific rate as 'optimal', instead recommending that 'Every effort should be made to provide caesarean sections to women in need, rather than striving to achieve a specific rate'.¹

Nevertheless, the above-mentioned health and socioeconomic impact as well as the unknown ecological and intergenerational consequences of the worldwide trend of increasing CS rate mean that it continues to be a widespread concern. The increase in CS deliveries is being seen not only in high-income and middle-income countries, but also in low-income ones. Moreover, the increase has not been equally distributed across income or residency strata; in low-income countries, inequalities are exacerbated by the unnecessary overuse of CS in or among some facilities, settings or patients groups alongside others where the lack of access to the procedure leads to high levels of maternal and perinatal mortality.¹⁷

Efforts have been made to devise effective strategies to reduce unnecessary CS. In order to better face this challenge, it is essential to study the population of women who undergo CS, to identify high-risk groups for poor outcomes and to investigate the reasons for these trends in different groups and settings.¹⁸ For many decades, the lack of a standard and internationally accepted CS classification system made it difficult to fully understand the growing trend and act on it. The 10-group Robson classification system now recommended by WHO and the International Federation of Gynecology and Obstetrics for assessing, monitoring and comparing CS rates within healthcare facilities over time as well as between them¹¹⁹ is simple, clinically relevant, accountable, replicable and verifiable,²⁰ all critical characteristics for such a system.

The aim of our work was to assess the pattern of CS rates according to the Robson classification and to describe maternal and perinatal outcomes by group in a rural district hospital in Tanzania. Based on these data, we propose potential strategies to address the overuse of CS procedures.

METHODS

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Design and participants

This was an observational retrospective study conducted in a rural district hospital in Tanzania. We included the women who gave birth in Tosamaganga Hospital from 1 January to 30 June 2014 and from 1 March to 30 November 2015. During these two periods, two Italian obstetrics and gynaecology resident doctors were available to support the hospital's maternity staff and ensure the completeness of patient charts (one during the first and one during the second period). Since a resident doctor was absent in the labour ward from July 2014 to February 2015, the information routinely collected in that period was considered inadequate for analysis and thus could not be included. Fetal position and information on previous deliveries are two important variables for the Robson classification, which were not collected and recorded systematically and routinely.

In addition, combining the two periods made it possible to increase our study population and avoid seasonal bias due to the dry and rainy season. We used the Robson classification to categorise each of the women into 1 of 10 groups. A full description of this classification system has been provided in online supplementary file 1.

Setting

St. John of the Cross Tosamaganga Hospital belongs to the Roman Catholic Church, Diocese of Iringa, and is supported in terms of governance and human resources by Doctors with Africa Collegio Universitario Aspiranti Medici Missionari, an Italian non-governmental organisation. Although the hospital is a private facility, it has been officially integrated into the Tanzanian public health system since 2007 in the context of the Private Public Partnership framework and is recognised as a Council Designated Hospital for Iringa District Council. Tosamaganga Hospital is the only Comprehensive Emergency Obstetric and Newborn Care Center in Iringa Rural District, serving an estimated population of 265 000 inhabitants.

Tosamaganga Hospital handles approximately 2300 deliveries per year. The hospital had a total of 165 beds, 48 of which were in the maternity department, including 12 obstetrics, 18 in vaginal postpartum and 18 in CS postpartum. There was also a labour room and a small neonatal resuscitation room. There was no anaesthesiologist in the hospital. Paediatric ward (32 beds) was served by only one paediatrician present during the day in and on call at night.

The maternity department had two functioning operating theatres, one for major and one for minor surgical procedures (eg, dilation and curettage, dressing). Midwives monitored labour progression with the use of a partograph, and the fetal heart rate was checked through intermittent auscultation done with a pinard. An ultrasound machine was available, but was not routinely used for labour assistance. The human resources allowed to perform CS during the study included a gynaecologist, a medical doctor (MD) and five assistant medical doctors (AMD). The maternity staff included 10 midwives divided over 3 shifts (3 in the morning, 2 in the afternoon and 2 at night) as well as a clinical officer. In addition to Tosamaganga Hospital, there were 10 health centres (HCs) and 62 dispensaries in the district. None of them were allowed to perform CS.

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Table 1Characteristics of women delivered during the
period from January to June 2014 and March to November
2015 in Tosamaganga Hospital, Tanzania (n=3012)

Maternal age					
Mean	25.6				
Range	14–45				
Parity					
Nulliparous (%)	1321 (43.9%)				
Multiparous (%)	1691 (56.1%)				
Previous CS					
No previous CS (%)	2493 (82.8%)				
One previous CS (%)	370 (12.3%)				
Two previous CS (%)	111 (3.7%)				
Three or more previous CS (%)	38 (1.3%)				
Referral status					
Self-admitted (%)	2844 (94.4%)				
Referred from other facilities (%)	168 (5.6%)				

CS, caesarean section.

Variables and data collection

The data were collected retrospectively from hospital registers (labour room, maternity ward and operating theatre) and patients charts in a Microsoft Excel dataextraction form specifically designed for this study (see online supplementary file 2). All data sources were compared to verify the quality of the information. For each woman who gave birth in the hospital, we collected data on maternal age, obstetric history (parity, previous CS), fetal presentation, gestational age (using the date of the last menstrual period (LMP)) and onset of labour (spontaneous, induced, pre-labour CS). Final mode of delivery was classified into two categories: vaginal delivery and CS. Vaginal delivery could have been either (1) simple vaginal delivery that included all vaginal deliveries not requiring forceps or vacuum though they may have had episiotomy and (2) operative vaginal delivery that included all vaginal deliveries that required forceps or vacuum

For each woman who underwent a CS, a single indication was assigned as the indication for use the procedure. When more than one indication was recorded in the woman's records and hospital charts, the authors selected only one for the analysis. This was done according to a predefined hierarchy devised for this study based on earlier proposals in the literature^{18 21 22} : (1) urgent or emergency CS (considering eclamptic, abrupio placentae, uterine rupture), mechanical or dynamic dystocia; (2) previous scar(s); (3) malpresentation; (4) cephalopelvic disproportion; (5) fetal distress; (6) breech; (7) twins and (8) others. We collected maternal outcomes (death before discharge), neonatal outcomes (birth weight, Apgar score at 1 and 5 min, death before discharge)

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and referral status (formally referred from village-level dispensaries, rural HCs or self-referred).

Since the date of LMP was missing from most of the records (n=2444; 81.1%), we used birth weight \geq 2500 g as a proxy for gestational age \geq 37 weeks.²³ This adaptation has been suggested and previously used for the Robson classification in settings where it is challenging to assign gestational age accurately.²⁴⁻²⁶

Exclusion criteria were birth weight <500 g (proxy for gestational aged <22 weeks). No data were collected on congenital malformations and all cases were included. For twin deliveries, only the first twin's outcome was taken into account.

The caesarean delivery rate was defined as the number of caesarean deliveries over the total number of live births.^{9 15} The maternal mortality rate was defined as the number of maternal deaths over the total number of women who gave birth regardless of birth outcome. We defined a neonatal composite outcome: severe neonatal outcome as the total number of stillbirths, early neonatal deaths (death of a live born neonate, by discharge or day 7 of life whichever occurred first) and birth discharged alive with an Apgar score of <7 at 5 min. The data available did not allow us to differentiate between fresh and macerated stillbirths. Deaths occurring after discharge were not captured. During the 2015 study period (1 March to 30 November), information was also collected on who performed the CS (gynaecologist, MD, AMD).

Each woman was categorised into 1 of 10 groups using the Robson classification.²⁷ We used the recommended subdivision for groups 2 and 4 into induced labour (2a or 4a) and pre-labour CS (2b or 4b). Group 5 was also divided into 5.1 (women with only one previous CS) and 5.2 (women with two or more previous CS).²⁷ We analysed intrapartum and postpartum perinatal mortality by type of delivery and using the Robson classification.

Patient and public involvement

No patients/members of the public were involved in the definition of the research question or outcome measures, nor in the design and implementation of the study. We have no plans to involve patients/members of the public in the dissemination of the study's results.

RESULTS

From 1 January to 30 June 2014 and from 1 March to 30 November 2015, 3052 women gave birth in the Tosamaganga Hospital. Complete information was available for 3012 (98.7%) of these deliveries, all of which were included in the Robson classification. The CS rate in the population included in our analysis was 35.2% of all births.

Table 1 summarises the characteristics of the study population. The mean age of the women was 25.6 years (range 14–45 years). Among all deliveries, 1691 women were multiparous (56.1%), 370 (12.3%) had undergone



Table	2 The Robson reporting table and nei	onatal outc	omes by Rot	ason group	o, Tosamaga	nga Hospital, Ta	anzania, Januar	y-June 2014	and March-Novemt	oer 2015
Grou	ň	Number of CS in group	Number of women in group	Group size (%)	Group CS rate (%)	Absolute group contribution to overall CS rate (%)	Relative contribution of group to overall CS rate (%)	Stillbirth (N stillbirth/N women (%))	Early neonatal death† (N neonatal deaths/N women (%))	Apgar <7 at 5 min (N live birth Apgar <7/N women (%))
-	Nulliparous, single cephalic, term pregnancy, in spontaneous labour	309	1128	37.5	27.4	10.3	29.2	9 (0.8)	28 (2.5)	24 (2.1)
N	Nulliparous, single cephalic, term pregnancy, induced labour or elective CS	35	56	1.9	62.5	1.2	3.3	8 (14.3)	1	1 (1.8)
ო	Multiparous (excluding previous CS), single cephalic, term pregnancy, in spontaneous labour	147	974	32.3	15.1	4.9	13.9	16 (16)	13 (1.3)	13 (1.3)
4	Multiparous (excluding previous CS), single cephalic, term pregnancy, induced labour or elective CS	25	45	1.5	55.6	0.8	2.4	7 (15.6)	1	1 (2.2)
Ŋ	One previous CS, single cephalic, term pregnancy	404	463	15.4	87.3	13.4	38.1	5 (1.1)	2 (0.4)	8 (1.7)
9	All nulliparous breeches	13	21	0.7	61.9	0.4	1.2	2 (9.5)	2 (9.5)	3 (14.3)
~	All multiparous breeches (including previous CS)	16	32	. .	50.0	0.5	1.5	5 (15.6)	4 (12.5)	1
œ	All multiple pregnancies (including previous CS)	48	22	2.6	62.3	1.6	4.5	3 (3.9)	7 (9.1)	I
໑	All abnormal lies (including previous CS)	30	30	1.0	100.0	1.0	2.8	1 (3.3)	1 (3.3)	3 (10)
10	All single cephalic, preterm (including previous CS)	33	186	6.2	17.7	1.1	3.1	22/11.8)	17 (9.1)	15 (8.1)
	Total	1060	3012	100	35.2	35.2	100	78 (2.6)	74 (2.5)	68 (2.3)
Unclé *Birth †Early CS, c	sssifiable: 40 cases, 1.3% (40/3052). \ weight ≥2500 g was used as proxy for ges / neonatal death was defined as the death o aesarean section.	tational age of a live borı	.>37 weeks n neonate, by	discharge c	r day 7 of life	(whichever occu	urred first)			

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Table2015	3 The Robson classification table showing only the subdivisions ir	ı groups 2, 4 a	nd 5, Tosam <i>a</i>	iganga Hos	pital, Tanzani	a, January–June 2014	and March-November
Grou	*œ	Number of CS in group	Number of women in group	Group size (%)	Group CS rate (%)	Absolute group contribution to overall CS rate (%)	Relative contribution of group to overall CS rate (%)
2a	Nulliparous, single cephalic, S37 weeks, induced	1	32	1:1	34.4	0.4	1.0
2b	Nulliparous, single cephalic, S37 weeks, CS before labour	24	24	0.8	100.0	0.8	2.3
4a	Multiparous (excluding previous CS), single cephalic, S37 weeks, induced	.	21	0.7	4.8	0.0	0.1
4b	Multiparous (excluding previous CS), single cephalic, S37 weeks, CS before labour	24	24	0.8	100.0	0.8	2.3
5.1	One previous CS, single cephalic, S37 weeks	272	327	10.9	83.2	9.0	25.7
5.2	Two or more previous CS, single cephalic, S37 weeks	132	136	4.5	97.1	4.4	12.5
*Birth CS, c	weight ≥2500 g was used as proxy for gestational age >37 weeks. aesarean section.						

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1 previous CS, 111 (3.7%) had undergone 2 previous CS and 38 (1.3%) had undergone 3 or more CS (table 1).

Table 2 shows the Robson classification. Almost 90% of the women admitted for delivery in this hospital were classified into groups 1 through 5 and about two-thirds into groups 1 through 4.

Of the nulliparous women with a term singleton fetus in cephalic presentation (n=1184), 1128 (95.3%) went into labour spontaneously, 32 (2.7%) were induced and 24 (2%) had a pre-labour CS (tables 2 and 3). Similarly, of the multiparous women with a term singleton fetus in cephalic presentation (n=1019), 974 (95.6%) went into labour spontaneously, 21 (2%) were induced and 24(2.4%) had a pre-labour CS.

Women admitted in the hospital for delivery with a term singleton fetus in cephalic presentation who entered labour spontaneously accounted for 70% of the obstetric population. They had CS rates of 27.4% and 15.1% in nulliparous and multiparous, respectively.

We analysed and interpreted the Robson table and the data according to the Robson classification interpretation guidelines published by $WHO^{27\ 28}$ which is shown in table 4.

Women in group 5 (previous CS) constituted about 15% of the obstetric population of the hospital, with a CS rate of 87%. Two-third of these women had undergone just one previous CS while one-third had undergone two or more CS (tables 2 and 3).

Overall, the most frequent indication for performing a CS was one or more previous CS (39.2%), followed by dystocia (22.3%) and then fetal distress (12.8%) (table 5).

The management of the women with previous CS is shown in figure 1. During the study, there were 519 (17.2%) women with one or more previous CS. One hundred and fifty three of them (29.5%) had an elective pre-labour CS, while the rest (70.5%) went into labour spontaneously. None of these women were induced. Among those who entered labour spontaneously 71 (19.4%) had a spontaneous vaginal delivery, while 295 (80.6%) had a CS. The indication recorded for the CS was 'previous CS' in 97.4% of the women who had a prelabour CS and 90.5% of the women who went into labour spontaneously (figure 1).

More than 40% of all CS in the hospital occurred in groups 1 and 3. Since the CS rate was particularly high for group 1 (27.7%) and group 3 (15.2%), we carried out an in-depth analysis regarding the indication for the CS in these two groups (figure 2). The majority of them were performed for dystocia (44.3% in group 1; 55.1% in group 3). Among the 168 women referred from other facilities, 107 (63.7%) delivered by CS.

We recorded two maternal deaths (one in group 1 and one in group 5) and 152 perinatal deaths (5%) of which 78 (2.6%) were stillbirths and 74 (2.5%) were neonatal deaths. About 70% of all perinatal deaths occurred in groups 1 (37 deaths), 3 (29 deaths) and 10 (39 deaths). We analysed 220 cases of severe neonatal outcome (stillbirths, neonatal deaths and live births with Apgar score



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November 2015 fol	lowing the WHO Robson Classification Interpretation Manual
Quality of data	► The CS rate of the group is 100% indicating a good quality of data
Type of population	 The size of groups 1 and 2 (39.5%) is within the expected range. However, the ratio of the size of group 1 vs that of group 2 is very high (20.1). In the WHO Multicountry Study reference population (population in the WHO study with relatively low CS rates as well as good labour and childbirth outcomes), this ratio was found to be 6.3.^{27,43} Similarly, the ratio of the size of group 3 vs that of group 4 is 21.6—very high compared with 6.3 in the WHO study.^{27,43} Both high rates probably indicate the need to increase inductions in these groups of women (term with singleton fetus in cephalic presentation) or even to avoid performing pre-labour CS. This is consistent with the high CS rates found in groups 1 and 3 and our data on stillbirth and neonatal deaths. Despite their being lower-risk groups, 37 (24%) and 29 (19%) of the total 152 perinatal deaths that occurred during the study period were in groups 1 and 3, respectively. Only group 10 had a larger number of perinatal deaths with 39 (25.7%) but this is a high-risk group where the women had singleton pregnancies in cephalic presentation preterm. The size of groups 3 and 4 is 33.9%. Since Tanzania has a high fertility rate, we expected a higher number of multiparous women. This can be explained by the very high size of group 5 (15.4%) with a CS rate of 87%, which contributes to about 38% of all the CS performed in the hospital. The size groups 6 and 7 is 1.6%, which is below the expected range for breeches. Moreover, the ratio of group 6/group 7 (0.5) is unusual since breeches are more frequent in nulliparous women with breech presentation into group 1. The size of group 10 is 6.2% that is slightly higher than that proposed by Robson (5%) and that found in the WHO Study (4.2%). Even if Tosamaganga Hospital is a referral hospital, only 168 women (5.6%) were referred, 107 (63.7%) of whom delivered by CS. For this reason, we consider that the larger sizes of groups 4 and 10 cannot be justified by a particularly
Caesarean section rate	 In all groups, the CS rates are higher than the expected range.²⁷⁴³ It has been proposed that CS rates in group 1 of about 10% are achievable. However, the above-mentioned high ratio of group 1 vs group 2 may be responsible for the high CS rate (27.4%) in this group. If insufficient numbers of women are induced or have necessary pre-labour CS, it is more likely that these women will need a CS at a later stage of labour. In addition, the high CS rate in group 2 is not caused by the size of group 2b (pre-labour CS, only 0.8% of the population), but mainly by a very low size of group 2a (1.1% of the population) and by the poor success for induction with a consequent high C/S rate (34.4%) in this group as well. Similar arguments apply to groups 3 and 4. The high CS rate in group 4 (55.5%) is not justified by the high size of group 4b (which accounted for only 0.8% of the population), but by the small size of group 4a (just 0.7% of the population). Particularly in groups 1 and 3, a large number of CS were performed with the diagnosis of dystocia. This might indicate a poor quality of diagnosis of dystocia and suboptimal management of the active phase of labour. The very high CS rate in group 5 (87.2%) is not justified by the proportion of women with two or more CS (group 5.2) who make up one-third of this group. CS rates in women with one CS (group 5.1) and two or more CS (group 5.2) are both high (83.2% and 97%, respectively), indicating the common practice of performing CS in women with previous scar. These rates contrast markedly with the 50%–60% rates considered appropriate by the Robson guideline and the 74.4% found in the WHO Study.^{27.43} Nevertheless, an assessment of the hospital's capacity to offer safe trial of labour. Moreover, the lack of information regarding previous caesarean deliveries (how they were performed and whether or not complications occurred) may have exacerbated doctor's fear regarding whether to offer a TOLAC. Looking at the higher-ri

CS, caesarean section; VBAC, vaginal birth after caesarean.

<7 after 5 min) by mode of delivery using the Robson classification as shown in table 6. A major contribution to severe neonatal outcome was made by groups 1 (27.7%), 10 (24.5%) and 3 (19.1%). Considering the incidence in each category, the groups with the highest severe neonatal outcome rate were groups 6 (33.3%), 7 (28.1%),

indicating a high risk for newborn in breech deliveries and 10 (29%) for preterm babies. The incidence of severe neonatal outcome was similar when analysed by mode of delivery. The majority of adverse neonatal outcomes in these groups occurred while performing simple vaginal delivery.

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Table 5Indication for CS in the study population,Tosamaganga Hospital, Tanzania, January–June 2014 andMarch–November 2015								
Previous scar	416	39.2%						
Mechanical or dynamic dystocia	236	22.3%						
Fetal distress	136	12.8%						
Breech	22	2.1%						
Twins	28	2.6%						
Malpresentation	41	3.9%						
CPD	90	8.5%						
Urgent or emergency CS	50	4.7%						
Others	41	3.9%						
Total number of CS	1060	100.0%						

CPD, cephalopelvic disproportion; CS, caesarean section.

We conducted a descriptive analysis on a subset of women who underwent CS during the 2015 study period. Information on the individual who performed the CS and the indication for the CS was available for 574 of the 616 CS conducted (93.1%). Most of the CS were performed by a MD (66.6%; 382), while 25.8% (148) were conducted by an AMD and 7.7% (44) by a gynaecologist. This distribution remains when stratifying by Robson groups and by CS indication (see online supplementary file 3).

DISCUSSION

Our analysis of 3012 deliveries in a rural district hospital in Tanzania using the Robson classification showed a 35% overall CS rate in an obstetric population of about 90% in Robson groups 1 through 5. These groups were arguably



Figure 1 Management of women with one or more previous caesarean sections during the study period.

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Figure 2 Indication for caesarean section in groups 1 and 3.

composed of low-risk women, but they presented high CS rates, for example, 27.4% and 15.1% in groups 1 and 3, respectively, who were women at term with a single fetus in cephalic presentation without previous CS who entered labour spontaneously.

High CS rates have been reported in other studies conducted in Tanzania^{25 29} (eg, 31% at the Muhimbli Hospital and 35% in Kilimanjaro Christian Medical Center (KCMC)) probably because of the role played by a referral hospital in targeting high-risk pregnancies. This hypothesis could be confirmed by the higher CS rate in women referred from other facilities (63.7% in our study). Sørbye *et al* described the situation at the KCMC³⁰ comparing patients who were referred and self-referred, with CS rates of 55% and 26.9%, respectively. However, the referral system seems to have played a minimal role in the setting of our study since only 5.6% of the women were referred (vs 20% in the Sørbye study).

Nilsen *et al*²⁹ hypothesises that poor quality of care at the dispensary and HC level contributes to increasing the number of preventable CS in women who are referred late and in critical condition, meaning that by the time they get to the medical facility an emergency CS is the only possible action.³¹ In addition, several studies have highlighted the inadequacy of obstetric and neonatal care services at the primary level in Tanzania.^{32–34} In a 2009 study conducted in the Kusulu district,³⁵ Kruk *et al* showed that 42.2% of women who gave birth in peripheral units bypassed the nearest services (dispensaries) in favour of higher-level facilities (HCs), governmental or private facilities. 61.4% of women who gave birth at home had a government dispensary in the village, but chose not to go there for their deliveries.



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Table 6	Distribution of severe	neonatal* outc	omes by Robsor	n group classi	fication				
Group	Number of severe neonatal outcomes/ number of women in group	Proportion of severe neonatal outcomes	Relative contribution of group to the overall severe neonatal outcomes	Proportion neonatal ou in simple va deliveries† simple vagi deliveries	of severe itcome aginal / total nal	Proport severe outcom operativ vaginal deliveri total op vaginal deliveri	ion of neonatal e in ve es‡ / erative es	Proportior severe nec outcome i total CS	n of onatal n CS /
1	61/1128	5.4%	27.7%	43/799	5.4%	1/20	5.0%	17/309	5.5%
2	9/56	16.1%	4.1%	7/19	36.8%	0/2	0.0%	2/35	5.7%
3	42/974	4.3%	19.1%	27/818	3.3%	1/9	11.1%	14/147	9.5%
4	8/45	17.8%	3.6%	7/20	35.0%	-	-	1/25	4.0%
5	15/463	3.2%	6.8%	1/58	1.7%	0/1	0.0%	14/404	3.5%
6	7/21	33.3%	3.2%	6/8	75.0%	-	-	1/13	7.7%
7	9/32	28.1%	4.1%	7/16	43.8%	-	-	2/16	12.5%
8	10/77	13.0%	4.5%	4/29	13.8%	-	-	6/48	12.5%
9	5/30	16.7%	2.3%	-		-	-	5/30	16.7%
10	54/186	29.0%	24.5%	47/153	30.7%	-	-	7/33	21.2%
Total	220/3012	7.3%	100.0%	149/1920	7.8%	2/32	6.3%	69/1060	6.5%

*Severe neonatal outcome includes stillbirths, neonatal deaths and live births with Apgar score <7 after 5 min.

†Simple vaginal delivery: vaginal deliveries not requiring forceps or vacuum, though episiotomy may have been done. ‡Operative vaginal delivery: vaginal deliveries that required forceps or vacuum.

CS. caesarean section.

Studies conducted by Straneo *et al* in the Tosamaganga catchment area showed high rates of institutional birth coverage, probably facilitated by the high health facility density.³⁶ However, coverage and quality do not always go together and the poorest women were reported accessing lower-level health services for birth where quality of care is suboptimal due to limited caseloads and poor staffing.³⁷

Comparing our study population according to the Robson classification with those in similar settings, Tosamaganga Hospital shows a bigger size of group 5 (15.4% compared with 8.8% in Muhimbli Hospital²⁵) and a smaller size of preterm births (6.2% vs 14.6%), while the size of groups 2 and 4 was similar, a probable confirmation of the low induction rate in both settings.

Severe neonatal outcomes were recorded for 220 newborns, almost half of them in groups 1 and 3, which may indicate that a high CS rate in these groups did not guarantee better quality of care and was not accompanied by better neonatal outcomes. This is consistent with the phenomenon of 'Perinatal Paradox' which has been described in the literature^{38 39} as the inconsistency between 'our superb ability to care for the individual patient and our dismal failure to address the problems of the larger society'.³⁹ The overuse of unnecessary technology in low-risk women translates in that the growing number of surgical procedures being performed are not associated with significant improvements in terms of maternal and neonatal outcomes.

Among 152 perinatal deaths, 78 were stillbirths. The highest incidence of severe neonatal outcome was recorded in groups 6, 7 and 10; therefore, in our hospital breech deliveries and preterm deliveries were the most at risk. As has been shown by other studies in similar setting,⁴⁰ a higher risk for adverse neonatal outcome in breech vaginal deliveries compared with breech CS was recorded in Tosamaganga Hospital, suggesting suboptimal management of breech presentation and the need for training to improve the skills of the providers. In addition, it underlines the need for appropriate, highquality antenatal healthcare programmes to encourage women to come to the facility earlier in order to identify, monitor and better manage risk factors for preterm birth, pregnancies with fetuses in breech presentation and also decrease the number of intrapartum deaths and macerated fetuses.

In Tosamaganga Hospital most of the CS were performed by the personnel incharge of the delivery room, namely the MD and the AMD, who handled all duty calls. The gynaecologist was involved in case of emergency and complicated elective or intrapartum CS. In all Robson categories, the highest CS rate was performed by the MD. Again, this suggests the need for obstetric and gynaecological training for the staff and a closer supervision by the gynaecologist. Nyamtema *et al* analysed the work of the MD, AMD and midwives in 10 rural HCs in Tanzania.⁴¹ Based on Tanzanian national guidelines

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and WHO recommendations,42 37% of CS were considered unnecessary and preventable. After a staff training programme was carried out and closer supervision provided, the proportion of unnecessary CS fell from 30% to 17% in HCs and from 37% to 20% in hospitals.⁴¹

Strengths and limitations

This study used data from a rural setting that can be compared with analogous population type described in other settings in the country. The availability of outcome data and the indication for CS made possible a more contextualised interpretation of CS rates in each group. Moreover, the availability of data on who performed the CS made it possible to specifically intervene in this aspect where appropriate. There were a number of limitations to this study. The data was collected retrospectively from handwritten records and some of the information may not have been recorded accurately. Due to deficient routine data collection, we included two different time periods (January–June 2014 and March–November 2015) in the study, meaning that there was discontinuity in data collection. Combining the two periods enlarged our sample size and allowed us to avoid bias due to seasonal differences. Some variables were not available in patient charts and registers (eg, length of labour, who made the decision to perform the CS or whether the stillbirth was macerated or fresh). Perinatal mortality may have been under-reported since early neonatal deaths occurring after discharge were not recorded. Data on congenital malformations were not available, making the interpretation of neonatal outcomes more difficult. Lastly, in the absence of reliable data on gestational age, we used birth weight as a proxy, a technique found in the literature on earlier studies conducted in low-resource settings.

CONCLUSION

We found a high CS rate at Tosamaganga Hospital even though the obstetric population served was not considered particularly high risk for a referral hospital. Our analysis of the data using the Robson classification showed that groups 1 and 3 (women at term with a single fetus in cephalic presentation who entered labour spontaneously) were larger than anticipated and presented very high CS rates. The large size of these groups and high CS rates combined with the stillbirth and neonatal mortality rates seen in the hospital may indicate insufficient induction rates and the need to provide more timely referrals so that women will get to the hospital before their conditions have become too critical.

Efforts to improve care and outcomes should include greater investment in the training of medical and nursing staff to improve the management of labour, with a correct use of the partograph and in particular for the judicious use of oxytocin augmentation in the management of prolonged labour. Training on the management of breeches and TOLAC should also be a priority in order to improve the quality of intrapartum care in the hospital.

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Author affiliations

¹Dipartimento di Salute della Donna e del Bambino, Universita degli Studi di Padova Dipartimento di Medicina, Padova, Italy

²Besearch Unit Cuamm Medici con l'Africa Padova Veneto Italy ³Tosamaganga Council Designated Hospital, Cuamm Medici con l'Africa, Iringa, United Republic of Tanzania

⁴Maternity Department, Tosamaganga Council Designated Hospital, Iringa, United Republic of Tanzania

⁵UNDP/UNFPA/UNICEF/WHO/World Bank Special Programme of Research, Development and Research Training in Human Reproduction (HRP), Reproductive Health and Research, World Health Organization, Geneva, Switzerland

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ORCID ID

Francesca Tognon http://orcid.org/0000-0001-6649-1525

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Pediatric Emergency Care in Low Income Countries: characteristics and outcomes of visits to a tertiary-care Emergency Department in Mozambique

ORAL PRESENTATIONS

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Authors Brugnolaro V.

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Pediatric Emergency Care in Low Income Countries: characteristics and outcomes of visits to a tertiary-care Emergency Department in Mozambique.

Authors: Brugnolaro V¹. MD, Nai Fovino L¹. MD, Calgaro S¹. MD, Putoto G. MD², Pizzol D². MD, Muhelo AR³. MD, Azzolina D⁴. PhD, Gregori D⁴. Prof PhD, Bressan S¹. PhD. MD, Da Dalt L¹. Prof. MD

- 1. Emergency Pediatric Department, University of Study of Padua, Padova, Italy
- 2. Doctors with Africa CUAMM, Padova, Italy
- 3. Pediatric Department, Beira Central Hospital, Beira, Mozambigue
- 4. Cardio-thoraco-vascular Science Department, University of Study of Padua, Padova, Italy

Introduction: Improving pediatric emergency care (PEC) could be critical to reduce child mortality in lowincome countries (LICs). However, the epidemiology of PEC visits is still understudied. We described the characteristics and outcomes of PEC visits presenting at a tertiary-care Pediatric Emergency Department (PED) in Mozambique, to identify healthcare flaws and eventually develop strategies to improve PEC in LICs.

Methods: We retrospectively reviewed PED visits' registries to identify patients <15 years old presenting at the "Hospital Central da Beira" (Sofala District, Mozambique, 2.000.000 inhabitants) between April 2017 and March 2018. We abstracted data on age, sex, residency, admission diagnosis, disposition, and mortality.

Results: Of 24,844 children, 58.8% were males, and 92% lived in the urban area. Mean age was 5 years (SD ±3.7 years). Chief complaints data were available for 14,204 (57%) visits. They were injury-related in 33% of cases (of which 53% were younger than 5 years of age), and due to medical conditions in 67% of visits, with respiratory diseases (29%), fever (27%) and gastrointestinal disorders (14%) being the most frequent reasons for presentation. One-fifth (20%) of children were hospitalized. Mortality was 2% (62% died within 4h from presentation). Most children (81%) who died were <5 years, with the highest mortality found in the <28 days age group (16%).

Discussion: Our results may provide valuable insight into PEC visits burden in Mozambique. Further steps will be focused on improving local documentation, exploring the reasons for the high recorded mortality, and identifying areas for improvement of care.







Focused ultrasound to diagnose HIV associated tuberculosis (FASH) in the extremely resource-limited setting of South Sudan: a cross-sectional study

PAPER

Authors

Bobbio F., Di Gennaro F., Marotta C., Kok J., Akec G., Norbis L., Monno L., Saracino A., Mazzucco W., Lunardi M.

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Topic

Tropical and infectious diseases

Focus country South Sudan



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Research

BMJ Open Focused ultrasound to diagnose HIVassociated tuberculosis (FASH) in the extremely resource-limited setting of South Sudan: a cross-sectional study

Flavio Bobbio,¹ Francesco Di Gennaro,² Claudia Marotta,⁹ John Kok,⁴ Gabriel Akec,⁴ Luca Norbis,⁵ Laura Monno,² Annalisa Saracino,² Walter Mazzucco,⁶ ⁶ Marta Lunardi⁷

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For numbered affiliations see end of article.

Correspondence to Dr Flavio Bobbio: flavio.bobbio@gmail.com

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ABSTRACT

Objective Our cross-sectional study aimed at evaluating the diagnostic performance of Focused Assessment with Sonography for HIV-associated tuberculosis (FASH) to detect extrapulmonary tuberculosis in extremely resource-limited settings, with visceral leishmaniasis as a differential diagnosis with overlapping sonographic feature.

Design Cross-sectional study. Setting Voluntary Counselling and Testing Centre (VCT) of

Yirol Hospital, South Sudan. Participants From May to November 2017, 252 HIV-positive patients out of 624 newly admitted to VCT Centre were registered for antiretroviral treatment. According to the number of trained doctors available to practise ultrasound (US) scan, a sample of 100 patients were screened using the FASH protocol

Interventions Following a full clinical examination, each patient was scanned with a portable US scanner in six different positions for pleural, pericardial, ascitic effusion, abdominal lymphadenopathy and hepatic/splenic microabscesses. according to the FASH protocol. A k39 antigen test for visceral leishmaniasis was also performed on patients with lymphadenopathy and/or splenomegaly. All demographic, clinical and HIV data, as well as FASH results and therapy adjustments, were recorded following the examination. Results The FASH protocol allowed the detection of pathological US findings suggestive of tuberculosis in 27 out of the 100 patients tested. Overall, FASH results supported tuberculosis treatment indication for 16 of 21 patients, with the treatment being based exclusively on FASH findings in half of them (8 patients). The group of FASH-positive patients had a significantly higher proportion of patients with CD4 count below 0.2 x10⁹/L (n=22. 81%) as compared with FASH-negative patients (n=35, 48%) (p=0.003). Moreover, 48% (n=13) of FASH-positive patients had CD4 below 100 cells/mm³. All patients tested had a negative result on k39 antigen test. Conclusion FASH was found to be a relevant diagnostic tool to detect signs of tuberculosis. Further research is needed to better define a patient profile suitable for investigation and also considering diagnostic accuracy.

BACKGROUND

In sub-Saharan Africa, the concomitant high burden of both HIV and tuberculosis (TB)

Strengths and limitations of this study

- > Our study analysed the yield of the diagnostic ultrasound FASH (Focused Assessment with Sonography for HIV-associated tuberculosis) protocol in detecting extrapulmonary tuberculosis in HIV-positive patients from an extremely resource-limited setting of rural African, without any other diagnostic opportunities
- It is worth mentioning that South Sudan is one of the poorest countries in Africa, with a huge need to address health and to meet healthcare demand.
- All ultrasound examinations were performed by a single clinician trained in using ultrasound.
- This is a single-centre experience with a relatively small number of patients recruited.
- Unavailability of a definitive microbiological diagnosis and lack of follow-up were the main limitations of the study.

has led to an increasing incidence of extrapulmonary tuberculosis (EPTB).¹

EPTB is found more frequently in HIV-positive than in HIV-negative individuals, and the diagnosis is often challenging even in high-income countries due to the low sensitivity and specificity of many available diagnostic tests and broad differential diagnoses.²

Ultrasound (US) can aid in the diagnosis of a variety of infectious diseases including EPTB, and the point-of-care ultrasound (POCUS) application is useful especially in resource-limited settings.4-6

Focused Assessment with Sonography for HIV-associated tuberculosis (FASH) is a US protocol aimed to detect sonographic signs of EPTB in patients with HIV infection.7 The examination is focused to find effusions (pericardial, pleural, peritoneal), intra-abdominal lymph nodes enlargement and microabscesses, especially in the spleen and



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Figure 1 FASH examination protocol: probe positions and findings (from Focus Assessment with Sonography for HIV/TB. A practical Manual, Tom Heller, 2013, TALC, with permission from the author). FASH, Focused Assessment with Sonography in HIV-associated tuberculosis.

also in the liver, using six standard scanning planes in the abdomen and lower thorax (figure 1).

POCUS plays a fundamental role in the diagnosis of different infectious conditions in contexts with limited resources, for example, TB, echinococcosis, amoebic liver abscess, intestinal schistosomiasis and visceral leishmaniasis.⁴ In particular, within the context of POCUS, FASH protocol was demonstrated to be very useful in the diagnosis of TB in both HIV-positive and HIV-negative subjects, including children and adults.8

Currently, in low-income countries with limited infrastructure and weak health systems, especially in terms of qualified human resources, treatment for EPTB is often started based exclusively on a clinical case definition.11 12 This is especially true for South Sudan, the youngest country in the world which has been suffering from years of civil war, economic downturn and famine. Endemic seasonal diseases such as malaria and a recent cholera outbreak (June 2016-February 2018)¹³ affect South Sudan's people and further strain the already weak health system.

Our study aimed to (1) evaluate the diagnostic role of FASH for EPTB in an extremely low-resource setting as Yirol Hospital, South Sudan; and (2) provide information on visceral leishmaniasis as potential relevant differential diagnosis with similar sonographic features so requiring a different management in the same context.

METHODS

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Study setting and design

An observational, cross-sectional study was designed and implemented at the Voluntary Counselling and Testing Centre (VCT) of Yirol Hospital in Eastern Lakes State, South Sudan. Yirol Hospital serves as a referral institution for the entire Eastern Lakes State, which has an estimated 442 000 inhabitants.¹⁴ Yirol Hospital has no X-ray services available and no health facilities capable of X-ray exams within reasonable distance. The VCT Centre tests patients for HIV infection in accordance with the

regulations and guidelines of the Ministry of Health of South Sudan and is authorised to provide antiretroviral treatment (ART) both for inpatients and outpatients. Subjects referred to VCT for counselling and testing are quite diversified and can be categorised into the following: (1) admitted to hospital wards (mainly medical) and sent to the centre for clinical reasons by doctors or clinical officers; (2) sent to VCT by clinical officers of the outpatient department of the hospital; (3) spontaneously coming to the centre for testing; and (4) under TB treatment and also tested positive for HIV (in South Sudan, the treatment of TB is managed by a specific non-governmental organisation that is not integrated in the hospital), or relatives to patients already enrolled.

From May to November 2017, 624 new adult patients accessed the VCT Centre of Yirol Hospital. Among these patients, 252 (40%) were positive for HIV according to the clinical guidelines used in South Sudan (Determine + Unigold).13 These patients were prospectively approached for consecutive enrolment in the study according with the availability of doctors trained for the US scan.

Following informed consent, each patient enrolled underwent a careful history and physical examination (vital signs, weight, height, and diastolic and systolic blood pressure, along with chest, abdomen and lymph node examination). Clinical staging according to the WHO classification (clinical guidelines of South Sudan for HIV) was done before US scan using clinical data only, following the protocol for all patients registered at VCT. Clinical symptoms suggestive of TB (cough, weight loss, haemoptysis, night sweats, fatigue) were enquired, and information on previous TB treatment, isoniazid preventive therapy and ART history was recorded. Acid-fast bacilli sputum smears were carried out when necessary and feasible (presence of chronic cough with sputum), while CD4 counts were done for all patients (PIMA Analyser, Alere, Jena, Germany). For patients with lymphadenopathy (presence of lymph nodes with at least a long axis diameter of more than 1.5 cm) and/or splenomegaly (bipolar axis >13 cm), k39 antigen test, a rapid test for visceral leishmaniasis, was performed (Kala-Azar test, Oscar Medicare, New Delhi, India).

At completion of the clinical examination, sonographic scans were performed according to the FASH protocol.7 In brief, each patient was scanned in six different positions (figure 1) using a portable blackand-white US scanner with convex (3.5 MHz) probe and linear (7 MHz) probe (May-October: DP-30, Mindray; November: M7 Premium, Mindray, Nanshan Shenzhen, People's Republic of China). All US examinations were performed by a single clinician trained in US. At the end of each examination, the clinician subjectively rated the quality of the US views as 'excellent', 'satisfactory' or 'problematic'. All demographic, clinical and HIV data, as well as FASH results and therapy adjustments, were recorded following the examination.

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Figure 2 Examples of ultrasound findings in patients with positive results on FASH examination admitted to Yirol Hospital, South Sudan. (A) Pericardial effusion, (B) periportal/para-aortic lymph nodes (>1.5 cm in diameter), (C) focal splenic lesions, and (D) pleural effusion and consolidation of the lungs. FASH, Focused Assessment with Sonography in HIV-associated tuberculosis.

According to FASH protocol, the examination was considered positive (FASH+) if at least one of the following US abnormalities was detected:

- ▶ Pericardial effusion (figure 2A).
- Periportal/para-aortic lymph nodes (>1.5 cm in diameter) (figure 2B).
- ► Focal splenic lesions (figure 2C).
- Pleural effusion or consolidation of the lung (figure 2D).
- ► Ascites without alternative explanation.
- ► Focal liver lesions.

It is important to note that TB treatments in South Sudan are delivered by a network of centres that are not directly related to government hospitals nor with the centres providing ART. It was thus of paramount importance to develop close relationship and trust between TB and ART centres. The TB centre in Yirol was informed about the study and agreed to initiate TB treatment based on US and clinical results.

Statistical analysis

Categorical variables were reported as absolute and relative frequencies (percentages). X^2 test (with Fisher's correction as required) was used to compare categorical variables using STATA V.13. All statistical tests were two-tailed and statistical significance was assumed for a p value <0.05.

Patient and public involvement

The research question was born to respond to the health needs of the poorest country in the world. The idea was to apply a transportable, economic method, easily applicable to the HIV and TB service in South Sudan. Patients and doctors at the Yirol Hospital were involved to better understand how to improve the project by sharing their own idea. The results of this study will be disseminated through a final report and other activities within the hospital and surrounding communities.

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RESULTS

Overall, 100 patients (52% female) were enrolled in the study and underwent full clinical examination followed by a FASH US evaluation. Table 1 summarises the demographic and clinical characteristics of the whole patient cohort stratified by FASH results (positive vs negative). Abnormal US findings consistent with FASH positive exams were detected in 27 (27%) patients.

The FASH-positive patients group had a significantly higher proportion of patients with CD4 count below 0.2 $\times 10^9/L^3$ (n=22, 81%) as compared with FASH-negative patients (n=35, 48%) (p=0.003); moreover 48% (n=13) of FASH-positive patients had CD4 below 100 cells/mm³.

WHO HIV stage significantly differed in the two groups (p=0.001), with a higher proportion of stage III (n=17, 63%) and stage IV (n=5; 18%) in FASH-positive patients as compared with the negative ones. Of the FASH-positive patients, 93% (n=25) were ART-naïve, even if no statistical difference was documented with the comparison group (p=0.177). The proportion of patients accessing a previous TB treatment was significantly higher (p=0.003) in FASH-positives (n=7, 26%) as compared with patients who are FASH-negative (n=3, 4%). A borderline statistical difference was highlighted between positive and negative FASH patients with regard to pharmacological TB prophylaxis (p=0.059), this practice being more frequently reported in FASH-positive patients (n=10, 37%) than in negative ones (n=13, 18%).

FASH positivity results, according to WHO HIV stage, are shown in figure 3. The proportion of FASH positivity significantly increases with the stage as compared with FASH-negative group (p=0.001).

In table 2 are reported additional diagnostic results of the 27 patients with US pathological findings. Sputum test was positive in 5 of the 27 patients (18%), while all the patients tested for k39 had negative results. Eighty-eight per cent of FASH-positive patients were symptomatic, but clinical examination resulted negative in 74% (n=20) of patients for palpable lymph adenopathies, in 89% (n=24)



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 Table 1
 Demographic and clinical characteristics of 100 patients recruited at Yirol Hospital, South Sudan, stratified by FASH

results				
	Total (N=100)	FASH-positive (n=27)	FASH-negative (n=73)	P value
	[Demographic characteris	tics	
Gender				
Male	48 (48)	12 (44)	36 (49)	0.82
Female	52 (52)	15 (55)	37 (51)	
Age				
18–30	34 (34)	6 (22)	28 (38)	0.26
31–40	44 (44)	12 (44)	32 (44)	
41–50	14 (14)	6 (22)	8 (11)	
>50	8 (8)	3 (11)	5 (7)	
Address				
Yirol Town	36 (36)	14 (52)	22 (30)	0.272
Yirol East	35 (35)	8 (30)	27 (37)	
Yirol West	22 (22)	4 (15)	18 (25)	
Other	7 (7)	1 (4)	6 (8)	
Setting				
Inpatient	58 (58)	19 (70)	39 (53)	0.17
Outpatient	42 (42)	8 (30)	34 (47)	
		Clinical characteristics	3	
Body mass index (kg/ m²)				
Low <18	83 (89)	20 (74)	63 (86)	1
Normal 18–25	9 (10)	2 (7)	7 (10)	
High >25	1 (1)	0 (0)	1 (1)	
CD4				
0.2 x10 ⁹ /L	57 (57)	22 (81)	35 (48)	0.003
WHO HIV stage				
I	13 (13)	0 (0)	13 (18)	0.001
II	30 (30)	5 (18)	24 (33)	
Ш	50 (50)	17 (63)	33 (45)	
IV	7 (7)	5 (18)	2 (3)	
Previous antiretroviral tr	eatment			
Yes	3 (3)	2 (7)	1 (1)	0.177
No	97 (97)	25 (93)	72 (99)	
Previous TB treatment				
Yes	10 (10)	7 (26)	3 (4)	0.003
No	90 (90)	20 (74)	70 (96)	
TB prophylaxis				
Yes	23 (23)	10 (37)	13 (18)	0.059
No	77 (77)	17 (63)	60 (82)	
	at with Sonography in HIV or	especiated tuberoulosis: TP, tub	boroulogia	

for lung abnormalities and in $85\%\,$ (n=23) for abdomen abnormalities.

The pathological findings documented in the 27 FASH-positive patients are summarised in table 3. Of the

three patients with ascites, one had an additional pleural effusion and one had splenic microabscesses. With regard to one patient with ascites as the only finding, as no other cause for ascites was detected (normal liver, spleen,

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Figure 3 WHO HIV stage according to FASH positivity among the 100 enrolled patients at Yirol Hospital, South Sudan. FASH, Focused Assessment with Sonography in HIVassociated tuberculosis.

heart and kidneys) and his CD4 count was very low (28 cells/mm³), also in light of the presence of a clinical wasting syndrome, it was decided to start TB treatment.

TB treatment was initiated in 21 (21%) patients after complete clinical and diagnostic examination (table 4). Overall, FASH results supported TB treatment indication in 76% (n=16) of all patients started; of interest, in half of them (n=8), treatment was based exclusively on FASH findings.

Table 2Additional diagnopatients with positive resultto Yirol Hospital, South Suc	stic characteristics of the 27 ts on FASH examination, admitted dan
Sputum test	
Positive	5 (18)
Negative	13 (48)
Not done	12 (44)
Kala-Azar test	
Negative	13 (48)
Not done	14 (52)
Symptoms	
Yes	24 (89)
No	3 (11)
CD4 (cells/mm ³)	
<100	13 (48)
>100 to ≤200	9 (33)
>200	5 (18)
Lymph nodes clinical exam	lination
Yes	7 (26)
No	20 (74)
Lung clinical examination	
Positive	3 (11)
Negative	24 (89)
Abdomen clinical examinat	ion
Positive	4 (15)
Negative	23 (85)
EASH Ecourad Accompany	with Sopography in HIV associated

FASH, Focused Assessment with Sonography in HIV-associated tuberculosis.

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Table 3Sonographic findings in 27FASH examination, admitted to Yirol	patients with positive Hospital, South Sudan
Pathological findings	n (%)
Periportal/para-aortic lymph nodes	15 (55)
Pericardial effusion	9 (33)
Lung consolidation	8 (30)
Pleural effusion	5 (18)
Splenic focal lesions	4 (15)
Ascites	3 (11)
Ascites in the pouch of Douglas	3 (11)
Liver focal lesions	1 (4)
Ascites in the splenorenal pouch	1 (4)
Ascites in the hepatorenal pouch (Morison's pouch)	0 (0)

FASH, Focused Assessment with Sonography in HIV-associated tuberculosis.

Out of 27 patients with abnormal FASH results, only 18 started TB treatment. Several reasons determined this clinical decision: two patients with pericardial effusion left the hospital before starting treatment; five were positive for pleural effusion or lung consolidation and were first treated as pneumonia with improvement; one showed a single focal hypoechoic lesions of the liver with an axis of 2 cm and was addressed to start ART treatment with a strict follow-up of the liver lesion; and one patient with abdominal lymph nodes, peritoneal and pleural-free effusion and splenic hypoechoic lesions died before initiating TB treatment. All patients (n=13) with enlarged lymph nodes, splenomegaly or splenic lesions were tested for antibody against k39 protein and all tests were negative.

The quality of the US examination rated by the clinician was 'excellent' in 39% (n=39) and 'satisfactory' in 56% (n=56); 5% (n=5) of the exams were considered 'problematic'.

Table 4 Indications for TB treatment initiation in 21 patients among the 100 enrolled at Yirol Hospital, South Sudan				
Indication for TB treatment initiation	n (%)			
Only FASH	8 (38.1)			
Only sputum test	0 (0)			
Only clinical reasons	2 (14.3)			
FASH + sputum test	4 (19.0)			
FASH + clinical reasons	3 (14.3)			
Sputum test + clinical reasons	2 (9.5)			
FASH + sputum + clinical reasons	1 (4.8)			
Total FASH	16 (76.2)			
Total sputum test	8 (38.1)			
Total clinical reasons	5 (23.8)			

FASH, Focused Assessment with Sonography in HIV-associated tuberculosis; TB, tuberculosis.



DISCUSSION

This observational study evaluated the yield of a diagnostic tool (FASH) for EPTB in Eastern Lakes State (Yirol Hospital), South Sudan. The FASH protocol allowed the detection of pathological US findings suggestive of TB in 27 out of the 100 patients tested.

The most frequent pathological findings documented were periportal/para-aortic lymph nodes, pericardial effusion and lung consolidation. FASH findings were more likely to be detected in patients with advanced HIV disease with CD4 count <200 cells/mm³, WHO stage III/IV and low body mass index (BMI). The quality of the US view was mostly rated as excellent and satisfactory by the clinician performing the examination.

Our findings support the important role of this simple, inexpensive and fast technique in resource-limited setting as the Yirol Hospital.^{15–17} Moreover, we were able to identify a core group with the highest yield in FASH, represented by patients with low BMI, low CD4 and advanced WHO stage.

FASH can be taught rapidly to physicians with limited or no prior US experience.¹⁸ In high prevalence setting, the learning process is facilitated by the presence of pathological findings in a large proportion of HIV/TB coinfected patients,¹⁹⁻²² which is supported by our data. Moreover, the fact that many patients under investigation are underweight makes scanning easier, as abdominal volume interfering with scanning becomes less relevant. The examination takes only a few minutes and may provide important findings with a direct and significant impact on patient management.^{2 23} Nevertheless, an important operational question is related to operators who can reliably use this diagnostic technique. In our single-centre experience, we did not succeed in motivating the local clinical officers of the hospital to be trained in the use of US. Young clinicians seemed absolutely more motivated. This is probably related to the poor capacity of the lower cadre of clinical staff in using diagnostic imaging tools and to the fact that the clinical officers in Yirol Hospital are not exclusively dedicated to the care of patients with HIV, and they had many concurrent competing tasks and activities

Although the diagnosis of EPTB based on abnormal US examination is not certain, it is justified to start a TB treatment based on these findings considering data from the literature and the lack of any other diagnostic tools for further work-up in a rural health setting.

In the region where the study was conducted, there are no epidemiological data for *Leishmania* spp infection, but this infectious disease is known to be locally prevalent in South Sudan. According to the documents of the Ministry of Health of South Sudan, visceral leishmaniasis is endemic in four states in South Sudan, namely Upper Nile, Unity, Jonglei and Eastern Equatoria; 2.7 million people are considered to be at risk in 28 counties.^{24–26} For this reason, we also tested patients for visceral leishmaniasis as this could be considered a potential differential diagnosis with overlapping imaging findings of enlarged lymph nodes and spleen lesions. With the sensitivity and specificity of the immunochromatographic strip test being more than 90%,²⁷ by using the k39 antigen test in patients with an abnormal US result we were able to

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exclude the presence of visceral leishmaniasis. Our study has some limitations, which include the relatively small number of patients, the unavailability of a definitive microbiological diagnosis and the lack of follow-up, but we believe our results remain relevant in light of the study setting. South Sudan is a country devastated by civil war, economic downturn and health epidemics such as cholera. As reported by previous studies conducted in such a deprived context with a vulnerable target population affected by HIV-related diseases,^{28–29} healthcare organisational models, human and technical resources, especially the availability of diagnostic tests, may have relevant implications on the pathways of care dedicated to patients with HIV.³⁰

There is an increasing interest in employing US in low-income and middle-income countries given its relatively steep learning curve, ionisation radiation-free nature and its increasing availability at reasonable costs.^{4 17 31} Moreover, it can be portable and can operate with batteries, being independent from a stable electric power supply.⁴ US gel, the only routine supply item needed, can be easily produced locally, thus making US an attractive option in resource-limited settings.¹⁶ On the other hand, some concern remains about the intrinsic interobserver variability and the potential for diagnostic errors, which should moreover be investigated specifically for TB. While the conditions for a wider implementation are favourable, few studies have been performed in low-income countries especially in rural settings. Our observation adds to the available evidence indicating that the use of FASH for the diagnosis of TB can be useful in this setting.

CONCLUSIONS

FASH was found to be a relevant diagnostic tool to detect signs of EPTB, even in an extremely resource-limited setting such us South Sudan, where HIV and TB incidence is high and radiological and microbiological investigations are scarce. Our data contributed data to better characterise a patient population with the highest yield, namely patients with low BMI, low CD4 and advanced WHO stage, while further research that considers feasibility and diagnostic accuracy is needed. Other interesting fields requiring further research include the training of health operators and the shifting of the procedure to the local staff.³⁰

Author affiliations

¹Doctors With Africa CUAMM, Yirol, South Sudan ²Infectious Diseases, University of Bari, Bari, Italy ³Department of Sciences for Health Promotion and Mother to Child Care G.D Alessandro, University of Palermo, Palermo, Italy ⁴Virol Hospital, Virol, South Sudan ⁵Ospedale San Raffaele, Milano, Lombardia, Italy

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⁶Department of Sciences for Health Promotion and Mother to Child Care G.D Alessandro, University of Palermo, Palermo, Italy ⁷Doctors With Africa CUAMM, Yirol, South Sudan

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Data sharing statement The data that support the findings of this study are available on demand from the authors upon reasonable request and with permission from Doctors with Africa Cuamm.

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Uncommon testicular localization of Disseminated TB: a case report from Mozambique

PAPER

Authors

Namburete E.I., Di Gennaro F., Jose Maria C., Bavaro D.F., Brindicci G., Lattanzio R., Pizzol D., Monno L., Saracino A.

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Case report

Uncommon testicular localization of Disseminated TB: a case report from Mozambique

Evangelina Inacio Namburete¹, Francesco Di Gennaro^{*2}, Cleide Jose Maria¹, Davide Fiore Bavaro², Gaetano Brindicci², Rossana Lattanzio², Damiano Pizzol³, Laura Monno², Annalisa Saracino²

¹Department of Medicine, Central Hospital of Beira, Mozambique

²Clinic of Infectious Diseases, University of Bari "Aldo Moro," Bari, Italy.

³Operational Research Unit, Doctors with Africa Cuamm, Maputo, Mozambique

Running title: Disseminated TB: a rare case report from Mozambique

SUMMARY

Tuberculosis (TB) of the testicle is a rarely reported and poorly described disease localization. There are no well-defined clinical features suggestive of testicular TB, which makes the diagnosis difficult to establish, especially in low-income settings like Mozambique, where TB is endemic and often associated with HIV-infection; both considered leading causes of death worldwide.

We reported the case of a 45-year-old male, HIV positive, naïve to antiretroviral treatment, admitted to the Department of Medicine of the Central Hospital of Beira to investigate chronic enlargement of the testicles.

Keywords: Tuberculosis, testicular TB, HIV, disseminated TB

Corresponding author: Francesco Di Gennaro

Clinic of Infectious Diseases, University of Bari "Aldo Moro," P.zza G Cesare 3 Bari, Italy Email: cicciodigennaro @ yahoo.it; Number: +39 0805592471; Fax: +39 0805592890



INTRODUCTION

Tuberculosis (TB) and HIV are a public health challenge for Mozambique; moreover, TB-HIV co-

Tuberculosis (TB) and HIV are a public health challenge for Mozambique; moreover, TB-HIV co-infections are increasing in this country, so that in 2008 about 60% of TB patients resulted anti-HIV positive (WHO, 2017). In fact, Mozambique, holding the 19th position in the ranking of the 22 countries with the highest number of TB cases in the world, is also burdened with one of the highest HIV-infection prevalence, with an estimated 62,000 deaths per year (WHO,2016; WHO, 2017; Di Gennaro e al.,2018).

TB and HIV are strictly correlated; in fact, HIV-1 infection greatly increases the risk of active TB, and TB, in turn, is an AIDS-defining illness (WHO, 2017). Pulmonary TB is the most common presentation of the disease, while extra-pulmonary TB (EPTB) accounts for about 10-15% of all cases (Krishnan et al., 2010; Webster et al., 2015). Among EPTB cases, lymph nodes are the most frequent localization of the disease. Conversely, genital tuberculosis is overall rare, and testicular localization is even more rare, accounting for less than 3% of all genital TB (Seo et al., 2013; Dong et al., 2015). Generally, testicular involvement occurs during disseminated TB, while testicular TB as sole localization is extremely rare (Mohammed et al., 2018; Das et al., 2016). Differential diagnosis should be established with other common testicular diseases such as cancer, testicular infarction or torsion (Khan et al., 2015), since the most common sign of testicular infarction and cancer (Bhargava et al., 2009; Badmos et al., 2012), young adults between 20 and 40 years are the most affected. However, unlike other illnesses, testicular pain may be missing in testicular TB, while systemic symptoms related to tuberculosis are commonly present (weight loss, night sweats, serotina fever, etc.).

Therefore, ultrasonography (US) is essential to confirm the clinical suspicion and should be followed by a fine-needle aspiration biopsy (FNAB) in ambiguous cases, especially in patients at higher risk for malignancies, like elderly patients (Paul et al., 2010; Bae et al., 2015, Bobbio et al., 2019). When testicular TB is diagnosed either correctly or early, the standard treatment with rifampicin, isoniazid, pyrazinamide, and ethambutol is the gold standard therapy (Gaifer et al., 2017; Das et al., 2016).

Herein, we present an uncommon case of disseminated TB diagnosed thanks to the testicular involvement.

CASE REPORT



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A 45-year-old male was admitted to the Medicine Department of the Central Hospital of Beira due to durable enlargement of the testis. The volume of the right testis had increased about two months before; after a few days, the patient noted that also the left testis was swollen. Although he was initially asymptomatic, he began to complain of increasing bilateral testicular pain associated with intermittent fever (T max 37.4C°), loss of weight, generalized weakness, anorexia, and nightmares. Apart from these symptoms, he did not complain about other diseases, like diabetes or chronic kidney impairment, and denied smoking or excessive alcohol consumption. However, the patient was aware of his HIV-positive status, although he had never accepted antiretroviral treatment.

Physical examination

At admission, he was clinically stable, alert, oriented and eupnoic; urgent vital medical support was not required. Nevertheless, his general condition was poor, dehydrated and cachectic. Body temperature was 37.4°C, heart rate was 92 beats per minute and respiratory rate was 18 acts per minute. Blood pressure was 120/70 mmHg and oxygen saturation rate in ambient air was 98%.

Clinical examination of the thorax showed no abnormalities, with no respiratory symptom, as did examination of the abdomen. Heart sounds were rhythmic without added pathologic noises. No enlarged lymph nodes were found. Both testicles were increased in volume; the skin of the right scrotal area was thickened, but local temperature and color were normal and without other signs of local illness.

Blood tests

Blood count showed medium-severe anemia (HGB-8.9 g /dl) and a slight leukocytosis (white blood cells were 13,300 cells/mm3) with increased absolute number of neutrophils (Neut-79.7%; 10600/µl). Erythrocyte sedimentation rate (ESR) was considerably high (85mm/h).

Other available blood tests at the time of admission were: RBC-3100/ μ l; HCT-26.1%; MCV-74.2fl; MCH-25.7pg; MCHC-34.1g/dl; PLT-159000/ μ l; LYM-12.2%, 1600/ μ l; 1100 μ l. HIV Determine and Unigold-Reagent; CD₄- 3.53%; 21 cells / μ l. The Quantiferon-TB gold was unavailable at the Hospital of Beira.

Radiological features

The chest x-ray, prescribed after the HIV-positive result, showed a miliary-reticulo-nodular pattern involving both the pulmonary parenchyma and the periphery (Figure 1), although the patient denied any respiratory symptom. The scrotal ultrasound examination of both right and left testis (3.14-3.21cm and 3.29-3.51cm, respectively) showed a generally homogeneous echo-





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texture. However, some abnormal echoic areas were present in the left testis. Therefore, a testicular fine needle aspiration biopsy was performed, and four smears (two each testis) were examined after May-Grunwald Giemsa coloration. A colliquate white nodule was observed, suggestive of granuloma with central necrosis. Ziehl-Neelsen staining and blood mixed particulate obtained by fine needle aspiration biopsy revealed acid-fast bacilli (AFB) (Figure 2).

After the diagnosis of testicular and pulmonary TB was confirmed, a standard anti-TB treatment regimen was prescribed: rifampicin; isoniazid, pyrazinamide and ethambutol RHZE (150mg/75mg/400mg/275mg), 4 tablets a day for 2 months, followed by rifampicin and isoniazid (RH) (150mg/75mg), 4 tablets a day for four months. Counseling to ensure good adherence to treatment was provided.

Antiretroviral treatment with Tenofovir (300 mg daily) plus Lamivudine (300 mg daily) plus Efavirenz (600 mg/die) started one month after the initiation of TB therapy.

The patient was referred to the out-patients Department of Urology and Infectious Diseases to continue the follow-up. Complete resolution of testicular swelling and pain, and of the X-Ray chest image was documented at the end of 6 months of treatment.

DISCUSSION

Genitourinary TB is an unusual presentation of TB, accounting for 8-15% of extra-pulmonary TB and affecting mainly males (male/female ratio 2:1) in the 30 to 50 age group (Hadadi et al, 2012; Das et al., 2016).

The mechanism of tubercular bacilli dissemination to the testis is unclear. Hematogenous and/or lymphatic diffusion is a possible but rare cause, while the retrograde diffusion from the urinary tract (including prostate, seminal vesicle, vas deferens and epididymis) is considered more frequent (Krishnan et al., 2010; Pasticci et al., 2012).

Testicular tuberculosis generally complicates a previous urinary tract and/or kidney tubercular infection; thus, it is often associated with urinary urgency or hematuria. Epididymo-orchitis, prostatitis, scrotal ulcer, and swelling (with or without discharge sinus) may be other manifestations associated (Fanosie et al., 2016; Gaifer et al., 2017).

In our case, the initial presentation was the swelling of the right scrotum with subsequent volume increase of the ipsilateral testis and the emergence of pain in both testicles. Notably, no respiratory or urinary tract symptoms were reported by the patient.



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In this case, US was the main diagnostic tool to exclude other testicular diseases (cancer and torsion) and to detect signs of possible extra-pulmonary TB (Yadav et al.,2017; Paul et al., 2010).

It should be remarked that, in a low-income setting like Mozambique, Quantiferon Tb test as well as other radiological and microbiological diagnostic tools are frequently too expensive and/or unavailable, even though required because of the high incidence of HIV-infection and TB (Fanosie et al., 2016; Di Gennaro et al., 2018; Schiavone et al., 2016, Marotta et al., 2018). Last but not least, performing FNAB was crucial to confirm TB diagnosis. To the best of our knowledge, there are no alternative algorithms for the diagnosis of testicular TB in low-income settings, where microbiological tools are unavailable (Yadav et al., 2017; Fumo et al., 2016; Bonura et al., 2012). Indeed, FNAB is the main diagnostic method in our experience, especially in this HIV-infected patient, and avoided more complex and invasive medical intervention, such as orchidectomy (Bhargava et al., 2009; Seo et al., 2013).

Notably, our patient presented many of the risk factors for EPTB reported in a recent metanalysis: HIV status, age, malnutrition, diabetes, African origin (Mohammed et al., 2018; Pizzol et al., 2017). Although it was not possible to perform the Genexpert test to confirm the rifampicin-sensibility, the six-month regimen of standard anti-TB chemotherapy effectively obtained a complete resolution of disseminated TB. Furthermore, other experiences in the literature have shown that the testicular localization of TB, generally rare, was more frequently observed in primary than in disseminated Tuberculosis, mimicking cancer metastasis (Dong et al., 2015; Paul et al., 2010).

This report presents not only a rare case of testicular TB successfully managed, useful for healthcare professionals in low-income countries facing similar situations, but also leads to some considerations. First, in HIV-positive patients, especially those naive to antiretroviral treatment, TB should be suspected in every case, even with uncommon localization (Norbis et al., 2012; Yadav et al., 2017).

Second, radiographic TB pulmonary screening should be prescribed for all HIV-positive patients, even without any known or objective evidence suggestive of active TB. This screening is crucial in low-resource settings, where other TB tests are usually unavailable (Khan et al., 2015; Tatar et al., 2009). Special attention should be paid to people with lower socioeconomic status due to their increased risk of disease and treatment failure (Di Gennaro et al., 2017). Finally, we would like to underline how case reports might help as a form of experience-sharing platform, especially for healthcare professionals in low-income countries, thereby playing an important role in solving complex and uncommon clinical cases.



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Figure 1. Chest x-ray image showing reticulo-nodular infiltrates with miliary pattern in both lung parenchyma.



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Figure 2. Panels A and B show granulomas with central necrosis





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Quaglio G., Pizzol D., Isaakidis P., Bortolani A., Tognon F., Marotta C., Di Gennaro F., Putoto G., Olliaro P.L.

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Breast Tuberculosis in Women: A Systematic Review

Gianluca Quaglio,^{1,2,3*} Damiano Pizzol,⁴ Petros Isaakidis,⁵ Anna Bortolani,² Francesca Tognon,² Claudia Marotta,² Francesco Di Gennaro,⁶ Giovanni Putoto,² and Piero L. Olliaro^{7,8}

¹European Parliamentary Research Services (EPRS), European Parliament, Brussels, Belgium; ²Operational Research Unit, Doctors with Africa, Collegio Universitario Aspiranti e Medici Missionari (CUAMM), Padua, Italy; ³Department of International Health, Care and Public Health Research Institute (CAPHRI), Faculty of Health, Medicine, and Life Sciences, University of Maastricht, Maastricht, The Netherlands; ⁴Operational Research Unit, Doctors with Africa CUAMM, Beira, Mozambique; ⁵Médecins Sans Frontières, Southern Africa Medical Unit (SAMU), Cape Town, South Africa; ⁶Department of Infectious Diseases, University of Bari, Bari, Italy; ⁷Special Programme for Research and Training in Tropical Diseases, World Health Organization (WHO/TDR), Geneva, Switzerland; ⁸Nuffield Department of Medicine, Centre for Tropical Medicine and Global Health, University of Oxford, Oxford, United Kingdom

Abstract. Breast tuberculosis (TB) is rarely reported and poorly described. This review aims to update the existing literature on risk factors, clinical presentations, constitutional symptoms, diagnostic procedures, and medical and surgical treatments for breast TB. In all, 1,478 cases of breast TB were collected. Previous history of TB was reported in 19% of cases. The most common clinical appearance of the lesion was breast lump (75%). The most common associated finding was axillary lymphadenitis (33%) followed by sinus or fistula (24%). The most common symptoms were pain and fever, reported in 42% and 28% of cases, respectively. The most used diagnostic method was fine-needle aspiration cytology (32%), followed by biopsy (27%), acid-fast bacteria Ziehl–Neelsen stain (26%), culture (13%), and polymerase chain reaction (2%). These tested positive in 64%, 93%, 27%, 26%, and 58% of cases, respectively. The majority (69%) of patients received a 6-month anti-TB treatment (isoniazid, rifampicin, pyrazinamide, and ethambutol). Surgery consisted of excision in 39% of cases, drainage in 23%, and mastectomy in 5%. The great majority of patients had a positive outcome. It often mimics breast cancer, which makes it difficult to diagnose. Most patients, when diagnosed in time, respond to antitubercular therapy alone.

INTRODUCTION

Globally, tuberculosis (TB) is now the number one killer infectious disease. More than 95% of TB deaths occur in low- and middle-income countries (LMICs), where TB is among the top three causes of death for women aged 15 to 44.¹ Any organ can be affected by TB, but the breast is an uncommon extrapulmonary TB site.² The first case of breast TB was described by Cooper in 1829 as, "scrofulous swelling of the bosom of young women,"³ but the first detailed description of the disease was not reported until the end of the 19th century by Richet⁴ and Powers.⁵ It is generally believed that the infection of the breast is usually secondary to a primary site elsewhere in the body, which may or may not be clinically apparent^{6,7}; however, breast TB may be the primary site when no demonstrable tuberculous focus exists elsewhere. Lymphatic spread by retrograde extension from the axillary lymph nodes is considered the most common way the disease spreads. Propagation from cervical and mediastinal lymph nodes has occasionally been reported.2

There are no well-defined clinical features suggestive of breast TB. Because of its protean clinical presentations, establishing a diagnosis is difficult. For instance, it may be confused with breast carcinoma or pyogenic abscess.^{2,8} The diagnostic delay can last months, and patients often undergo numerous investigations and unsuccessful treatments before a definitive diagnosis is made.^{9,10} The most common clinical presentation is a lump, with or without a duct, painful or not.⁶ The lump can mimic carcinoma, being hard, with irregular borders, and fixed to either the skin or the

muscle or even to the chest wall.^{8,11} Other presentations include diffuse breast swelling and edema, diffuse nodularity, nipple retraction, fistulization, multiple sinuses, skin ulcers, and recurrent abscess with or without axillary involvement.^{12–15}

There are different ways to diagnose and follow up breast TB, although none are ideal because of a combination of technical limitations and no or limited availability, particularly in LMICs. The gold standard for diagnosis is the detection of Mycobacterium tuberculosis by acid-fast bacteria Ziehl-Neelsen stain (AFB) or the isolation of the organism from the lesion on culture, but the former lacks sensitivity in paucibacillary samples, and the latter is relatively expensive and impractical in some low-resource settings.^{2,8} An alternative is polymerase chain reaction (PCR) to identify the M. tuberculosis genetic material, but it is rarely used.¹⁵ Fineneedle aspiration cytology (FNAC)-which detects the presence of epithelioid cell granulomas and necrosis-is often used instead, but has drawbacks-differential diagnosis is difficult in cases of granulomatous mastitis and sarcoidosis, for instance.^{16,17} Histopathology on biopsy identifies a chronic granulomatous inflammation (with caseous necrosis and Langhans-type giant cells).8 Investigations such as ultrasonography, mammography, computed tomography, and magnetic resonance imaging do not give a conclusive diagnosis and, once again, are not widely available in LMICs.^{12,15,18-21} Treatment generally involves anti-TB medications with or with-out surgery.^{2,6} Medical treatment often consists of an intensive four-drug, 2-month phase with isoniazid, rifampicin, pyrazinamide, and ethambutol, followed by a two-drug, 6-month (or longer) continuation phase with isoniazid and rifampicin.

Despite several published literature reviews of breast TB,^{7,10,18,22,23} a systematic review has not been conducted. Therefore, we aimed to update and expand the existing evidence base by systematically reviewing the English, Spanish, and French literature about risk factors and clinical, diagnostic, and therapeutic aspects of breast TB in women.



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^{*}Address correspondence to Gianluca Quaglio, European Parliamentary Research Services (EPRS), European Parliament, Rue Wiertz 60, Brussels B-1047, Belgium. E-mail: gianluca.quaglio@europarl. europa.eu

Impact of Ebola outbreak on reproductive health services in a rural district of Sierra Leone: a perspective observational study

PAPER

Authors

Quaglio G., Tognon F., Finos L., Bome D., Sesay S., Kebbie A., Di Gennaro F., Camara B.S., Marotta C., Pisani V., Bangura Z., Pizzol D., Saracino A., Mazzucco W., Jones S., Putoto G.

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Research

BMJ Open Impact of Ebola outbreak on reproductive health services in a rural district of Sierra Leone: a prospective observational study

Gianluca Quaglio,^{1,2,3} Francesca Tognon,⁴ Livio Finos,⁵ David Bome,⁶ Santigie Sesay,⁶ Atiba Kebbie,⁷ Francesco Di Gennaro,⁸ Bienvenu Salim Camara,⁹ Claudia Marotta,^{9 10} Vincenzo Pisani,⁷ Zainab Bangura,⁷ Damiano Pizzol,³ Annalisa Saracino,⁸ Walter Mazzucco,^{9 10} Susan Jones,¹¹ Giovanni Putoto³

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For numbered affiliations see end of article.

Correspondence to Dr Gianluca Quaglio; gianluca.quaglio@europarl. europa.eu

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ABSTRACT

Objectives To assess the trends concerning utilisation of maternal and child health (MCH) services before, during and after the Ebola outbreak, quantifying the contribution of a reorganised referral system (RS).

Design A prospective observational study of MCH services.

Setting Pujehun district in Sierra Leone, 77 community health facilities and 1 hospital from 2012 to 2017. Main outcome measures MCH utililization was evaluated by assessing: (1) institutional deliveries, Cesareansections, paediatric and maternity admissions and deaths. and major direct obstetric complications (MDOCs), at hospital level; (2) antenatal care (ANC) 1 and 4, institutional delivery and family planning, at community level. Contribution of a strengthened RS was also measured. Results At hospital level, there is a significant difference between trends Ebola versus pre-Ebola for maternal admissions (7, 95% Cl 4 to 11, p<0.001), MDOCs (4, 95% Cl 1 to 7, p=0.006) and institutional deliveries (4, 95% Cl 2 to 6, p=0.001). There is also a negative trend in the transition from Ebola to post-Ebola for maternal admissions (-7. 95% CI -10 to -4, p<0.001), MDOCs (-4, 95% Cl -7 to -1, p=0.009) and institutional deliveries (-3, 95% Cl -5 to -1, p=0.001). The differences between trends pre-Ebola versus post-Ebola are only significant for paediatric admissions (3, 95% Cl 0 to 5, p=0.035). At community level, the difference between trends Ebola versus pre-Ebola and Ebola versus post-Ebola are not significant for any indicators. The differences between trends pre-Ebola versus post-Ebola show a negative difference for institutional deliveries (-7, 95% Cl -10 to -4, p<0.001), ANC 1 (-6, 95% CI -10 to -3, p<0.001), ANC 4 (-8, 95% CI -11 to

-5, p<0.001) and family planning (-85, 95% Cl -119 to -51, p<0.001).

Conclusions A stronger health system compared with other districts in Sierra Leone and a strengthened RS enabled health facilities in Pujehun to maintain service provision and uptake during and after the Ebola epidemic.

INTRODUCTION

The 2014–2015 Ebola virus disease (EVD) outbreak was the most severe in history,

Strengths and limitations of this study

- The study uses data from a remote rural district in Sierra Leone, with a 6-year observational period. Data have been collected in a prospective way, reducing the potential bias in the accuracy of the data reported by other studies carried out in countries affected by Ebola.
- Data from pre, intra and post-Ebola periods allowed comparisons between trends, something rarely carried out in countries heavily affected by Ebola.
- The data refer to a single area of Sierra Leone: the sample cannot be considered representative of the country as a whole.
- In addition to measures put in place to reduce the impact of the disease on mothers and children, Pujehun had far fewer Ebola cases than other districts, which may also have led to the utilisation of health services.

mainly affecting three West African countries; Guinea, Sierra Leone and Liberia. Overall 28616 people were infected of which 11310 died and the outbreak was declared a global public health emergency by the WHO.1 Of the three countries affected, Sierra Leone had the most confirmed cases (8704), which accounted for 50% of all confirmed cases in West Africa, and 3589 deaths.²⁻⁴ All 14 districts in Sierra Leone were affected, but at different times and to varying degrees.⁵ During the Ebola crisis, the population's trust in the national health system declined in Sierra Leone, leading to an overall reduction in the use of health services, including reproductive, maternal and child services.⁶ Underlying factors for the decrease in the use of health services included fear of infection, for both healthcare workers and patients, the underlying fragility of the health systems, the

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reduced numbers of available health personnel and the death of healthcare workers due to EVD.^{9 10} It has been estimated that 30% of health workers who died of EVD in West Africa were maternal and child health (MCH) care providers.¹¹ However, there were considerable variations in the reduction of health service uptake when looked at by district level in Sierra Leone.^{6 12–14} While districts such as Kambia, Port Loko and Bonthe showed large reductions in facility-based delivery (between 38% and 41%), the district of Pujehun showed only a 5% decrease in the same service. Similar geographic variations were seen in the reduction in antenatal care (ANC) visits.^{12 13}

The number of confirmed EVD cases—and deaths—varied considerably by district. There were no >100 confirmed cases in both Bonthe and Pujehun, and up to 4000 confirmed cases in both Port Loko and Bombali.¹⁵ However, public fear of Ebola, regardless of the actual number of cases per district, may still have prevented many people from accessing services. The challenge of providing adequate levels of care during a humanitarian emergency such as the EVD crisis was further exacerbated by the weak health system in Sierra Leone, particularly in rural areas where the poor condition of the roads and high transport costs cause delays in accessing services, and contribute to increased maternal and neonatal mortality.¹⁶

Doctors with Africa (DwA) CUAMM is an Italian non-governmental organization (NGO) working in Sierra Leone since 2012. It is present in the Pujehun district focusing on MCH care both at hospital and community level.¹⁷¹⁸ In this paper, community level refers to peripheral health units (PHUs), that is, all health facilities outside the hospital. As described in our previous reports,^{17 18} a number of measures were put in place to control the Ebola epidemic in the Pujehun district which might have reduced the impact of the disease on mothers and children compared with other districts. During this EVD epidemic, the predominantly vertical focus on outbreak control was associated with failures in providing effective care for routine health needs.¹⁹⁻²¹ In contrast, the approach implemented in the Pujehun district was not based on vertical actions and 'humanitarian response to health emergencies with a short half-life'.²¹ Rather, it worked on strengthening all the components of the health system-governance, human resources, community involvement-before, during and after the epidemic. A rapid response to the crisis by the local health authorities was implemented adopting public health measures before any other district in Sierra Leone.² The activities were mainly concentrated on keeping the health service open and properly functioning in order to reduce the collateral effects of the epidemic on routine health services. No health units in the Pujehun district were closed during the epidemic. Measures to empower community leaders and use culturally appropriate methods of communication helped to dispel community mistrust in the health services. At community level, a number of strategies were implemented such as the regular rotation of health facility staff, which strengthened teamwork and effective leadership. In Sierra Leone, healthcare workers 6

based at community health centres may often work alone in isolated centres with limited support from clinical colleagues or management. By rotating staff through the various facilities, they gain on the job training, peer support and develop new working relationships. At the start of the Ebola epidemic, many expatriate healthcare workers in NGOs left Sierra Leone, negatively affecting care delivery and staff morale. The continued presence of international teams in the daily activities in Pujehun hospital and the acceptance of the professional risks by both national and international staff may have contributed to maintaining an attitude of 'normality' in an extremely stressful environment. This might also help to explain the population's positive receptiveness towards the health services.^{17 18}

Different types of referral systems (RSs) such as motorbikes were present in the country in the pre-Ebola period to transport patients from the villages to the nearest health facility. Ambulances were also present in several districts with 73% of health facilities nationwide having a functioning RS, 59% of them consisting of an ambulance on call.^{12 23} In the Pujehun district, the RS was barely functioning, only able to support the activity of a limited number of PHUs. The service was also entirely funded by the patients themselves, resulting in underutilisation of the service. Utilisation was further reduced during the outbreak, when the ambulances were identified by the population with the transport of Ebola-infected patients, and their use occasioned fear and distrust. In January 2015, in collaboration with the Ministry of Health and Sanitation (MoHS) of Sierra Leone and UNICEF, DwA began the reorganisation and reinforcement of the RS, transferring pregnant women and paediatric cases from PHUs to the Pujehun hospital.

Our previous studies¹⁸ provided information only on three MCH indicators, namely paediatric admissions, maternity admissions and institutional deliveries; in addition, it did not assess the trends in the post-EVD period. Existing studies examining the influence of EVD on MCH services targeted the outbreak and the immediate post-outbreak periods.²⁴⁻²⁷ Understanding the trends in the use of MCH services before, during and after the EVD outbreak will help to guide post-EVD interventions, increasing access to MCH services in rural Sierra Leone. This information will also be useful in preparing a more organised and structured RS. With this background, the aims of this study are (1) to assess trends in institutional deliveries, C-sections, paediatric and maternity admissions, paediatric and maternity deaths, and major direct obstetric complications (MDOCs), before, during and after the EVD in the Pujehun hospital, thus complementing the results of the previous report which were limited to three MCH indicators; (2) to assess trends in ANC 1 and 4, institutional delivery and family planning, at community level. This study was carried out in conjunction with the strengthening of an RS initiated a few weeks after the Pujehun district was declared Ebola-free.

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Figure 1 Study area, the Pujehun district in Sierra Leone.

METHODS Setting

Sierra Leone has four provinces that are divided into 14 districts. Pujehun is one of four districts in the southern province (figure 1). It has a population of ~375000 inhabitants. The primary care network included 77 MoHS PHUs, 5 of which provide basic emergency obstetrics care (BEmOC). The secondary care system consists of the MoHS provided district hospital, which comprises the MCH complex, providing comprehensive emergency obstetric and newborn care (CEmONC) services. Connections between the community and health facilities are difficult because of the very poor condition of the roads. Furthermore, the district is divided by a major river (Moa River) and has a riverine area reachable only with boats, which further hinders access. The first case of Ebola in Pujehun district was reported on the 7 July 2014. The district was declared Ebola free on the 10 January 2015.²⁸ A total of 49 patients were registered with a case fatality rate of 85.7% (42/49).

Referral system

In the Pujehun district, two ambulances managed by the District Health Management Team (DHMT) were functioning in the pre-Ebola period, but only 63% of the PHUs were able to use the service.^{12 23} Emergency calls were not coordinated by the hospital and the transport costs were covered by the patients, dissuading many from using the service. During the outbreak, people came to associate the ambulances with transporting Ebola-infected patients, which further discouraged their use. A 24-hour free-of-charge ambulance RS, transferring pregnant women with obstetric complications from the health centres to Pujehun hospital was implemented in January 2015. In the hospital, a call centre was established and the call centre number was distributed to all the 77

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PHUs. Private calls were considered only in the case of an emergency or if the staff of the PHU were not available. After confirming an emergency condition together with the PHU staff, the hospital midwife had the responsibility to authorise the referral. A nurse on duty from the maternity hospital accompanied the driver in each referral. Health personnel at hospital and PHUs levels were trained on Life Saving Skills—Emergency Obstetric and Newborn Care, including referral criteria and definition of MDOCs.²⁹

Referrals were carried out by three ambulances, two positioned in the Pujehun MCH complex, and a third one in Jendema, bordering Liberia, on the opposite side of the Moa River. Around the Jendema area, 15 PHUs were located serving a population of ~80000 inhabitants. Referrals in this area were made using the ambulances and by transferring patients at the river crossing point via a barge or a motor boat, depending on the flow rate of the river. Paediatric referrals were performed using private motor bikes available in the villages and hired from PHUs staff without the involvement of the call centre. A referral form describing the clinical case and the justification for the referral was distributed to all the PHUs. The bike rider, after bringing the patient to the paediatric ward, delivered the referral form and received the reimbursement. For all patients carried to the hospital information was collected, including demographics, location and the reason for contacting the RS. Community awareness activities were organised about the RS through meetings and radio discussions held by the DMHT, hospital health personnel and local authorities.

Study design, population and period

A prospective observational study using routinely collected health services data, from January 2012 to December 2017, was carried out. Three time periods were considered: pre-Ebola period (1 January 2012 to 30 May 2014); Ebola period (1 June 2014 to 28 February 2015); post-Ebola period (1 March 2015 to 31 December 2017). We considered the Ebola period from 1 month before the first confirmed case in the district (ie, June 2014) to 1 month after the country being declared Ebola-free (ie, February 2015). This was done because in Sierra Leone the outbreak had started in other districts of the country before the first case registered in Pujehun and continued to affect other districts until November 2015. It is realistic to assume that public fear of potential EVD cases and lack of confidence in the health services persisted in the Pujehun population during that time.¹⁴ In addition, expanding the Ebola period enabled a full assessment of the impact of the disease with an adequate comparison with the two long periods before and after the Ebola epidemic.

Data collection

Data on MCH indicators were prospectively collected from hospital registers (maternity ward, delivery unit, paediatric ward, operating theatre). The following variables



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were collected on a monthly basis: (1) paediatrics admissions; (2) paediatric deaths; (3) maternity admissions; (4) maternal deaths; (5) deliveries; (6) C-sections; (7) MDOC cases. MDOC cases were collected using a dedicated database within the hospital and confirmed by a gynaecologist. All hospital maternal deaths were reviewed by DHMT and classified according to Maternal Death Surveillance and Response policy by MoHS. Paediatric deaths did not include stillbirths and early neonatal deaths, but only deaths of children admitted to the paediatric ward.

At community level, the following variables were collected from the local district Health Management Information System: (1) family planning consultations per month; (2) deliveries per month; (3) ANC 1 per month; (4) ANC 4 per month. Different variables were collected from the two types of sites, based on the different services provided at community level (BEmOC) and at hospital level (CEmONC). Quarterly review meetings were organised with the staff in charge of the health facilities to address data discrepancies in the reports. Technical assistance was provided to the DHMT to improve timeliness, completeness and accuracy of data regarding CEmOC and BEmONC services.

For the RS, data were collected from records of all of the study sites, including delivery registers, delivery logbooks, prenatal registers, referral registers and death registers. Additional data were collected from the ambulance database and logbook. Records in the database were then validated by cross-checking the records with registers at the study sites.

Statistical analysis

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For each indicator, a segmented seasonal autoregressive model of order 1 was estimated. The segments defined the three periods: before the EVD epidemic (January 2012 to May 2014), during the epidemic (June 2014 to February 2015) and after the epidemic (March 2015 to December 2017). Differences were considered statistically significant at p<0.05. The analysis was performed using R.³⁰ The full description of the methodology of the statistical analysis is available in online supplementary annex 1.

Patient and public involvement

No patients were involved in defining the research question or the outcome measures, nor were they involved in the design and implementation of the study. There are no plans to involve patients in the dissemination of the results. The full statistical analysis is available in online supplementary annex 2.

RESULTS

Hospital level: pre-Ebola period

At hospital level, for all indicators, the trend is stable during the pre-Ebola period, without significant changes (figures 2 and 3).

Hospital level: Ebola versus pre-Ebola period

At hospital level, the differences between Ebola period versus pre-Ebola averages show a statistically significant increase for institutional deliveries (11, 95% CI 2 to 21, p=0.02) and for the reduction of maternal deaths (-1, 95% CI -2 to 0, p=0.042) (table 1). There is also a statistically significant difference between the trend of Ebola period versus pre-Ebola period, for maternal admissions (7, 95% CI 4 to 11, p<0.001), MDOCs (4, 95% CI 1 to 7, p=0.006) and institutional deliveries (4, 95% CI 2 to 6, p=0.001) (figures 2 and 3).

Hospital level: Ebola versus post-Ebola period

At hospital level, the differences between averages of the post Ebola versus Ebola are statistically significant for all indicators: institutional deliveries, C-sections, paediatric and maternity admissions, paediatric and maternity deaths, and MDOCs (table 1). There is also a negative trend in the transition from Ebola to post-Ebola for maternal admissions (-7, 95% CI -10 to -4, p<0.001), MDOCs (-4, 95% CI -7 to -1, p=0.009) and institutional deliveries (-3, 95% CI -5 to -1, p=0.001) (figures 2 and 3).

Hospital level: pre-Ebola versus post-Ebola period

The differences between averages of the pre-Ebola versus post-Ebola periods are also statistically significant for all



Figure 3 C-sections, deliveries, MDOCs, paediatric and maternal deaths at hospital level. MDOCs, major direct obstetric complications.

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Table 1 MCH indicators	s at hos	pital and comm	nunity level						
	Difference between average of Ebola period versus pre-Ebola period		Difference between average of Ebola period versus post-Ebola period		Difference between average of pre- Ebola period versus post-Ebola period				
Indicator	β	95% CI	P value	β	95% CI	P value	β	95% CI	P value
Hospital level									
Maternal admissions	7	-7 to 22	0.333	43	28 to 58	<0.001	50	37 to 64	<0.001
Maternal deaths	-1	-2 to 0	0.042	2	1 to 3	0.001	1	0 to 2	0.135
Institutional deliveries	11	2 to 21	0.02	28	18 to 38	<0.001	39	31 to 48	<0.001
C-sections	5	-1 to 11	0.13	15	8 to 21	<0.001	19	13 to 25	<0.001
MDOC	2	-11 to 14	0.782	41	30 to 54	<0.001	43	31 to 54	<0.001
Paediatric admissions	1	-39 to 40	0.968	133	92 to 174	<0.001	134	98 to 170	<0.001
Paediatric deaths	-1	–6 to 5	0.826	9	3 to 15	0.004	8	3 to 14	0.003
Community level									
Institutional deliveries	148	99 to 196	< 0.001	-10	-59 to 39	0.695	138	93 to 183	<0.001
ANC 1	74	3 to 145	0.042	-48	-122 to 26	0.2	26	-40 to 91	0.448
ANC 4	80	21 to 139	0.008	23	-38 to 84	0.461	103	48 to 157	<0.001
Family planning	490	-92 to 1073	0.099	-262	-855 to 330	0.386	228	-293 to 750	0.391

ANC, antenatal care; MDOCs, major direct obstetric complications.

indicators, except for maternal deaths (table 1). The differences between trends between pre-Ebola versus post-Ebola period are only significant for paediatric admissions (3, 95% CI 0 to 5, p=0.035) (figures 2 and 3).

Community level: pre-Ebola period

At community level, all indicators in the months before Ebola showed a positive trend. There was a monthly average increase of 8 institutional deliveries (95% CI 6 to 10, p<0.001); a monthly average increase of 7 ANC 1 (95% CI 4 to 10, p<0.001) and 6 ANC 4 (95% CI 4 to 8, p<0.001), and a monthly average increase of 69 women accessing family planning services (95% CI 42 to 95, p<0.001) (figure 4).

Community level: Ebola versus pre-Ebola period

At community level, with the exception of family planning, the differences between averages of Ebola period



Figure 4 ANC 1, ANC 4, deliveries and family planning at community level. ANC, antenatal care.

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versus pre-Ebola are statistically significant for all indicators: institutional deliveries (148, 95% CI 99 to 196, p<0.001), ANC 1 (74, 95% CI 3 to 145, p=0.042) and ANC 4 (80, 95% CI 21 to 139, p=0.008) (table 1). The difference between trends (figure 3) of the Ebola versus pre-Ebola period are not significant for any of the indicators considered (figure 4).

Community level: Ebola versus post-Ebola period

At community level, the differences between averages (table 1) and the difference between trends (figure 4) of the Ebola versus post-Ebola period are not significant for any of the indicators considered.

Community level: pre-Ebola versus post-Ebola period

The differences between averages of the pre-Ebola versus post-Ebola are statistically significant, with an increase in institutional deliveries (138, 95% CI 93 to 183, p<0.001) and ANC 4 (103, 95% CI 48 to 157, p<0.001) (table 1). However, there is a negative difference between trends among the two periods, for all the variables considered: institutional deliveries (-7, 95% CI -10 to -4, p<0.001), ANC 1 (-6, 95% CI -10 to -3, p<0.001), ANC 4 (-8, 95% CI -11 to -5, p<0.001) and most significantly for family planning (-85, 95% CI -119 to -51, p<0.001) (figure 4).

RS: obstetric and paediatric results

Between January 2015 and December 2017, there were 2450 obstetric referrals. Of these, 1574 (64%) were MDOC, which represent 70% of all the 2233 MDOCs treated in the hospital over the same period. The baseline characteristics and reasons for MDOCs collected through the RS are reported on table 2. At the same time, 4671 paediatric patients were admitted in the hospital through the RS, representing 72% of the 6518 total admission



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Table 2Baseline characteristics and reasons for MDOCscollected through RS, period 2015–2017

	Number	%
Age (years)		
Mean	25.3	SD 7
12–19	442	28
20–29	613	39
30–39	464	29
40+	43	3
Unknown	12	1
No of previous deliveries		
0	474	30
1 or 2	377	24
3 or 4	292	19
5 or 6	207	13
7+	212	13
Unknown	12	1
MDOC treated		
Prolonged/obstructive labour	848	54
Antepartum haemorrhage	195	12
Severe pre-eclampsia/eclampsia	165	11
Abortium complicatium	117	7
Postpartum haemorrhage	157	10
Ectopic pregnancy	24	2
Rupture uterus	30	2
Sepsis	38	2
Total	1574	100

MDOCs, major direct obstetric complications

Table 3 Reasons for paediatric RS, period 2015–2017*						
Reason for referral Number %						
Malaria	1540	30				
Anaemia	910	18				
Pneumonia/ARI	830	16				
Diarrhoea and vomiting	495	10				
Malnutrition	274	5				
Convulsion	186	4				
Hernia/hydrocele	165	3				
Sepsis/septicemia	127	2				
Dehydratation	48	1				
Burn	30	1				
Others	522	10				
Total	5127	100				

 $^{\ast}\mbox{For a number of patients, more than one suspected diagnosis for referral was reported.$

ARI, acute respiratory infection; RS, referral system.

during the same period. Reasons for paediatric referrals are shown on table 3.

DISCUSSION

This study presents for the first time trends in utilisation of MCH services before, during and after Ebola, at hospital and community level from the country most heavily affected by the Ebola epidemic. It also presents data on the restructured and reorganised RS, which started immediately after the EVD outbreak. The study shows that there was a decrease in all MCH indicators and service uptake immediately after the onset of the outbreak, with a levelling or increase during the EVD period. In the post-Ebola period, all indicators (except for maternal deaths) showed an increase, in comparison with the pre-Ebola period. This was particularly marked at hospital level because the post-Ebola reinforcement of the RS led to an increase in paediatric admissions, maternal admissions, and consequently a rise of institutional deliveries, C-sections and MDOCs. In addition, while at the hospital level trends in the post-Ebola period are in line with the pre-Ebola, at community level there is a negative trend compared with the pre-Ebola period for all indicators taken into consideration. The study presents results in contrast to other studies that showed a decline in MCH services in the Ebola and post-Ebola periods.631

Pre-Ebola and Ebola periods

As mentioned above, the approach implemented in the Pujehun district^{17 28} avoided vertical interventions only focused on the containment of the EVD epidemic. It worked on strengthening all the components of the health system—before, during and long after the epidemic. This approach may have contributed to reducing the spread of infection and the impact of the disease on MCH services. $^{17\ 18}$ As shown in this paper, at community level family planning, ANC and institutional deliveries were affected only at the beginning of the Ebola outbreak with a small decrease in service utilisation. In contrast, Jones et al evaluated the number of antenatal and postnatal visits, institutional births, emergency obstetric care, maternal deaths and stillbirths across 13 districts of Sierra Leone for 10 months during, and 12 months prior to the epidemic. They found that following the onset of the epidemic there was an 18% decrease in the number of women attending ANC visits and an 11% decrease in the number of women attending for birth at healthcare facilities.¹

During the Ebola epidemic, the Pujehun hospital maintained C-sections and delivery volume at pre-Ebola levels. There was a stable number of patients attending the hospital during the Ebola outbreak, as shown by the number of maternal and paediatric admissions. The study of Brolin Ribacke and colleagues focused on in-hospital deliveries and C-section volume in Sierra Leone. They showed that nationwide, although with substantial variation between districts, in-hospital deliveries and C-sections decreased by over 20% during the Ebola outbreak,

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mainly because of the closure of not-for-profit hospitals.⁶ Brolin Ribacke also noted that in general, at hospital level, in Sierra Leone those facilities that remained open performed about the same number of deliveries and C-sections after the onset of the EVD outbreak as they did before.⁶ This seems to indicate that the decrease observed at national level was related to the closing of key health facilities. The number of Ebola cases was not uniform throughout districts in Sierra Leone and Pujehun was one of the least affected districts. The low number of cases may also have helped to maintain public confidence in service provision and uptake of services.⁷⁸

Post-Ebola period

There is a shortage of data in Sierra Leone and the other West Africa countries affected regarding the resumption of services after the epidemic. Pujehun district showed contrasting results at community level. Results of the post-Ebola versus pre-Ebola show an increase of activities for institutional delivery and ANC 4. However, there is a negative trend among the two periods, for the variables taken into consideration, namely institutional deliveries (-7, 95% CI -10 to -4, p<0.001), ANC 1 (-6, 95% CI -10 to -3, p<0.001), ANC 4 (-8, 95% CI -11 to -5, p<0.001) and family planning (-85, 95% CI -119 to -51, p<0.001). In 2017, the Pujehun district showed a coverage of 98% for ANC 1 (98% in 2013), 91% for ANC 4 (76% at national level in 2013) and 90% for institutional deliveries (62% in 2013).^{33 34} The initial intervention carried out by DwA in the period 2012–2014 at the community level probably increased these percentages, with an initial growth of the trend that had been slowing down in the years 2016–2017. Possible explanations for this may include bypassing, that is, using alternative healthcare instead of free or subsidised public clinics; increased opportunities to get transport to seek healthcare in neighbouring districts; reduced demand for MCH services at community level; and reduced quality of MCH services at PHUs.

A study by Camara *et al* in a rural district of Guinea showed a considerable recovery gap in the post-Ebola period for ANC (37%) and institutional deliveries (34%).³¹ Also, Delamou *et al* noted a significant reduction in the average number of ANC visits and institutional deliveries during the Ebola outbreak, in six districts of Guinea, and the overall post-outbreak trends did not suggest recovery.³² By contrast, Wagenaar *et al*, which analysed 10 primary care indicators in Liberia, before, during and after the Ebola outbreak, showed significant positive trends during the post-EVD period for ANC and institutional deliveries.³⁵

There are multifactorial and complex reasons for the decline of family planning in the Pujehun district. The activities that MoHS and DwA implemented from 2012 onwards were maintained during and after the EVD epidemic. However, a general decrease in the availability of healthcare personnel and international aid was observed and this could be a factor in the family planning decline. A possible stock-out of family planning methods

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has also been suggested as a reason for the decrease.²⁵ In addition, a reduction in demand for family planning in the post-Ebola period could account for the decline of the service. Experiencing a disaster can trigger the desire to 'rebuild' communities, reducing the need for family planning methods,³⁶ or communities may prefer traditional methods of contraception.³⁷ However, the reduction in family planning use in Pujehun district did not translate into an increase in institutional deliveries as occurred in neighbouring Liberia.³⁸ Although no further transmissions of Ebola took place in the Pujehun district after November 2015, the awareness of the ongoing transmission elsewhere in Sierra Leone, in Guinea and Liberia might have influenced health seeking behaviours.39 However, this does not seem to have influenced other types of MCH services at community level. For comparison, the above mentioned study of Camara et al showed that the utilisation of family planning declined by 51% during the Ebola outbreak but recovered in the post-Ebola period.³¹

At hospital level, the situation is different. In the post-Ebola period, there was a significant increase in the volumes of activities: paediatric and maternal admissions, MDOC cases, deliveries and C-sections. This increase can be directly linked to the reorganisation and strengthening of the RS immediately after the Ebola epidemic. Based on the three delays theory,⁴¹ in Pujehun it was decided to tackle the second delay, a lack of accessibility to health services. The distance to the hospital as well as lack of accessible and affordable vehicles were recognised as significant barriers when attempting to access CEmONC services at the hospital.^{42 43} The success of the RS service can be linked to the integration of the key components needed for a successful service, namely: (1) a transport system which took account of the specific geographical characteristics of the district⁴²; (2) an effective communication system with a call centre in contact with all PHUs of the district, the ambulance drivers and the hospital; (3) training of all the PHU staff on the recognition of obstetric emergencies and on the RS.44 45 Several meetings were planned with local community leaders and religious leaders to raise awareness of the importance of giving birth in health facilities. Prohibitive costs have been shown to be a major factor in preventing women accessing health facilities during childbirth in Sierra Leone. $^{42\,46\,47}$ Meetings were also organised to inform the population that the service was free of charge, and to give reassurance that the ambulances carried no risk of Ebola infection to people using them. The increase in complicated cases treated at the hospital did not translate into an increase in maternal and paediatric deaths, reflecting positively on the quality of care provided. The maternity ward death rate remained around 1% throughout the 2012-2017 study period. The differences in average death rates during the period 2015-2017 among referred and not referred paediatric patients were 10.5% and 4.3%, respectively. This showed that the paediatric RS works for the most critical cases able to reach the hospital in time.



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CONCLUSIONS

There are a number of contextual factors and limitations that should be taken into account in the analysis of the results of this study. The data refer to a single area of Sierra Leone and therefore our sample cannot be considered representative of the country as a whole. We defined our distinct period of EVD outbreak arbitrarily, from 1 month before the first case in the district to 3months after the last case in the district. This was done because the EVD crisis affected areas of the country outside Pujehun prior to and after outbreak within Pujehun. The official end of the EVD epidemic for Sierra Leone was declared on 17 March 2016, and for the countries of Guinea and Liberia was declared on 1 June 2016. All the results should be taken with some degree of statistical caution, because no correction was performed to take into account the multiplicity of the tests carried out. Finally, our study assumed that no other interventions in addition to those described occurred concurrently with the Ebola epidemic.¹⁸ Similarly, we assumed that no other substantial interventions in addition to the reorganisation of the RS happened in the post-Ebola period which would have affected the service trends that we observed. The Pujehun district had 49 confirmed EVD cases. This number is much lower than in other districts. If it is true that the fear of Ebola may have prevented people from accessing health services, the small number of EVD cases in the community may have also raised confidence, leading to the increase of utilisation rates after the initial drop. The strength of this study is that it uses data from a remote rural district in Sierra Leone, with a 6-year observational period. The pre, intra and post-Ebola periods data allowed a comparison between trends. DwA was working in this community before the outbreak began, which gave an advantage of knowledge of the setting when the epidemic began, which in turn facilitated mitigating measures to be put in place. In addition, this allowed a collection of data in a prospective way, reducing the potential bias in the accuracy of the data reported by other studies.^{6 14 32}

Failures in providing effective healthcare are associated with a chiefly vertical focus on outbreak control.¹⁹⁻²¹ The approach implemented in the Pujehun district worked on strengthening all the components of the health systemgovernance, human resources, community involvement-before, during and after the epidemic.

The strengthening of the health system in the district, compared with other districts, allowed the containment of the epidemic and, above all, to maintain and strengthen MCH services as shown by the data reported in the paper. Health facilities in the district, both at community and hospital level, were able to maintain their services during the epidemic, overcoming public fear of Ebola and lack of confidence in service providers, which led to the public staying away from facilities in other districts in Sierra Leone.¹⁴ In postcrisis situations, 'windows of opportunity' are opened for redirecting the policies of the national health systems, renovating specific sectors (eg, human resources, epidemiological surveillance systems, financing and so on) and renewing services/practices at the operational level.⁴⁸ In Pujehun, the implementation of an RS immediately

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after the acute Ebola phase might have reduced delays in patients accessing care and enabled a significant improvement in all MCH indicators at hospital level. Other studies have also found that using this window of opportunity to introduce systems such as performance-based financing can also produce positive outcomes.49 As Sierra Leone continues its recovery, there is a need to quantify the impact of the outbreak on MCH care to guide long-term strategies for MHC services. This study provides evidence on strategies to increase the resilience of fragile healthcare services and the importance of NGOs and government collaboration to bring about change.

Author affiliations

¹European Parliamentary Research Services (EPRS), European Parliament, Brussels, Belaium

²Department of International Health/CAPHRI, University of Maastricht, Maastricht, The Netherlands

³Operational Research Unit, Doctors with Africa CUAMM, Padua, Italy

⁴Department for Woman and Child Health, University of Padua, Padua, Italy

⁵Department of Developmental Psychology and Socialisation, University of Padua, Padua, Italy ⁶Ministry of Health and Sanitation, Freetown, Sierra Leone

⁷Department for Woman and Child Health, Pujehun Hospital, Pujehun. Sierra Leone ⁸Department of Infectious Diseases, University of Bari, Bari, Italy ⁹National Centre for Training and Research in Rural Health of Maferinyah,

Forécariah, Guinea

¹⁰Department of Science for Health Promotion and Mother to Child Care, University of Palermo, Palermo, Italy

¹¹Department of Nursing and Midwifery, School of Human and Health Sciences, University of Huddersfield, London, UK

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Infectious and tropical diseases

Retention in HAART among youth accessing SAAJ (Serviços Amigos dos Adolescentes e Jovens) in Beira, Mozambique

POSTER PRESENTATIONS

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Authors Praticò L.

Focus country Mozambique







Retention to HAART among youths accessing SAAJs (Serviços Amigos dos Adolescentes e Jovens) in Beira, Mozambique

C. Vitali¹, G. Prennushi¹, E. Namarime², D. Pizzol³, G. Putoto³, L. Praticò³ ¹University of Pavia, ²CUAMM Beira, ³CUAMM Padova

Introduction

 Extensive use of HAART has improved health conditions of HIV+ people and reduced transmission even in high prevalence settings like Sub-Saharan Africa, where the transmission rate is still very high, especially in vulnerable groups.

Mozambique is the 9th poorest country in the world and has one of the highest prevalence rates in the African continent (16.3%). Children and young adults aged 10 to 24 years, who represents about a third of the population, are highly vulnerable because of both low access to health services and risky behaviors. HIV prevalence in this age group is estimated at around 3-9%, with the highest prevalence among pregnant girls. Retention to treatment represents is a major problem in this age group, with around 40-50% of patients dropping out after only six months of treatment.

- Factors hindering adherence to antiretroviral therapies are an important research topic. Cost of care has been found to have a strong negative impact. Mozambique is an interesting case study in this respect, because antiretroviral drugs and condoms are made available for free by the government. In the absence of this key hereign to adherence other factors can be trenkingd. barrier to adherence, other factors can be analyzed.
- Since 2000, the Mozambican Health Ministry has devised a program targeted to young people which involves schools and health centers. Specific health services for adolescents, the "Serviços Amigos dos Adolescentes e Jovens" (SAAJS), have been established in rural and urban health centers. SAAJs provide medical and psychological assistance, including HIV testing, counselling and treatment to youths aged 10 to 24 years. The Italian NGO Doctors with Africa-CUAMM has been supporting SAAJ activities since 2013.

Results

The quantitative data indicated that retention to HAART is indeed a serious issue, with about 25% of patients dropping out every month and only about 5% returning (see table 1).

Focus groups and interviews confirmed that patients

- often drop out in the initial phase of treatment because of side effects, as well as logistical difficulties in reaching the centers or frequent moves.
- Activist records confirmed that patients did not pick up their drugs at the SAAJ (29% forgot the appointment date, 16% were sick) or refused to continue because of side effects (12%) (see figure 1).

Conclusions

- While Mozambique took the bold step of offering free HAART and runs sexual and reproductive health programs for adolescents, retention is still too low
- This study found that factors such as side effects and distance from health centers are relevant, but that socio-cultural factors play a key role.
- Interventions that aim to increase adherence need to address not just access to centers and side effects but also discrimination, including within the family.
- · Follow-up by activists who seek out patients who abandon treatment ("busca") can play an important role in raising awareness in families and communities, combating misinformation, overcoming stigma, and increasing retention.
- HIV+ activists can be particularly effective, as they
 offer proof that antiretroviral treatment allows HIV+
 people to lead a normal life.

Study Design and Methods

- Our study Design and Methods Our study investigated the determinants of retention in HAART among HIV+ youths in Beira, Mozambique's second-largest city, where the HIV prevalence rate is 13.1%. Field work was carried out during March-June 2018 in five youth service centers (SAAJs), where care is free
- The study is based on 18 focus groups discussions with youth treated in SAAJs and activists from three community-based organizations, as well as eight informant interviews with health practitioners from the SAAJs, activists, and NGO coordinators.
- · A retrospective analysis of patient records data and a prospective follow-up on retention to treatment over a period of nine months were also carried out.
- Eurther data on determinants of retention were extracted from the activists organizations' records of patients who had abandoned HAART.

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Infectious and tropical diseases

Hypertension and HIV-related risk factors in young subjects on anti-retroviral therapy in Tanzania

POSTER PRESENTATIONS

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Authors Trifirò S.

Focus country Tanzania





Infectious and tropical diseases



Hypertension and HIV-related risk factors **in young subjects on anti-retroviral therapy in Tanzania** Silvia Trifirò¹ (silvia.trifiro@ao-pisa.toscana.it), Francesco Cavallin², Sabina Mangi³, Lawrence Mhaluka³, Silvia Maffoni⁴, Stefano Taddei⁵, Giovanni Putoto⁶, Giovanni Torelli⁷

1 Azienda Ospedaliero-Universitaria Pisana, Italy, 2 Independent statistician, Solagna, Italy, 3 Tosamaganga Council Designated Hospital, Iringa, Tanzania, 4 University of Pavia, Italy,5 University of Pisa, Italy, 6 CUAMM Doctors with Africa, Padua, Italy, 7 CUAMM Doctors with Africa, Iringa, Tanzania

Introduction

- O HIV infection is a global health concern, especially in Sub-Saharan Africa where the majority of PLWHIV (people living with HIV) live
- O The increasing use of ART (antiretroviral therapy) has shifted HIV infection to a chronic condition, posing the new challenge of non-AIDS-related chronic noncommunicable diseases (NCDs), such as cardiovascular diseases.
- O PLWHIV have been found at an increased cardiovascular risk and hypertension represents an important risk factor. Indeed, HIV infection has been demonstrated to accelerate inflammatory processes which promote atherosclerosis and hypertension, and patients on ART have a metabolic profile at increased risk of hypertension as well.
- O In addition, traditional cardiovascular risk factors such as smoking and physical inactivity are frequently reported in PLWHIV
- O The links between NCDs and HIV infection/therapy and the relative role of viral infection, ART and traditional cardiovascular risk factors remain

Study Design

controversial

- PLWHIV attending the HIV clinic of Tosamaganga Hospital were retrospectively evaluated. Data were retrieved from hospital records
- O Tanzanian HIV clinics (named CTC- care and treatment center) regularly assesses HIV positive subjects for monthly dispensation of ART.
- O Tosamaganga Hospital is a district hospital located in Iringa region, a rural area in South-western Tanzania, and it serves approximately 260,000 people.
- Tosamaganga Hospital is supported by the Italian NGO Doctors with Africa CUAMM, which works in Tanzania since 1968

Methods

- O Inclusion criteria were age between 26 and 80 years and regular ART. Exclusion criteria were acute febrile illnesses, pregnancy and lactation
- O Demographic data, social and past medical history were retrieved from hospital records
- O Data regarding HIV infection history (HIV infection duration, WHO stage ad diagnosis, CD4 counts, ART history), biometry (BMI and waist circumference), blood pressure (BP), glucose levels were collected
- O Hypertension was defined as blood pressure (BP) ≥ 140/90 mmHg, as defined by WHO [1]. Body mass index (BMI) was categorized using the standardized definition of the WHO [2]. Waist circumference measurements were done as per WHO guidelines and central obesity was defined as waist circumference > 88 cm for females, >102 cm for males [3]. Capillary blood glucose (fasting or random according on the patient's fasting status) was measured on site by finger prick (Glucoplus Inc, Canada). Diabetes was diagnosed with fasting blood glucose ≥ 126 mg/dl or random blood glucose ≥ 200 mg/dl, as per WHO definitions [4].

Results

- O 242 patients were included in the analysis.
- O Median age was 43 years [IQR 38-50], 98 (41%) were males and 146 were females.
- O Median HIV infection duration since diagnosis was 6 years [IQR 3-9], median ART duration was 5 years [IQR 2-8].
- O ART was started 76 days after HIV diagnosis [IQR 20-278].
- 79% of subjects were on first line ART and the most used combination was tenofovir, efavirenz and lamivudine
- O The preferred second line ART was tenofovir, emtricitabine and lopinavir/ritonavir
- O CD4 count raised from 213 cells/ul at diagnosis [IQR 113-314] to 518 cells/µl to last visit [IQR 382-73].

Results of 2

NCDs AMONG PI WHIV

- O 62 subjects (26%) were found hypertensive, 10 (4%) had diabetes and 8 (3%) had past history of cardiac
- Prevalence of NCDs was almost doubling considering subjects over 55 years old with hypertension and cardiac diseases





OBESITY AND LIFE-STYLE FACTORS AMONG PLWHIV

- O 36 subjects (15%) were overweight, 19 subjects (8%) had central obesity and 9 subjects (4%) were
- O 16% of subjects disclosed smoking habits, 40% alcohol intake

Results of 3

O Hypertension was found associated with traditional factors such as age, family history for hypertension, BMI, history of cardiac diseases and diabetes.

Table 1 Hyperter				
	TOTAL	NORMOTENSIVE	HYPERTENSIVE	p-value
Age, years	43 [38-50]	42 [37-50]	49 [42-57]	<0.0001
Cardiac disease	8 [3.3]	1 [0.6]	7 [11.3]	0.0002
Diabetes	10 [4.2]	3 [1.7]	7 [11.3]	0.004
Family history of hypertension	17 [7.0]	7 [3.9]	10 [16.1]	0.009
BMI, kg/m²	21.6 [19.8-24.3]	21.3 [19.6-23.8]	23.3 [20.5-27.0]	0.002
Waist circ, cm	78 [73-85]	78 [73-83]	83 [75-94]	0.003

O Hypertension was also found associated with a more advanced WHO clinical stage and a more depressed CD4 count at HIV diagnosis

O A longer HIV infection and a longer exposure to ART was associated with hypertension as well.

Table 2 Hypete				
	TOTAL	NORMOTENSIVE	HYPERTENSIVE	p-value
HIV infection duration, years	6 [3-9]	6 [3-9]	8 [3-10]	0.04
WHO clinical stage at diagnosis				
I stage II stage III stage IV stage	44 [21.1] 41 [19.7] 93 [44.3] 31 [14.9]	40 [25.8] 30 [19.4] 63 [40.6] 22 [14.2]	4 [7.5] 11 [20.8] 29 [54.7] 9 [17.0]	0.04
T-CD4 cells/µl At diagnosis At last visit	213 [113-314] 518 [382-730]	219 [123-329] 509 [382-745]	153 [65-279] 546 [378-663]	0.01 0.53
Duration of	5 [2-8]	4 [2-8]	7 [3-9]	0.009

Table 2 Multivariable analysis of hypertension				
Variables	p-value	OR (95% CI)		
Age	0.001	1.06 [1.02 to 1.10]		
вмі	0.002	1.15 [1.06 to 1.25]		
T-CD4 at diagnosis	0.01	0.99 [0.99 to 0.99]		

Conclusions

- Hypertension was the most prevalent NCDs in a cohort of relatively young HIV positive subjects on regular ART.
- Hypertension was found associated with both traditional cardiovascular risk factors and HIV related features, such as more severe immunosuppression at HIV diagnosis, longer HIV infection duration and longer use of ART.
- O Further studies to confirm this association and surveys with active screening for NCDs in PLWHIV, especially in low and middle income countries such as Tanzania, are warranted.

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Improving IPT coverage in rural Cabo Delgado, Mozambique. An integrated approach

POSTER PRESENTATIONS

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Focus country Mozambique





Improving IPT coverage in rural Cabo Delgado, Mozambique. An integrated approach.

Piera Fogliati¹, Leonardo Pedro Monforte¹, Ana Constancia David², Aly Manuel Mussa³

¹ Doctors with Africa - CUAMM, Mozambique
 ² Fundação Wiwanana, Mozambique
 ³ Núcleo de Investigação Operacional Pemba, Mozambique

Introduction

- Intermittent Preventive Treatment (IPT) with Sulfadoxine-Pyrimethamine from the second trimester up to delivery together with regular use of ITNs is WHO recommended strategy to reduce the burden of malaria in pregnancy.
- Findings from a provincial representative survey indicate that pregnant women in Cabo Delgado are not sufficiently protected against malaria (IMASIDA 2015).
- We explored factors contributing to low IPT coverage in rural Cabo Delgado and we implemented an integrated approach to reverse the scenario

Program intervention

- Area of intervention: 64 rural communities, characterized by a very low literacy level (over 90% of women 15-49 years old were illiterate) and limited availability of radio and mobile phones (<15%).
- SBCC activities (creating demand)
 Face-to-face education sessions conducted by community activists
- Involvement of 137 influential people ("madrinhas"), whose cultural role in reproductive health is essential, especially in promoting early ANC booking.
- Increased health service provision: extension / strengthening of ANC outreach activities
- Improved data collection and capacity building in reporting.

Community involvement, strenghtened outreach activities and improved data collection resulted in **doubling of IPT coverage** in 2 rural districts of Cabo Delgado



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Results

- After 18 months of intervention increased knowledge on the importance of IPT was measured among women in reproductive age
- DHIS2 showed higher IPT coverages in 2018 compared to baseline values from 2017.



Conclusions

- Community involvement, and strengthened outreach activities were successful in increasing early ANC attendance and IPT uptake in rural settings in Cabo Delgado
- Supporting strategies, such as community mobilization before scheduled outreach activities and accurate data management also contributed to improved IPT indicators.
- Further studies are needed to assess the impact of this intervention on reducing malaria mortality and morbidity in pregnant women and newborn in rural Cabo Delgado.





Fighting HIV among adolescents in Beira, Mozambique

POSTER PRESENTATIONS

 $\begin{array}{l} \textbf{Conference} \\ \textbf{3}^{\rm rd} \, \text{international workshop on HIV and Adolescents} \end{array}$

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Authors Atzori A.

Focus country Mozambique





Abstract

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Fighting HIV among Adolescents in Beira, Mozambique

Atzori A¹ ¹Doctors With Africa Cuamm, Padova, Italy

Background: HIV in Mozambique is a crucial public health challenge. As of 2017, approximately 2.1 million people were living with HIV (PLHIV), out of which only 57% were accessing antiretroviral therapy (ART). CUAMM's projects are targeted at adolescents, a particularly at risk group for contracting the virus in high prevalence situations. In Beira, prevalence is estimated at 25%.

Materials & Methods: The project of Doctors with Africa CUAMM is based on three levels of intervention - health facilities, schools, and communities – creating a strong linkage between counselling, testing and treatment.

1) Health facilities

Since 2016 CUAMM has supported specific facilities for adolescents and young people (10-24 years), named SAAJ (Serviços Amigos dos Adolescentes e Jovens). The SAAJ services are located inside a health centre and they offer free counselling on reproductive and sexual adolescent health; pregnancies (antenatal and postnatal visits); prevention, test and treatment of HIV and sexually transmitted infections (STIs) and contraceptive methods. Since 2018, CUAMM has introduced the role of the case manager aiming at following up the HIV+ adolescents over time, in order to understand and tackle potential barriers hindering the specific adolescent to stay on treatment.

2) Schools

The project supports the cantinho escolares (school corners areas) in primary and secondary schools, specifically designed to provide information and counselling on sexual and reproductive health and rights for adolescents. Among the organized activities: sensitization sessions on a weekly basis and trainings within the school. These corners count on the daily presence of peer activists, one focal point professor and, periodically, a nurse from the health centre.

3) Community

CUAMM organizes raising awareness activities to make sure people get familiar with HIV prevention, get tested, start treatment if necessary, and stay on treatment. In order to increase effectiveness, CUAMM involves young people themselves, who chose to work in peer education activities to cut down fear and stigma and who serve as link between the community and the health centre. CUAMM operates in partnership with Geração Saudável Association and ANANDJIRA, two groups of young activists (peer to peer support groups) some of whom HIV positive — who receive and support youths referred from SAAJs and organize events, provide psychological support for adolescent and youth at SAAJ at home.

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Results: From August 2016 to September 2018, in the 7 targeted SAAJ, the following results have been achieved: 109.790 young people and adolescents accessing SAAJs for the first time; 53.537 young people and adolescents tested for HIV; 1.658 adolescents tested positive for HIV and followed up for care and treatment.

Conclusions: From July 2017 to September 2018, the number of adolescents who accessed SAAJs and started ART has increased. Adolescents are key to a society development and investing on their health and well-being is fundamental for a Country like Mozambique, in which the youth population is growing fast and 34.7% is among 10-24 years old. Starting from these encouraging results, CUAMM intends to intensify its intervention to achieve a major impact.

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Infectious and tropical diseases

Poster presentations

Inquéritos sobre o uso de redes mosquiteiras em mulheres gravidas: influência nas respostas das entrevistas

POSTER PRESENTATIONS

Conference Jornadas Regionais de Saude

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Authors Fogliati P.

Focus country Mozambique




INQUÉRITOS SOBRE O USO DE REDES MOSQUITEIRAS NAS ZONAS RURAIS DE CABO DELGADO: A ÎNFLUÊNCIA **DO LUGAR DA ENTREVISTA NAS RESPOSTAS**

Piera FOGLIATI 1; Leonardo Pedro MONFORTE 1; Aly Manuel MUSSA 2. 1. Médicos com África – CUAMM, Cabo Delgado

Núcleo de Investigação Operacional de Pemba, Cabo Delgado

INTRODUCÃO:

A OMS recomenda ás mulheres gravidas o uso continuo da rede mosquiteira e a quimioprofilaxia com Sulfadoxina -Pyrimethamina (SP) para reduzir o peso da malária na gravidez.

No âmbito dum projecto de luta contra a malária em 8 áreas de saúde Rurais dos Distritos de Montepuez e Balama foi realizado em 2017 um estudo CAP (conhecimentos. práticas e atitudes) relacionado a malária.

OBJECTIVO:

Avaliar a posse e uso de redes mosquiteiras durante a gravidez em areas rurais dos Distritos de Montepuez e Balama, Provincia de Cabo Delgado.

MÉTODO:

Análise secundária do estudo de linha base. Os dados foram recolhidos nas comunidades de 8 áreas de saúde através de entrevistas estruturadas ás mulheres em idade fértil com crianças menores de 5 anos (inquérito comunitário) e nos 8 centros de saúde através de inquérito a saída nas consultas pré-natais (CPN).

O tamanho da amostra do inquérito comunitário foi calculado para o efeito da avaliação do projecto com uma amostra representativa de mulheres de 15 até 49 anos com crianças menores de 5 anos. O inquérito a saída foi realizado com uma amostra de conveniência (n=60) de mulheres atendidas nas CPN nos dias do inquérito.Os dados foram analisados em STATA versão 11.

RESULTADOS:

No inquérito comunitário foram entrevistadas 168 mulheres de 15 até 49 anos (idade media 25 anos), dessas mulheres 16 eram gràvidas. 14/16 mulheres grávidas (87,5%) possuíam uma rede, entre elas 12 (85,7%) referiram o uso da rede na noite anterior. 75,3% (125/166) das mulheres entrevistadas na comunidade mencionáram o uso constante de rede durante a última

gravidez. No inquérito a saída foram entrevistadas 60 mulheres grávidas de 13 até 42 anos (idade media 24 anos). 47/60 mulheres (78,3%) possuíam uma rede, entre elas 24 (51 %) referiram o uso da rede na noite anterior, 23 mulheres (38,3%) referiram uso constante da rede durante a gravidez em curso.

Correspondencia: Piera Fogliati Medicos com Africa - CUAMM p.fogliati@cuamm.org 258 865723545







Posse e uso de rede mosquiteiras nas mulheres gravidas de 8 areas de saude dos Distritos de Montepuez e Balama. Cabo Delgado . 2017

LUGAR DA ENTREVISTA	POSSE DA REDE	USO DA REDE ANOITE	
	N%	N%	
CASA	14/16 (87,5%)	12/14 (85,7%)	
CENTRO DE SAUDE	47/60 (78.3%)	24/47 (51.1%)	
Fonto Inguarita linha haga Cuanana Nian 2017			

Fonte: Inquerito linha base. Cuamm - Niop 2017

CONCLUSÃO:

Os resultados indicam que a informação sobre o uso de redes mosquiteiras nas zonas rurais de Cabo Delgado pode variar dependendo do lugar da entrevista.

Entrevistadas em casa, 85,7% das mulheres gravidas referiram ter dormido debaixo duma rede anoite anterior ao inquérito. Quando a mesma pergunta foi feita à saída da CPN somente 51% das mulheres grávidas entrevistadas referiram o uso da rede anoite.

Em áreas caracterizadas pelo baixo nível de escolaridade e limitados recursos, a informação recolhida através de questionários deve ser validada através de varias fontes e diferentes métodos e lugares de investigação.

PALAVRAS CHAVE:

Malaria na gravidez; Posse e uso de REMILDs.

REFERÊNCIAS

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Infectious and tropical diseases





Stop the exploitation of migrant agricultural workers in Italy

PAPER

Authors

Marotta C., Di Gennaro F., Parente P., Putoto G., Mosca D.

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Topic

Universal coverage and equity

Focus country Italy



Stop the exploitation of migrant agricultural workers in Italy

Across the whole of Italy, agriculture counts the fallen like those on a battlefield. People from different nationalities come to work in Italy in the agricultural sector.[1] They often have similar stories to tell and all face a common fate. They are an exploited working class, often immigrants from poorer countries. Their living conditions are grim. Their deaths are quickly forgotten and often invisible to official statistics. [1] [2]

It is March: the weather is cold, and things look more desolate. Yet, as on any day of the year, work in the fields goes on relentlessly, and so does the exploitation of migrant workers: unseen, untold, unstopped. And people die. The death of agricultural low wage workers knows no seasons.

Sacko was shot while looking for corrugated plates to build barracks. Becky died in a fire. Paola died from heat and exhaustion, Marcus from the cold.[1] [3] And many other nameless workers are dead, such as the 12 agricultural workers who died in August in a car accident in Puglia.[4] They were crammed into an old van, not fit for purpose, on their way back from the fields. Over the past six years the number of agricultural workers who have died as a result of their work is more than 1500.[1] This affects immigrants and Italians alike. Some have died in fires in ghettos[5] [6]—one hit by a train while returning from work, others dying from exhaustion or killed by intense manual labour. Others have been killed by "gangmasters"—the so called "Caporali," who are modern slave masters.[7] [8]

The workers are paid according to the amount of vegetables they collect rather than the time spent at work, or they are paid €12 for eight hours' work under the supervision of Caporali, and they live in the "Ghetti." These are shantytowns, isolated from city centers, without water or proper standards of hygiene, sanitation, or health services. Italy has an estimated 50-70 of these settlements, accounting for around 100 000 low wage migrant workers. This is only an estimate, as no official census exists.[2]

They work to make it possible for people from London to Shanghai to buy and eat Italian tomatoes at a low cost, any day of the year. But how much do these tomatoes really cost? What is the human cost of these products?

Over the years the presence of the state, the church, non-governmental organisations, and volunteers has been felt, but it has not been enough to bring about meaningful change. If we are to deal with the "Agromafia" phenomenon—the structure of exploitation and the criminal system behind this exploitation—and achieve fair, working hours and salaries for low wage workers, then strong cultural change and collective actions are required. Yvan Sagnet, a former agricultural worker, began a legal process to have the system officially defined as "Caporalato." The aim was to recognise the existence of a criminal sector exploiting agricultural workers with unwritten laws and rules.[9] A specific law was passed, but the exploitation continues.[1]

Meanwhile, the human dignity of workers and citizens must be preserved, and essential services must be ensured. Are we not pursuing universal health coverage? Since 2015, Doctors with Africa CUAMM,[10] in partnership with local institutions, has been providing basic health services to these workers. Every Sunday a mobile outpatient clinic is held in three of the ghettos in Puglia.

Over the past four years many services have been provided, resulting in a total of 4800 outpatient consultations (average 43/day). Of these, 60% were first consultations, so 2880 patients have been seen. Our data show that the main reasons for the consultations were: fatigue and/or musculoskeletal conditions (46%); dental problems (19%); respiratory symptoms (10%); dermatological symptoms (8%); obstetric/gynaecological symptoms (4%); trauma (4%);



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cardiovascular problems (4%); ophthalmic symptoms (2%); metabolic issues (2%); and psychiatric problems (1%). Almost 80% of the patients required pharmacological treatment, while a complex process was required for the 10% of patients who needed referral to secondary care. However, no clear and definite healthcare pathways are in place to make the health interventions fast and efficient. It is hard to imagine that this situation will improve given current political trends in Italy and "Decreto Sicurezza"—a new law regulating migration—and the fact that sees this as a matter of national security only.

In line with the latest evidence, our experience as part of Doctors with Africa CUAMM and global health activists suggests that the health conditions of this population are mainly linked to specific working activities in the agricultural fields, as well as to the hygiene, living conditions, and lack of social protection in their life and job.[11] [12] Therefore, the issue is: how can we tackle the root causes of these avoidable deaths and diseases? How can we end the exploitation that these workers face? A response is necessary, and the health sector should voice its concerns and make a stand, although it will not be sufficient without coordinated, intersectoral action. Legal, labour, and health protection of low wage agricultural workers and their families is urgently needed. Health, migration, the economy, sustainable development, and justice are all interlinked facets of our world, and we feel a duty for the science and health community to care and to give a voice to the voiceless.

Each of us is involved not only because we are doctors, citizens, scientists, consumers, or economists. We keep working in the field, guided by the principles of "health for all," universal health coverage, and "leaving no one behind," enshrined in the World Development Agenda 2030. Yet our work is the work of volunteers, of a society that wants to remain "civilised" and not just civil. The work of doctors who keep believing that we are meant to fight diseases not people—and that all of us need to stand up and fight exploitation, discrimination, racism, and egotism, however disguised their forms might be.

Claudia Marotta, Doctors with Africa CUAMM, Italy; Department of Sciences for Health Promotion and Mother and Child Care, Palermo, Italy

Francesco Di Gennaro, Doctors with Africa CUAMM, Italy; Department of Infectious Diseases, University of Bari "Aldo Moro," Bari, Italy

Paolo Parente, Department of Public Health, Università Cattolica del Sacro Cuore di Roma, Italy

Giovanni Putoto, MD, DTM&H, MAHMPP, Doctors with Africa CUAMM, Italy

Davide Mosca, Realizing Health SDGs for Migrants, Displaced, and Communities, Italy.

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Pattern of domestic violence from 2011 to 2015 in Beira, Mozambique

PAPER

Authors

Cebola B.R., Menegazzo F., Salmaso L., Facchin P., Isidoris V., Figueredo R.L., Mazive S.A., Schiavone M., Boscardin C., Putoto G.

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Topic

Universal coverage and equity

Focus country Mozambique



Pattern of domestic violence from 2011 to 2015 in Beira, Mozambique

Bonifácio Rodrigues Cebola¹, Francesca Menegazzo², Laura Salmaso², Paola Facchin², Valentina Isidoris³, Ramon Llapur Figueredo⁴, Samito Anselmo Mazive⁴, Marcella Schiavone⁵, Chiara Boscardin⁶, Giovanni Putoto³, Damiano Pizzol⁷

- 1. Scientific Direction, Beira Central Hospital, Beira Mozambique.
- 2. Department of Woman and Child Health, University of Padua, Italy.
- 3. Operational Research Unit, Doctors with Africa, Padua, Italy.
- 4. Department of Legal Medicine, Beira Central Hospital, Beira Mozambique.
- 5. Department of Emergency and Organ Transplantation, University of Bari, Italy.
- 6. Department of Woman and Child Health, Medical School, University of Padua, Italy.
- 7. Operational Research Unit, Doctors with Africa, Beira, Mozambique.

Abstract

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Background: Violence against women represents a violation of a fundamental human right and is a significant cause of death and disability worldwide. In developing countries, this issue is particularly dramatic and in sub-Saharan Africa were reached 65% of women reporting domestic violence.

Objective: In this study, we assessed the burden and pattern of domestic violence registered at Beira Central Hospital, Mozambique from 2011 to 2015.

Methods: We performed a descriptive analysis of data collected at the CHB Legal Medicine Service.

Results: In five years, are recorded a total amount of 1,491 admissions for domestic violence of which 1307 were females. About 80% of all female cases are represented by the 11-40 age range and, in almost 90% the aggressor was the current or past partner. More than 75% were cases of repeated violence and in more than 60% there were minors attending the phenomenon. **Conclusion**: It is crucial to act immediately and with a multi-disciplinary approach in order to fight domestic violence, especially against women due to its dramatic consequences as isolation, inability to work, loss of wages, lack of participation in regular activities and limited ability to care for themselves and their children.

Keywords: Domestic violence, violence against women, sexual violence, physical violence.

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Introduction

Violence against women is a violation of a fundamental human right with significant impact on the public health

Corresponding author:

Damiano Pizzol, Operational Research Unit Doctors with Africa CUAMM Rua Fernao Mendes Pinto 165, Ponta Gea 1363 Beira Mobile (+39) 3668731237 Email: d.pizzol@cuamm.org involving physical, sexual, reproductive and mental state of a woman and it represents a significant cause of death and disability worldwide¹. Violence against women includes physical, sexual and psychological violence occurring in the family (including battering, sexual abuse of female children in the household, dowry-related violence, marital rape, female genital mutilation and other traditional practices harmful to women, non-spousal violence and violence related to exploitation). Physical, sexual and psychological violence also occurring within the general community and they are often perpetrated or condoned by the State, wherever it occurs². Although reducing violence against women is indicated as a key strategy for the

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achievement of the Millennium Development Goals and many efforts are underway in order to prevent and eliminate violence against women and girls worldwide, but we are still far from the achieving this goal^{3,4}.

A particular form is the domestic violence or intimate partner violence that refers to the range of sexual, psychological, and physical coercive acts used against adult and adolescent women by current or former male intimate partners⁴. Intimate partner abuse may take various form, including physical violence, sexual violence emotionally abusive behaviors (such stalking, belittlement, humiliation) and economic restriction⁵. It is estimated that, worldwide, between 10 to 60% of women who have ever been married or partnered have experienced at least one incident of physical violence from a current or former partner⁶. The wide variation in the prevalence reported is due to different factors: studies methods and design, differences in violence definition and measurement, and lack of data from developing countries^{4,6}.

The WHO Multi-country study on Women's Health and Domestic Violence Against Women, performed in 10 countries, showed that a variable proportion between 15-71% of ever-partnered women had experienced physical or sexual violence and the greatest amount was reported in Bangladesh, Ethiopia, Peru, and Tanzania⁶. Unfortunately, violent acts were not isolated events but, in the majority repeated and sometimes frequent.

Despite lack and poor quality of data, in sub-Saharan Africa 65% of women reported domestic violence⁷. The Demographic Health Survey conducted in seven sub-Saharan African countries (Cameroon, Kenya, Malawi, Rwanda, Uganda, Zambia, and Zimbabwe) reported a wide percentage of women (15–49 years) who had experienced physical violence ranging from around 30% in Malawi to 60% in Uganda⁸.

In Mozambique, the few data available suggests that violence against women is widespread with 54% of polled women had been subject to physical or sexual violence and it is a more evident phenomenon in both rural and urban areas^{9,10}.

The aim of our study was to assess the burden and pattern of domestic violence based on Legal Medicine registers of Beira Central Hospital, Mozambique from 2011 to 2015.

Ethical approval

The study was approved by National Ethical Board (CNBS) by the Protocol Number 108/CNBS/17

Setting

The city of Beira has about 500,000 inhabitants, of which 17% are less than 5 years. The Central Hospital of Beira (CHB) is a 1020-bed government tertiary referring and teaching Hospital for the central region of the Country (population of about 7 million) in Mozambique and the second hospital in the country. The CHB Legal Medicine service, counting on four specialists, is a landmark for the whole city of Beira and represents the institution that assists justice in different areas of law, both for the requests of prosecutor's offices, court and the criminal police.

Methods

The CHB Legal Medicine specialists collected and reviewed all out-patient records of patients admitted to the Service during the 2011-2015 period. The extracted data provided a database with personal and related to violence information, organized in the following variables: gender, age group (0-10, 11-20, 21-30, 31-40, over 40 years) and employment of the victim, referring institution, type of violence, episode's severity, relationship with the perpetrator, reason, repetition, setting and location of the event, presence of other people at the event, time interval between event and specialist counseling.

We conducted a descriptive analysis of the collected data as yet available.

Results

From 2011 to 2015, the number of visits progressively increased from 30 to 505, for a total amount of 1,491 admissions over the five-year period considered (Table 1). Over two-thirds of the visits concerns victims that had been addressed to the Legal Medicine Service by the Women's Law Association And Development (Muleide) (1,137, 76.1%), one fifth by the Police (303, 20.3%), the remaining by the accuser (13, 0.9%) and the Tribunal (6, 0.4%). In three cases, it has been indicated that the person had been sent to a specialist visit from more than one institution. In only 2.3% of cases the referring institution is not indicated.

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Year	N° admissions
2011	30
2012	261
2013	235
2014	460
2015	505
Total	1,491

Table 1: Admissions distribution by year

The vast majority of visits concerns women (1,307 fe-male vs 170 male), determining a male: female ratio of about 1:8. Missing data are 14 (0.9%).

Global admissions distribution by age shows that the third decade of life is the most represented, covering half

of the cases (744); 24.6% (367) concerns subjects aged between 31 and 40, 12.8% (188) ranging from 11 to 20, 1.3% (19) children and the rest (151) pertains to people over 40 years of age. Admissions distribution stratified by age and gender shows differences between males and females, as shown in the figure below (Figure 1).



Figure 1: Admissions distribution by gender and age.

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Accesses distribution by aggressor was stratified by gender of the victim, indicating significant differences between males and females: nearly three-quarters of these are attacked by the current partner (77.2%), 12.2% by the former partner, 7.5% by a family member. Regard to males, the aggressor is the partner in half the cases, the former partner in 12.9% and a family member in almost a third of the cases (Figures 2 and 3).



Figure 2: Female's admissions distribution by abuser.



Figure 3: Male's admissions distribution by abuser.

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Stratification of admissions by aggressor and age of the victim shows that, during childhood (0-10 years), the abuser is a relative in the majority of the episodes and

in 20% the aggressor is not indicated. In the other age groups, the aggressor is usually represented by the partner or, less commonly, by the former partner, as depicted in the chart below (Figure 4).





Physical assault, unrelated to other forms of abuse, represents almost all forms of reported violence, involving 96% of admissions (1,431) (Table 2).

In 45.7% of cases, it is not indicated whether the current episode is the first; among the remaining, the majority is part of a repeating phenomenon (622 repeated event vs 187 first time event).

With regard to the presence of witnesses of violence, the data is unknown for more than 70%. Among the 406 cases in which it was collected, it emerges that in 63% of the events there were minor attending alone (231) or in the presence of adults (26).

The accessibility of the service has been explored considering the time interval between the abuse and the legal advice, which in the vast majority of cases (1,153) was carried out over the first week of the episode (90%).

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Type of abuse	Ν	%
Physical	1,431	96.0
Psychological	8	0.5
Sexual	2	0.1
Physical + psychological	19	1.3
Physical + sexual	3	0.2
Physical + psychological + sexual	1	0.1
Not indicated	27	1.8
Total	1,491	100

Table 2: Admissions distribution by type of abuse.

Discussion

Domestic violence represents a worldwide multifactorial issue involving community, educational, social, political and health aspects. In developing countries, the problem of domestic violence and, in particular, violence against women is pronounced since resources are limited, and women often have highly constrained choices for economic, social, and emotional reasons. Mozambique has one of the lowest human and social development indicators in the world, ranking at 185 out of 187 countries with a Human Development Index of 0.327 in 2016¹¹. In addition, across the country, official, quality and standardized data are missing and domestic violence represents a neglected issue.

To the best of our knowledge, this is the first study in Mozambique assessing the burden and the pattern of domestic violence.

The main finding of our study is the steady increase in the number of cases referred and reported at the Legal Medicine service. More than a real increase, this trend reflects a better hospital organization (only in 2011 was a dedicated register introduced), a greater population awareness and the presence of organization focused on this topic as Muleide. Muleide is an association promoting gender balance, respect for the human rights of women (especially vulnerable women) and the enhancement of their social status. The main objective of Muleide is

to sustain a fairer society, which guarantees rights equality between men and women and equal access and control of resources and power. This association seems to be crucial on this issue as referred over three-quarters of all women accessed to the Hospital service. As it was foreseeable, most of the victims (88.5%) were females highlighting that is urgent to implement and adopt laws, policies and strategies to prevent violence against women and girls and to increase usage of existing quality violence against women services. For both, males and females, the most affected age group seems to be between 20 and 40 years but maybe this represent only a major possibility for those to refer the violence. About 80% of all female cases are represented by the 11-40 age range, the fertile age, and it is related to the type of abuser. In fact, the aggressor of women victims was most of all the partner (or ex-partner) (89.4%) and only in 7.5% of cases was a family member. This data is particularly dramatic considering that they are or will be mothers and, thus, protecting them means protecting the present and future offspring. Instead, with regard to males, although in most cases the aggressor was the present or past partner, for more than 30% the violence was performed by a family member. These data, in addition to the data regarding violence suffered by children mainly by family members, suggests that preventive and educational interventions should be addressed not only women, in order to empower them, but also male and the whole community to educate them and prevent abusive behavior.

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Another particular aspect emerging from our study concerns the nature of violence: more than 95% of reported, was physical violence. Of course, this is not the reality but reflect the context: on one hand, there are not trained health workers, tools and appropriate equipment to notice and record sexual and psychological violence. On the other hand, both victims and health workers are afraid of repercussions and retaliation. Moreover, we have to consider the psychological aspect for which, the victim of sexual abuse experiences deep feelings of guilt and shame, making it difficult to confess and even more to denounce the violence. These considerations not only stresses once again the necessity of prompt interventions for the victims but also urges measures in order to protect health workers allowing them to fulfill their duty of denunciation.

Despite the lack of accurate data, two other critical aspects emerge from our study: more than 75% (622/809) were cases of repeated violence and in more than 60% (257/406) of cases there were minor attending the phenomenon. As reported by international literature, usually violence is not a sporadic phenomenon, but is a chronic conduct within a relationship/but is a chronic way to relate between two specific individuals. Children's involvement in domestic violence, even if in the role of witnesses, is extremely worrying, in the light of the recent scientific evidence, which shows that assisted violence is comparable to directly suffered violence in terms of damage to child's development.

Finally, considering the time between the abuse and reference, the majority were referred within 7 days. In some respects, it is good because the victims do not spend much time before reporting but, at the same time, it could be a problem with some injuries, and therefore potential tests, may disappear.

The main limitations of this study are the poor quality and the lack of data due to the absence of guidelines and standardized case record. In fact, our data were extracted by descriptive reports drawn at the discretion of the doctor on duty, so we do not have the same indicators for each victim. We have no information regarding pregnant women nor number of deaths due to domestic violence. Moreover, we have no data regarding clinical conditions and the follow-up, so it is impossible to consider the implications and complications (i.e. orthopedic and gynecological).

Despite these limitations, our preliminary study has several health, legal, social and political implications:

I) Multi-sectorial policies should be developed that address discrimination against women, promote gender equality, support women and help to move towards more peaceful cultural norms; II) It is necessary to increase the awareness among the whole community; III) It is mandatory to create adequate and standardized guidelines and places to the management of victims in an integrated approach (medical, legal and psychological); IV) Health workers have to be trained, protected and well informed regarding legal duties in denouncing violence; V) It is desirable to create a community network that includes health services, police and associations.

Conclusion

This is a small step in fighting domestic violence, especially against women due to its dramatic consequences as isolation, inability to work, loss of wages, lack of participation in regular activities and limited ability to care for themselves and their children. More and larger studies are needed to know the state-of-the-art and the current evidence on this topic in order to facilitate the choice of the best strategy depending on the sociocultural and resource-dependent context. to facilitate the choice of the best strategy depending on the sociocultural and resource-dependent context.

Conflict of interest

All authors declare no conflict of interest.

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Papers

A matter of fragility

PAPER

Authors Zangrando M., Putoto G.

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Una questione di fragilità A matter of fragility

Mario Zangrando, Giovanni Putoto

Medici con l'Africa Cuamm

Parole chiave: Migrazioni, Africa, Sud Sudan, Etiopia, Uganda

RIASSUNTO

Obiettivi: il termine "migrazione" è spesso presente nel dibattito pubblico attuale, in particolare per quanto riguarda la crisi dei migranti in Europa. Il presente intervento ha l'obiettivo di offrire un resoconto sulle migrazioni interne ed esterne all'Africa

Metodologia: dopo una revisione dei dati quantitativi disponibili in merito al fenomeno delle migrazioni in atto a livello globale e continentale, vengono analizzati il caso della crisi regionale nel Sud Sudan e l'intervento di Medici con l'Africa Cuamm nel paese stesso e nei confinanti Etiopia e Uganda, gli stati che ospitano il maggior numero di sfollati provenienti dal Sud Sudan.

Risultati: la conclusione evidenzia un nuovo approccio alla questione migratoria che punta a un processo di sviluppo che vada oltre la gestione dell'emergenza.

Keywords: Migration, Africa, South Sudan, Ethiopia, Uganda

SUMMARY

Objectives: the term "migration" is often present in the current public opinion debates, especially in regards to the migrant crisis in Europe. The paper has the objective to give an account of the African external and internal migrations.

Methodology: after a review of the quantitative data available on the phenomenon of migrations taking place at a global and continental level, the paper analysis the case of the regional crisis in South Sudan and the intervention of Doctors with Africa Cuamm there and in Ethiopia and Uganda, the hosting countries with the highest numbers of South Sudanese displaced people.

Results: the conclusion highlights the new approach to the migration issue aiming at a development process that goes beyond the emergency management.



Autori per corrispondenza: m.zangrando@cuamm.org; g.putoto@cuamm.org

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Premessa

Ciò di cui ci occuperemo solo parzialmente in questo intervento fa parte di una dinamica in corso a livello globale che si può riassumere come segue: oggi stiamo assistendo ai più elevati livelli di migrazione della popolazione mai registrati. Per quanto riguarda il capitolo delle migrazioni cosiddette "forzate", al momento sono 68.5 milioni le persone in tutto il mondo che sono state costrette a lasciare le proprie case. Un numero senza precedenti. Di queste, 40 milioni sono migranti interni, vale a dire persone che si sono spostate da un'area all'altra del proprio Paese d'origine, 25.4 milioni invece sono i rifugiati fuoriusciti dal proprio Paese (57% di tutti i rifugiati al momento provengono da Siria, Afghanistan e Sud Sudan). Infine 3.1 milioni di persone sono classificate come richiedenti asilo. Vi è poi il fenomeno degli apolidi, quantificato in 10 milioni di persone a cui è negata una qualsiasi nazionalità e che, di conseguenza, vivono privi dei diritti fondamentali che l'appartenenza ad una nazionalità assicura o dovrebbe assicurare. Parliamo di diritti quali: educazione, sanità, possibilità di avere un impiego, opportunità di andare all'estero¹.

Questa vastissima dinamica è il frutto di 23 crisi attive contemporaneamente a livello globale ². Quella degli sbarchi nel Mediterraneo che coinvolge Italia, Spagna, Grecia, Malta e Cipro e che maggiormente ci viene proposta dai media italiani è solo una tessera di questo puzzle e, a giudicare dai numeri delle persone coinvolte, non sembra nemmeno quella più grande. Per i primi tre mesi del 2019, infatti, gli arrivi di migranti si attestano a 14.971 di cui 524 in Italia. Nel 2018, per cui disponiamo dei dati sui 12 mesi, il flusso totale è stato di 141.472 arrivi, suddivisi tra i territori di Italia, Malta, Grecia, Spagna e Cipro. Numeri che erano stati superiori negli anni precedenti con una punta massima di 1.032.000 arrivi nel 2015 ³.

Le quattro crisi considerate attualmente più gravi, per il numero di individui messi forzosamente in movimento, mostrano però volumi di persone in fuga di molto superiori, nella maggior parte dei casi, anche alla punta più alta della crisi mediterranea: parliamo di Siria (oltre 5.680.000 persone in fuga all'esterno del Paese d'origine), Venezuela (3.377.000), Sud Sudan (2.281.000), Repubblica Democratica del Congo (833.000) – tutte persone fuoriuscite dal Paese di origine.

Questi dati non tengono conto però del numero dei migranti interni (IDP, internal displaced people) che, se prendiamo ad esempio il caso del Sud Sudan, sono grossomodo 1.760.000⁴. La somma dei migranti all'interno e all'esterno del territorio del Paese



¹ Questi i dati più aggiornati (19 giugno 2018) forniti dall'Alto Commissariato Onu per i Rifugiati,

l'UNHCR https://www.unhcr.org/figures-at-a-glance.html consultato il 5 aprile 2019

² https://data2.unhcr.org/en/situations#_ga=2.90879196.757345186.1552914886-

^{627658110.1552914886} Consultato il 5 aprile 2019

³ https://data2.unhcr.org/en/situations/mediterranean consultato il 5 aprile 2019

⁴ https://www.unhcr.org/south-sudan.html consultato il 5 aprile 2019

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ci restituisce le reali dimensioni della crisi sud sudanese che tratteremo in seguito più approfonditamente.

Il tema che intendiamo affrontare in questa sede è il problema delle migrazioni delle popolazioni africane all'interno del continente stesso. Questa tematica è parte, però, di un più ampio fenomeno che si può suddividere in due componenti. Prima di entrare nel merito è certamente utile distinguere questi due aspetti del problema.

Migrazioni interne ed esterne all'Africa e Stati fragili

Il fenomeno delle migrazioni esterne al continente africano "gode" in Italia e in Europa di una certa attenzione, tanto da parte dei media quanto da parte del discorso pubblico. Non altrettanta attenzione, per lo meno in Italia, viene riservata invece al fenomeno delle migrazioni interne all'Africa. Eppure, se le migrazioni di tipo extra-africano, costituite soprattutto da movimenti di popolazione che lasciano il continente partendo dai Paesi del Nord Africa, rappresentano una percentuale che contribuisce per il 15-20% al totale delle migrazioni di popolazione africana a livello mondiale, la componente delle migrazioni interne all'Africa risulta invece preponderante, pesando per il restante 80-85% dei movimenti complessivi di popolazione ⁵. Le motivazioni sottostanti a questo massiccio movimento di persone sono legate certamente a ragioni di tipo lavorativo, di studio, di ricongiungimento con le famiglie. Ma a questi movimenti che possiamo classificare come "volontari" vanno aggiunti quelli dettati da insicurezza e conflitti che si sviluppano in particolare a partire dai cosiddetti Stati fragili, come ad esempio il già citato Sud Sudan, la Repubblica Centrafricana, la Repubblica Democratica del Congo, l'Eritrea e la Somalia. In questi casi lo spostamento delle popolazioni si può classificare come "forzato", dal momento che rimanere può equivalere ad un forte rischio per la propria incolumità a breve termine.

Secondo il report States of Fragility 2018 pubblicato dall'OECD (Organizzazione per la cooperazione e lo sviluppo economico) entro il 2030 fino a 620 milioni di persone, circa l'80% della popolazione più povera nel mondo, vivrà all'interno di Stati fragili, Paesi che attraversano situazioni di emergenza pura, esposti a conflitti, epidemie, povertà estrema, effetti dei cambiamenti climatici(1-2)⁶. Le Nazioni Unite hanno identificato nel mondo 50 Paesi fragili, di questi 28 sono in Africa. Nell'aprile 2018 l'organizzazione americana The Fund For Peace ha presentato un indice che monitora lo stato di fragilità di 178 Paesi: si passa dai paesi Very sustainable (Finlandia, Norvegia, Svizzera e Danimarca) a Paesi semplicemente Sustainable (Islanda, Nuova Zelanda, Australia, Svezia, Canada

⁵ African Development Bank, Annual Development Effectiveness Reviews 2018, p. 47, disponibile in rete a questo link: https://www.afdb.org/fileadmin/uploads/afdb/Documents/Development_Effectiveness_Review_2018/ADER_2018_EN.pdf

⁶ States of Fragility 2018, OECD, pubblicato il 17 luglio 2018 e disponibile in rete a questo link: http://www.oecd.org/dac/states-of-fragility-2018-9789264302075-en.htm



Doctors with Africa CUAMM

ma anche Irlanda e Portogallo), cui seguono i Paesi More stable (Cile, Spagna, Polonia, Italia, Argentina) e Stable (Ungheria, Oman, Grecia). Si passa poi ai Paesi che destano preoccupazione: Warning (come Albania, Cipro, Brasile, Kazakistan), Elevated warning (come Perù, Arabia Saudita, Messico, Tanzania) per arrivare infine alla zona più "calda" della lista con i Paesi classificati High warning, Alert, High alert e Very high alert 7. I Paesi di intervento di Medici con l'Africa Cuamm sono tutti collocati in questa zona della classifica con la sola eccezione della Tanzania (Elevated warning), operando in Mozambico, Sierra Leone e Angola (High warning), Uganda ed Etiopia (Alert), Repubblica Democratica del Congo, Repubblica Centrafricana e Sud Sudan (Very high alert). Per questi ultimi due è in corso una transizione molto difficile da una fase di guerra civile ad una pacificazione che consenta di riprendere il cammino verso lo sviluppo, interrotto dalla conflittualità interna. Se la presenza di Medici con l'Africa Cuamm in Repubblica Centrafricana è recente (2018) quella in Sud Sudan inizia tredici anni fa, nel 2006. La presenza dell'organismo è proseguita, senza interruzioni, anche in seguito all'inizio della guerra civile innescatasi nel dicembre 2013 rimanendo per larghi tratti (in particolare nel corso del 2015) l'unica ONG operativa in alcune delle aree più instabili del paese (ex Stati federali di Lakes e di Western Equatoria).

Sud Sudan, una crisi regionale

Indipendente dal 2011, il Sud Sudan conta circa 12 milioni di abitanti. Nel 2015 occupava la 169° posizione su 188 Paesi nell'indice di sviluppo umano elaborato annualmente da UNDP, nel 2016 è retrocesso alla 181° posizione e nel 2018, infine, ha toccato il fondo collocandosi alla 189° posizione su 189⁸. Questo rapido scivolamento all'indietro nella classifica che misura e compara indicatori sanitari, economici e sociali, è da attribuire al perdurare della guerra civile che, dal 2013, contrappone le forze del Presidente Salva Kiir Mayardit e i sostenitori dell'ex Vice presidente Riek Machar, con gravissime ripercussioni sulla vita della popolazione. Il 31 ottobre 2018 entrambi i leader si sono incontrati (ancora una volta) a Juba per celebrare l'ennesimo accordo di pace e inaugurare una nuova fase di conciliazione che prevede il rientro di Machar nel Paese e al Governo. Ma fino a che questo delicato passaggio non sarà completato, non si potrà confermare l'avvenuta pacificazione.

Come si può immaginare, la popolazione è stremata non solo dalle dirette conseguenze della guerra in termini di mancanza di sicurezza e protezione, ma anche dall'impatto che la guerra ha avuto e sta avendo sulle disponibilità alimentari e di servizi di base (3). Per il 2019 OCHA, Ufficio delle Nazioni Unite per gli affari umanitari, ha stimato in 6,5



⁷ http://fundforpeace.org/fsi/2018/04/24/fragile-states-index-2018-annual-report/ consultato il 5 aprile 2019

⁸ http://hdr.undp.org/en/countries/profiles/SSD consultato il 5 aprile 2019

milioni le persone bisognose di assistenza umanitaria (57% degli abitanti) ⁹. Di queste 2.281.000 sono uscite dai confini del Paese come riporta l'ufficio statistico di UNHCR¹⁰ per andare a rifugiarsi nei Paesi confinanti - Sudan (844.000), Uganda (801.000), Etiopia (422.000), Kenya (116.000) e persino in Repubblica Democratica del Congo, altro stato in condizione di estrema fragilità che, come il Sud Sudan, si colloca nella fascia Very high alert nell'indice degli Stati fragili.

Il fenomeno di migrazione che caratterizza la crisi sud sudanese ha assunto pertanto caratteristiche regionali, coinvolgendo massicciamente tutti i Paesi confinanti, fatta eccezione per la Repubblica Centrafricana, anch'essa in condizione di fragilità estrema, e dalla quale non vengono riportati numeri rilevanti per quanto riguarda l'afflusso di rifugiati dal Sud Sudan.

Come detto, due tra i Paesi maggiormente coinvolti in questa dinamica sono rispettivamente l'Uganda e l'Etiopia che assieme assorbono oltre il 53% dei rifugiati sud sudanesi attualmente fuoriusciti. Sia in Uganda che in Etiopia Medici con l'Africa Cuamm è presente e, come nel Sud Sudan, l'organismo è intervenuto in accordo con le autorità locali, per contribuire a gestire l'emergenza dettata dalle fasi più acute della crisi, come si descriverà di seguito.

Assistenza agli sfollati interni in Sud Sudan

Come anticipato in premessa, secondo UNHCR il numero degli sfollati interni in Sud Sudan è di circa 1.760.000. Un numero difficile da calcolare di questi è riparato, durante gli anni di guerra civile, nell'ex Stato federale di Unity, in particolare nei territori della contea di Panyijar, presso la quale, nel febbraio 2017, è stato dichiarato dalla FAO lo stato di carestia¹¹.

A seguito di questa grave emergenza Medici con l'Africa Cuamm, che era presente nel paese in 12 contee e 5 ospedali (Yirol, Lui, Cuibet, Rumbek, Maridi), ha deciso di intervenire proprio nella contea di Panyijar (circa 100.000 abitanti tra residenti e sfollati), zona che durante gli anni del conflitto è rimasta stabilmente nelle mani dell'opposizione. La contea di Panyijar è stata caratterizzata da un intenso flusso di sfollati interni, in quanto considerata sicura, poiché difficilmente raggiungibile dall'esercito. Il suo territorio infatti è paludoso, costituito da una miriade di piccole isole. Su queste si trovano molti insediamenti di fortuna abitati dalla popolazione sfollata, raggiungibili solo mediante imbarcazioni o mezzi anfibi e ampiamente dispersi sul territorio. Un simile ambiente, da una parte, offriva un rifugio relativamente sicuro per le popolazioni in fuga ma, dall'altra,

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⁹ https://reliefweb.int/report/south-sudan/south-sudan-situation-report-29-march-2019 consultato il 5 aprile 2019

¹⁰ https://data2.unhcr.org/en/situations/southsudan consultato il 5 aprile 2019

¹¹ http://www.fao.org/news/story/en/item/471251/icode/ consultato il 5 aprile 2019

rendeva difficile erogare e accedere a rifornimenti e servizi di qualunque tipo, sanità di base e aiuti umanitari inclusi.

L'intervento del Cuamm nella contea di Panyijar si è focalizzato pertanto su tre direttrici. Innanzitutto, è stata offerto supporto alla principale struttura sanitaria presente nell'area, il Centro di Salute di Nyal, che è stato rifornito di materiali sanitari e farmaci essenziali e per il quale è stata impostata un'operazione di miglioramento generale. La seconda direttrice è stata quella di allestire quattro posti di primo soccorso in altrettanti villaggi remoti, individuati in accordo con le autorità locali. La terza, infine, è consistita nella messa in funzione di un team sanitario mobile per garantire alle comunità più isolate l'accesso: alla sanità di base, alla prevenzione, alla diagnosi e al trattamento per le malattie più comuni.

Operare in quest'area ha comportato notevoli difficoltà logistiche, istituzionali e di sicurezza, nonostante le quali si è riusciti ugualmente a svolgere tutti e tre i filoni dell'intervento. I risultati dell'iniziativa si possono misurare sui dati sanitari attualmente disponibili provenienti dall'area: da ottobre 2017 a dicembre 2018 infatti si sono raggiunti con visite mediche 30.625 pazienti, di questi 7.713 bambini di età inferiore a 5 anni. La principale causa di morbilità riscontrata presso i bambini è stata la malaria, seguita da diarrea e infezioni respiratorie. Presso il Centro di Salute di Nyal e nei posti di salute abilitati si è riusciti a offrire a 941 gravide l'accesso ad almeno una visita prenatale e, a partire da marzo 2018, il team mobile garantisce le vaccinazioni di routine ai bambini fino ai 2 anni di età. Sono state somministrate 426 dosi di vaccino contro la tubercolosi, 332 dosi di vaccino antipolio, 358 dosi di vaccino DPT (Difterite/Pertosse/Tetano), 330 dosi di vaccino contro il morbillo. Sono stati completati fin qui n. 123 cicli di vaccinazione. Le vaccinazioni sono integrate con le visite prenatali in una consultazione generale aperta a gravide e bambini fino a due anni: 249 donne in età fertile e 199 portatrici di bambini hanno avuto accesso alla vaccinazione contro il tetano. Lo screening dello stato di nutrizione è stato introdotto come parte del servizio di visita e vaccinazione oltre ad essere implementato come attività di massa, a beneficio di 11.190 bambini di età inferiore ai 5 anni. Sebbene i quattro avamposti allestiti sul territorio non siano destinati a funzionare come sala parto, il loro staff e il team mobile hanno assistito 562 donne nel dare alla luce un bambino.

Rispondere con un intervento sanitario di medio periodo ad una crisi umanitaria è stata una scommessa molto ambiziosa, difficile. I dati sopra presentati mostrano che nonostante le grandi difficoltà dettate dal contesto, si è riusciti a rafforzare i diversi livelli di servizio che costituiscono un sistema sanitario, portando l'assistenza di base presso le comunità, istituendo dei posti di primo soccorso e migliorando il centro di salute di riferimento, in modo da dare una risposta sia ai bisogni sanitari di base sia alle emergenze. Va aggiunto che quelli descritti sopra sono i primi dati sanitari mai raccolti in quest'area del Sud Sudan (4).

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Assistenza agli sfollati sud sudanesi in Etiopia e Uganda

Etiopia e Uganda insieme hanno assorbito il numero più ampio di sfollati sud sudanesi fuoriusciti dai confini del Paese. L'Etiopia, mentre scriviamo, ospita 422.240 sfollati sud sudanesi di cui 400.000 si trovano presso la regione di Gambella, geograficamente la più prossima al confine con il Sud Sudan (5)¹². Simile la situazione in Uganda che ospita oltre 700.000 profughi sud sudanesi degli 801.000 totali nel Paese all'interno di una sola regione, quella del West Nile, anche in questo caso la più vicina al confine col Paese d'origine. A Gambella, in Etiopia, con l'arrivo dei profughi si è assistito sostanzialmente al raddoppio della popolazione presente nella regione, con un rapporto di uno a uno tra residenti e popolazione ospite. Proporzioni diverse ma simili e di difficile gestione anche per le autorità ugandesi se si pensa che i residenti in West Nile, prima della crisi dei rifugiati, erano 2.180.000 e che a questi si sono aggiunti in breve tempo 1 milione di rifugiati (come riportava l'UNHCR nel 2017)¹³ ora scesi a 700.000.

Medici con l'Africa Cuamm è presente dal 1980 in Etiopia e dal 1958 in Uganda con interventi orientati allo sviluppo. Si tratta di una presenza continua ed ininterrotta che, negli anni, ha accreditato l'organismo presso le autorità locali. In virtù di questa presenza solida e di lunga durata e grazie all'appoggio di importanti donatori (UNICEF, ECHO, Agenzia Italiana per la Cooperazione allo Sviluppo, fondazioni e donatori privati), il Cuamm ha potuto realizzare sia a Gambella sia in West Nile due interventi caratterizzati dalla medesima filosofia di fondo: agire nell'emergenza cercando però di gettare le basi per una prospettiva di sviluppo del sistema sanitario delle due regioni che, quanto a contesto sanitario, presentavano indicatori particolarmente negativi, anche in rapporto alle medie nazionali, già prima dell'emergenza profughi.

Rispettando questa impostazione di fondo, l'intervento del Cuamm a Gambella si è suddiviso tra il campo profughi di Nguenyyiel, realizzato dalle autorità etiopi per ospitare fino a 50.000 persone ma giunto a gestirne circa 80.000 nel corso del 2017, e le strutture sanitarie e le comunità residenti nella regione.

Presso il campo profughi di Nguenyyiel il Cuamm è intervenuto cercando di assicurare migliori condizioni di igiene e sicurezza epidemiologica, cercando di migliorare la qualità dei servizi sanitari di base offerti alla popolazione e curando, nel caso di necessità urgenti come un parto complicato, il riferimento dei casi alla struttura sanitaria esterna al campo più adeguata a gestirlo.

L'altro versante dell'intervento è stato proprio sulle strutture sanitarie già presenti sul



 ¹² https://data2.unhcr.org/en/situations/southsudan/location/1840 consultato il 5 aprile 2019
 ¹³ Tra agosto 2017 e luglio 2018 la presenza di popolazione rifugiata sud sudanese in Uganda e in particolare nel west Nile è stata stabilmente sopra al milione di persone per poi discendere gradual-

mente a partire dalla seconda metà del 2018: https://data2.unhcr.org/en/situations/southsudan/ location/1925 consultato il 5 aprile 2019

territorio ma in grave difficoltà già prima dell'emergenza e messe a dura prova dal sostanziale raddoppio della popolazione e dagli accresciuti bisogni in termini di salute. Medici con l'Africa Cuamm ha condotto delle riabilitazioni funzionali ed edilizie presso l'ospedale Regionale di Gambella, in particolare presso il reparto di Maternità, ed ha agito anche sulle strutture sanitarie periferiche presenti in due dei distretti della regione, garantendo ristrutturazioni e riabilitazioni funzionali dove necessarie, fornitura di farmaci e attrezzature, formazione e training on the job del personale già in servizio, oltre a realizzare presso le comunità residenti attività di educazione sanitaria e attivazione e sensibilizzazione della popolazione.

L'azione condotta in Uganda, nel West Nile, ha avuto i medesimi connotati, realizzando azioni orientate ad un tempo sia alla gestione dell'emergenza sia allo sviluppo. L'azione in West Nile si è sviluppata sia all'interno dei 19 campi profughi presenti nel territorio regionale, con interventi su igiene e sanità di base, sia all'interno delle strutture sanitarie regionali presenti in sei distretti con attività volte al loro rafforzamento a più livelli, con la formazione del personale, la fornitura di attrezzature necessarie e la riabilitazione funzionale degli edifici dove necessario (257 le strutture beneficiate complessivamente).

Gli immigrati africani in Italia: dove sono gli ugandesi?

Nonostante il posizionamento nella fascia dei Paesi con fragilità di tipo Alert, l'Uganda è un Paese che grazie alle condizioni di relativa stabilità in cui si trova dal 1986 sta compiendo un percorso orientato alla crescita e allo sviluppo. A questo percorso non è del tutto estraneo il tipo di interventi di cooperazione realizzati da Medici con l'Africa Cuamm.

Il Cuamm, come detto in precedenza, è presente nel paese dal 1958, prima ancora dell'indipendenza. L'organismo non ha mai abbandonato l'Uganda nemmeno nelle fasi più acute di instabilità come la guerra tra Uganda e Tanzania del 1979 e il periodo di tensioni politiche e violenze che si susseguirono negli anni successivi.

Volendo riassumere i 60 anni di intervento nel paese, possiamo dire che gli operatori che il Cuamm ha inviato in Uganda sono stati 350 per la maggior parte di profilo sanitario conducendo un intervento che si è sviluppato all'interno di 16 ospedali sia governativi che diocesani, presenti in diverse aree del Paese ma soprattutto nel nord e nelle aree più complesse, povere, periferiche quali la Karamoja e il West Nile.

Oltre all'intervento a sostegno dell'offerta di servizi sanitari alla popolazione, sia a livello ospedaliero che dei centri di salute periferici, che delle comunità, il Cuamm è intervenuto anche nel campo della formazione degli staff e dei quadri sanitari locali e dei manager sanitari attraverso training on the job, corsi di formazione più strutturati e arrivando anche alla didattica nelle facoltà di Health Sciences and Health Management delle Università di Makerere e Nkozi.

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L'approccio è sempre stato attento all'evoluzione del Paese: si è cercato di intercettare, assecondare e, dove possibile, anticipare il cambiamento delle necessità intervenendo nelle regioni caratterizzate dalle diseguaglianze più gravi come, appunto, la Karamoja. In questa regione negli ultimi 5 anni, presso 7 distretti, 121 centri di salute, scuole, villaggi, si è portato avanti un intervento nel campo della salute materna e infantile che ha raggiunto una popolazione di riferimento di 1.5 milioni di persone ed ha migliorato l'accesso al parto assistito portandolo dal 27% di partenza all'attuale 72%, misurazione realizzata non dal Cuamm ma da una realtà terza come il DHS (Demographic Health Survey) e che lo stesso ministro della Sanità dell'Uganda ha accolto con grande soddisfazione (6). Un risultato di questo genere è stato raggiunto attraverso diverse leve:

- Continuità e durata nel tempo: la presenza di Medici con l'Africa Cuamm in Karamoja non si riduce solo ai 5 anni del progetto, ma ha una storia che inizia nel 1971 con l'invio del proprio personale nell'ospedale St. Kizito di Matany, nel distretto di Napack e che prosegue senza interruzione fino ad oggi.
- 2) Utilizzo di tecnologie frugali ma appropriate: come l'implementazione di un sistema di voucher a rimborso dei costi di trasporto sostenuti dalle gravide per recarsi alle strutture sanitarie. Questi incentivi si sono dimostrati assai efficaci per abbattere la barriera ai servizi rappresentata dal costo del trasporto. Oppure lo sviluppo del birth cushion un'innovazione low- tech e a basso impatto economico, implementato per la prima volta nel 2013 proprio nel già citato progetto quinquennale realizzato in Karamoja. Si tratta di un intervento che ha contribuito ad abbattere le barriere di tipo culturale da parte delle donne nell'accedere al parto assistito. I Birth Cushions offrono alle donne della Karamoja la possibilità di assumere la posizione accovacciata per partorire (posizione tradizionale per il parto presso il popolo karamojong), consentendo lo stesso posizionamento sebbene leggermente modificato per facilitare il parto.
- 3) Approccio critico: oltre a misurare costantemente il proprio intervento, si è disponibili a ricevere la misurazione degli interventi da parte di realtà terze. Per l'intervento in Karamoja si è chiesto alla Fondazione Bruno Kessler, in particolare all'IRVAPP (Istituto per la ricerca valutativa sulle politiche pubbliche) di valutare criticamente l'intervento, contribuendo ad individuare ulteriori aree di miglioramento per le implementazioni future.

Si diceva poco sopra della necessità di leggere, interpretare e se possibile anticipare il cambiamento: questo accade oggi nella regione del West Nile.

Il Cuamm iniziò a lavorarvi sin dall'inizio, nel 1958, con una massa critica di intervento molto elevata tra la metà degli anni ottanta e la fine degli anni novanta. Oggi il West Nile, come abbiamo visto, è la regione più esposta nel Paese ai flussi di migrazione determinati dal conflitto nel confinante Sud Sudan. Il Cuamm vi è intervenuto utilizzando il

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paradigma di cui si è parlato poco sopra, fatto di costanza, durata, radicamento nell'area, attenzione alla formazione e allo sviluppo delle risorse umane locali, innovazione frugale e utilizzo di tecnologie appropriate, approccio critico e orientato alla misurabilità dei risultati dell'intervento.

Ci rendiamo conto che quelle suggerite sono solo buone pratiche, ma vale la pena sviluppare una riflessione su cosa significa garantire a chi vive in Africa la possibilità di restare nelle terre in cui è nato.

Alcune riflessioni finali

Parlare in modo onnicomprensivo di un'Africa "povera" risulta riduttivo oltre che superficiale. Gli eventi susseguitesi negli ultimi anni hanno portato ad un cambiamento della mappa della povertà all'interno del continente africano, con il fenomeno delle migrazioni forzate e interne ai paesi e al continente che ha preso piede in modo preponderante fino a diventare il principale aspetto da considerare quando si vanno ad analizzare i movimenti complessivi di popolazione.

Ne risulta un quadro frammentato e composito, dove anche la categoria dei cosiddetti "Stati fragili" presenta dentro di sé livelli di criticità diversi e conseguenti variabili stadi di sviluppo da tenere in considerazione. Tali Stati sono e saranno sempre più il centro dell'intervento del Cuamm che, come evidenziato in precedenza, è caratterizzato da una gamma di azioni che vanno dalla riabilitazione delle strutture sanitarie al supporto clinico e gestionale, passando per il rafforzamento dei servizi decentrati e mobili per favorire il collegamento con le popolazioni che vivono ai margini del sistema sanitario. In contesti di conclamata emergenza inoltre il Cuamm realizza interventi che favoriscano la transizione dall'emergenza pura allo sviluppo intervenendo nelle aree di crisi dei paesi dove è già presente e radicato, portando avanti un approccio integrato e rispettoso delle diverse tradizioni culturali.

Si tratta di interventi che sin dalla fase di progettazione contemplano azioni volte a favorire la transizione dell'intervento da situazioni di emergenza o post emergenza a interventi di sviluppo progressivo dei sistemi sanitari locali, attraverso un approccio di medio-lungo termine e che siano in grado di modificarsi tenendo conto dei cambiamenti nei teatri dell'intervento e delle conseguenti evoluzioni dei bisogni di salute da soddisfare. Emblematica la vicenda dei rifugiati sud sudanesi: il Comprehensive Refugee Response Framework ¹⁴, inserito all'interno della Dichiarazione Universale ONU per i Rifugiati e i Migranti adottata nel 2016 e fondato sulla necessità di integrare sin dal principio i rifugiati nella popolazione ospitante, dà prova di questa volontà di andare oltre l'assistenza umanitaria di breve periodo e di "innescare" un processo di sviluppo che conduca a nuovi e più elevati livelli di benessere generale. Tra i sette Stati africani dove l'UNHCR ha



¹⁴ https://www.unhcr.org/new-york-declaration-for-refugees-and-migrants.html#CRRF

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iniziato una collaborazione per implementare tale approccio, vi sono tra l'altro l'Uganda ed Etiopia – con il primo Stato elogiato come modello positivo di gestione della crisi migratoria e promotore di una strategia d'azione "pilota" da tenere in considerazione anche in altri Paesi (7) e il secondo che ha recentemente adottato una legislazione che permette ai rifugiati di ottenere permessi di lavoro, accedere all'istruzione primaria, registrare legalmente nascite e matrimoni e avere accesso ai servizi finanziari nazionali come le banche.

Medici con l'Africa Cuamm si fa portavoce della stessa visione con il fine di contribuire a sviluppare sistemi sanitari sostenibili e comunità resilienti, capaci a poco a poco di affrontare in modo sempre più autonomo le sfide presenti e future (8). Senza dimenticare il celebre paradigma del learning by doing: solo mediante un resoconto fattuale delle attività che si sono portare avanti sul campo si possono riconoscerne errori e margini di miglioramento e sviluppare un'analisi critica che permetta di "aggiustare il tiro" ed aumentare non solo l'accessibilità alla salute ma anche la qualità e l'efficienza dei servizi offerti e, di conseguenza, migliorare l'impatto degli interventi sul territorio, contribuendo a far sì che la scelta di emigrare non dipenda da condizioni forzate e quella di restare non equivalga a rassegnarsi a condizioni di conflitto, povertà e violazione dei diritti umani fondamentali.

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Community perceptions on demand-side incentives to promote institutional delivery in Oyam district, Uganda: a qualitative study

PAPER

Authors

Massavon W., Wilunda C., Nannini M., Agaro C., Amandi S., Orech. J.B., De Vivo E., Lochoro P., Putoto G.

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BMJ Open Community perceptions on demandside incentives to promote institutional delivery in Oyam district, Uganda: a qualitative study

William Massavon,¹ Calistus Wilunda,^{92,3} Maria Nannini,⁴ Caroline Agaro,⁵ Simon Amandi,⁵ John Bosco Orech,⁵ Emanuela De Vivo,¹ Peter Lochoro,⁶ Giovanni Putoto⁷

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For numbered affiliations see end of article.

Correspondence to Dr Calistus Wilunda; calistuswilunda@yahoo.co.uk

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ABSTRACT

Objective To examine the perceptions of community members and other stakeholders on the use of baby kits and transport vouchers to improve the utilisation of childbirth services.

Design A qualitative study.

Setting Oyam district, Uganda

Participants We conducted 10 focus group discussions with 59 women and 55 men, and 18 key informant interviews with local leaders, village health team members, health facility staff and district health management team members. We analysed the data using qualitative content analysis.

Results Five broad themes emerged: (1) context, (2) community support for the interventions. (3) healthseeking behaviours postintervention, (4) undesirable effects of the interventions and (5) implementation issues and lessons learnt. Context regarded perceived long distances to health facilities and high transport costs. Regarding community support for the interventions, the schemes were perceived to be acceptable and helpful particularly to the most vulnerable. Transport vouchers were preferred over baby kits, although both interventions were perceived to be necessary. Health-seeking behaviours entailed perceived increased utilisation of maternal health services and 'bypassing', promotion of collaboration between traditional birth attendants and formal health workers, stimulation of men's involvement in maternal health, and increased community awareness of maternal health. Undesirable effects of the interventions included increased workload for health workers, sustainability concerns and perceived encouragement to reproduce and dependency. Implementation issues included information gaps leading to confusion, mistrust and discontent, transport voucher scheme design; implementation; and payment problems, poor attitude of

some health workers and poor quality of care, insecurity, and a shortage of baby kits. Community involvement was key to solving the challenges. **Conclusions** The study provides further insights into the

implementation of incentive schemes to improve maternal health services utilisation. The findings are relevant for planning and implementing similar schemes in lowincome countries.

Strengths and limitations of this study

- We collected data from a wide variety of respondents to ensure a cross-sectional representation of viewpoints.
- Triangulation of the results from different categories of respondents and data collection methods increases the validity of our findings.
- Most key informants were male, which might have led to biases in some of the perceptions elicited.
- The venues for focus group discussions might have limited the freedom of expression for some participants.

INTRODUCTION

Despite decades of implementing interventions to improve maternal health outcomes, complex and multifaceted barriers still impede progress to achieve set targets in many low-income and middle-income countries, particularly in sub-Saharan Africa (SSA).¹ This situation contributed significantly to the largely unachieved Millennium Development Goals 4 and 5 in the region.² Numerous barriers to obstetric care still exist in SSA, translating into huge coverage gaps, particularly for services that require regular contacts with the health system.² For instance, in 2016, the coverage of at least four antenatal care (ANC) visits in SSA was 52% compared with the global average of 60%, and that of delivery by a skilled birth attendant was about 50% compared with the global average of 78%.³ These average statistics, however, mask stark inequities defined by region, wealth status and urban/rural place of residence.²⁻⁴

In the quest for practical solutions, several studies on incentive schemes targeting barriers to utilisation of maternal health services have shown positive results.^{5–9} However, there is a need for context-sensitive



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approaches. As illustrations, a study in Kenya reported that some women who purchased service vouchers meant to cover direct healthcare costs did not use them because of high transport costs, which were not considered during the study design.¹⁰ A recent study in South Sudan found that women continued to deliver at home despite the availability of free-of-charge delivery services in their county.¹¹

Interventions designed with inputs from the beneficiary communities are more likely to succeed. Early dialogues involving beneficiary communities before and during the design and implementation of interventions may identify and prioritise the needs of the communities, explore and address potential barriers, and promote community engagement, which may generate a sense of ownership among the beneficiaries.^{12–14}

Incentive schemes have become popular in Uganda, with promising results. A recent study has shown that offering Maama kits to pregnant women during facility delivery was associated with perceptions of affordable healthcare. However, logistical challenges and inconsistent implementation could undermine the desired outcomes of the intervention.¹⁵ Another study has shown that maternal health vouchers have the potential to increase coverage of services through several pathways, such as strengthening public-private partnerships, which in turn can enhance referral networks and shorten distances to service points for potential users.¹⁶

Oyam district has almost 390000 inhabitants¹⁷ and is situated in a rural postconflict region in northern Uganda. The district has high levels of illiteracy, poverty and fertility, but a low family planning uptake. In 2016, 42% of women delivered in a health facility according to routine data, whereas the region-wide (Lango) contraceptive prevalence rate was 41% according to a household survey.¹⁸ Most of its residents live more than 5 km away from a health facility. The health system is weak and relies on regular support from donors/partners to provide basic services. Moreover, the majority of the health facilities are health centre (HC) level 2 with limited capacity to provide maternity services.¹⁹ Consequently, some residents have to travel long distances to access higher quality healthcare. Some pregnant women are compelled to use nearby health facilities that may be providing low-quality maternity services or to deliver at home without skilled care.²⁰⁻²²

Considering the barriers to accessing health services in Oyam District, in 2014, Doctors with Africa Collegio Universitario Aspiranti e Medici Missionari (CUAMM), hereafter referred to as CUAMM, implemented two demand-side incentive schemes-baby kits and transport vouchers-to improve the utilisation of institutional delivery services. A study on the effects of the interventions has been published.²³ The present study examines the perceptions of the community members and other stakeholders on those incentive schemes.

MATERIALS AND METHODS Design

This qualitative study collected data using focus group discussions (FGDs) and key informant interviews (KIIs). FGDs were used to explore the general perceptions of community members whereas KIIs were used to gather in-depth information from other stakeholders and to triangulate some of the information gathered through FGDs. Data were analysed using qualitative content analysis approach, which is an efficient method to analyse a large volume of textual data, yielding a condensed and broad description of phenomenon inform of structured concepts or categories.²⁴ We report this study according to the consolidated criteria for reporting qualitative research.25

Setting

This study was conducted in four subcounties in Oyam district, where baby kit and transport voucher schemes were implemented by CUAMM. Details about the setting, the selection of the subcounties and the incentive schemes have been described elsewhere.²³ In brief, two subcounties with the lowest institutional delivery coverages in the district were purposively selected after consultations with local authorities. Community dialogues played a crucial role in the design, implementation and improvement of the interventions. The dialogues were open gatherings involving local community leaders, members of the village health teams (VHT), social workers, the research team, the project staff of CUAMM and other stakeholders. The meetings also availed an opportunity to provide feedback to the community on the interventions and to highlight the challenges that needed solutions from the community. The discussions yielded suggestions to improve the interventions, particularly the transport voucher system, and to phase out the baby kits.

Transport vouchers were given to pregnant women attending ANC and/or delivering in one of the study subcounties. The vouchers were meant to improve geographical accessibility to health facilities. In the second study subcounty, baby kits were offered to all pregnant women who delivered at the only health facility in that subcounty. The baby kits were meant to encourage facility delivery while easing the cost of newborn care. Each baby kit consisted of a plastic basin, a bar of soap, a polythene bag, 1/2kg of sugar, and a piece of cotton cloth for wrapping the baby. Each voucher was valued at US\$ 4.23 Two comparable subcounties were selected as controls.²³ Based on the findings, we extended the transport vouchers to the two control subcounties in 2016 for 3 more years, whereas, the baby kits were phased out. Thus, the interventions were ongoing at the time of this study.

Participants and sampling

Participants of FGDs consisted of women who used maternal health services in 2015/2016 and their male partners. These participants were purposively selected through multiple approaches, including face-to-face

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invitations with the help of VHT members, phone calls and invitation letters. Participants of KIIs were identified through snow-balling and consisted of people considered to be knowledgeable about maternal health service delivery in the study subcounties or district. They included subcounty chiefs, midwives, health facility in-charges, a politician, VHT focal persons, and members of the district health management team (DHMT). There were no refusals or drop-outs during the study.

Data collection

Data were collected in 2015/2016 using pretested and refined open-ended interview guides (online supplementary file 1) by a team of research assistants trained on how to facilitate FGDs. The FGD data collection team consisted of a moderator, a translator, a note-taker-all conversant with the local language and culture-and two of the investigators (WM and MN). The investigators supervised data collection and followed the discussions through the translator. WM and MN conducted all KIIs in English. For technical challenges, 8 out of 10 FGDs and 16 out of 18 interview sessions were audio recorded and field notes were taken for the rest. FGDs lasted 90-120 min while the KIIs lasted 30-40 min.²⁶ There were no repeat interviews. Data saturation was achieved when participants had nothing more to say on probes from the data collectors. We were unable to return transcripts to participants for comments due to logistical challenges.

Data were collected at locations that were considered most convenient by the participants. As most participants of the FGDs were from distant villages, data were collected at HCs. Only one of the men's FGDs was conducted at a trading centre proposed by the participants. At the HCs, a room was allocated to the research team and the discussions and interviews were conducted behind closed doors. Since the venues were reserved for the exclusive use by the research team on the selected days, there were no interruptions from intruders including health facility staff. The FGD at the trading centre was also conducted in a venue that ensured privacy. Similarly, KIIs with facility in-charges, midwives, and VHT members were conducted at HCs. Other key informants were interviewed in their respective offices.

This study included 10 FGDs (5 for each gender) consisting of 114 participants, and 18 KIIs (figure 1). Twelve of the key informants were male.

Data analysis

All the audio-recorded interviews and FGDs were transcribed verbatim and translated into English, where applicable, by a professional translator. Field notes, all taken in English, were edited at the end of each day of data collection and typed into a Word document. The transcripts were then cross-checked with the field notes. Data were coded by two of the authors (WM and CW) using NVivo V.11 (QSR International, Melbourne, Australia). Qualitative content analysis approach suggested by Gläser and Laudel²⁷ was used. This approach, which is arguably more

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Figure 1 The number of participants in focus group discussions and key informant interviews. DHMT, district health management team; FGDs, focus group discussions; HCs, health centres; HF, health facility; KIIs, key informant interviews; TC, trading centre; VHTs, village health teams.

efficient and open than other alternatives,²⁷ involved reading through transcripts and field notes several times to identify emerging themes, setting up a list of the preidentified themes in NVivo, coding segments of the text that corresponded to the theme, and updating the list as new themes emerged during coding. Differences between the coders were resolved by consensus. After completing the coding process, segments of text under each theme were then summarised to provide an overview of the content relating to that specific theme. Related themes were categorised into broader themes. We performed triangulation of data sources and methods by comparing information from different sources (categories of respondents) and different data collection methods (KIIs and FGDs). We captured quotations from the participants to illustrate typical responses.

All participants provided written informed consent. For illiterate participants, this was done in the presence of a witness. Each participant received a transportation cost refund.

Patient and public involvement

Patients and/or the public were not involved in setting the research questions and in the design and implementation of the study.

RESULTS

Table 1 displays the characteristics of study participants. Overall, 81% of the participants were aged 20–49 years; about half (50.8%) were male; 71.2% were married and 40% had no formal education. Most key informants were male (66.7%), with at least secondary education (83.3%) and civil servants (72.2%). On the other hand, slightly more than half (51.8%) of the participants for the FGDs were female; 46.5% had no formal education and 64% were farmers.

This study exposed a range of issues regarding the perceptions of the community on the use of transport vouchers and baby kits to promote utilisation of maternal health services.We identified five broad themes: (1)



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Table 1 Characteristics of study participants, stratified by FGDs and Klls			
Characteristics	FGDs n=114, n (%)	Klls n=18, n (%)	Total n=132, n (%)
Gender			
Male	55 (48.2)	12 (66.7)	67 (50.8)
Female	59 (51.8)	6 (33.3)	65 (49.2)
Age category			
<20 years	20 (17.5)	0 (0)	20 (15.2)
20–49 years	93 (81.6)	14 (77.8)	107 (81.0)
50–60 years	1 (0.9)	4 (22.2)	5 (3.8)
Education level			
No formal education	53 (46.5)	0 (0)	53 (40.2)
Primary	41 (36.0)	0 (0)	41 (31.0)
Secondary	20 (17.5)	15 (83.3)	35 (26.5)
Tertiary	0 (0)	3 (16.7)	3 (2.3)
Marital status			
Single	9 (7.9)	3 (16.7)	12 (9.1)
Married	80 (70.2)	14 (77.8)	94 (71.2)
Divorced/ separated	25 (21.9)	1 (5.5)	26 (19.7)
Occupation			
Unemployed	12 (10.5)	0 (0)	12 (9.1)
Farmer	73 (64.0)	3 (16.7)	76 (57.6)
Petty trader	25 (21.9)	2 (11.1)	27 (20.4)
Civil servant	4 (3.5)	13 (72.2)	17 (12.9)

FGDs, focus group discussions; KIIs, key informant interviews.

context, (2) community support for the interventions, (3) health-seeking behaviours postintervention, (4) undesirable effects of the interventions and (5) implementation issues and lessons learnt. table 2 summarises the main findings under each broad theme and minor theme.

Context

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Geographical inaccessibility, poor quality of health services and inadequate health facilities were perceived to be the major contextual issues affecting health service access in the district. Individuals living in remote and isolated areas had to walk long distances or use bicycles to reach health facilities. Lack of reliable means of transportation and unaffordable transportation costs exacerbated the problem of geographical inaccessibility.

...some villages are quite isolated, and the distance is very far away, and sometimes we don't have even a bicycle to send women to the health centres for help, for these reasons we feel that the interventions are extremely helpful. (Female FGD participant, HC II) Most pregnant women who come to deliver here come from places where it is not easy to access transport. (Male key informant, HC II)

Most of the communities were served by HC IIs, which were perceived to be providing poor quality and inadequate health services due to their limited service delivery capacity.

Some sub-counties are remote with bigger populations, yet they get few health services. (Male FGD participant, HC III)

Iceme sub-county is wide with a big population without proper health services. (Male FGD participant, HC II)

Community support for the interventions

The incentive schemes were widely acceptable in the community. This was linked to their perceived positive impact and hence the desire to have them scaled-up to achieve a district-wide coverage. The schemes were perceived to be reducing maternal and newborn deaths and improving health-seeking behaviours (see below). They were also perceived to be helpful particularly to the most vulnerable and poor women, such as single mothers.

I think it [baby kit] is very useful because it is helping us. Sometimes we do not have enough money to buy these things. Mothers are happy with the basin, soap and cloth to take care of their babies. (Female key informant, Ngai Sub-County)

Single mothers will get help since the voucher facilitates delivery at the health facility. (Male FGD participant, HC II)

Besides improving maternal and newborn health, the interventions were perceived to be reducing a financial burden on families. The cost of transport to health facilities imposed a heavy financial burden on the residents leading to loss of household assets and precipitating household food insecurity, as households were forced to sell their belongings to carter for transportation costs. This mainly affected households that were poorer or located in remote and hard to reach areas.

These [the incentives] are good initiatives because they save some household food and assets like chicken or goats from being sold during the period of labour and delivery. (Male FGD participant, HC II)

Owing to the prevailing barriers to utilisation of maternal health services in the district, participants felt that the interventions should be scaled up district wide, as illustrated below.

We want to have a district-wide coverage, which can also be recognisable at the national level, not just in Ngai sub-County. Because by scaling up to other sub-counties, it will be very easy to increase delivery in the facilities, so even the district coverage will go up. (Male key informant, HC III)

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Table 2 A summary of perceptions towards	s incentives to promote institutional deliveries
Coding tree	Key findings
1.0. Context	
1.1. Geographical inaccessibility	Long distances to health facilities and remoteness of some villages. Lack of reliable means of transportation and high transportation costs.
1.2. Poor quality and inadequate health services	HC IIs, which served a majority of the community members, were perceived to be providing poor quality and inadequate health services
2.0. Community support for the interventions	S
2.1. Acceptability and impact of the interventions	Incentives perceived to be reducing maternal and newborn deaths and improving health-seeking behaviours. Incentives also perceived to have reduced a financial burden on families, which prevented loss of household assets and household food insecurity. Interventions perceived to be helpful particularly to the most vulnerable and poor women.
2.2. The need to scale up the incentive schemes	The interventions need to be scaled up to cover the entire district to achieve district-wide increased utilisation of maternal health services.
2.3. Preferred intervention	Transport vouchers preferred over baby kits. However, simultaneous implementation of the two interventions was necessary given the high level of poverty and barriers to access health services in the district.
3.0. Health-seeking behaviours postinterven	tion
3.1. Increased utilisation of maternal health services	The interventions were perceived to have increased the number of ANC attendance and institutional deliveries. The transport voucher system facilitated efficient referral of women in need of emergency obstetric care to the HC IV and the hospital.
3.2. Bypassing resident health facilities in favour of intervention facilities	The incentives encouraged some women in the neighbouring subcounties to by-pass health facilities in their own subcounties for services at HCs in the intervention subcounties.
3.3. Home deliveries and changing roles of traditional birth attendants (TBAs)	Transport vouchers were perceived to have encouraged some TBAs to escort pregnant women to HCs thereby reducing the no of home deliveries.
3.4. Men's involvements in maternal and newborn healthcare	The incentives motivated men to transport their partners to health facilities for ANC and delivery and to participate in birth preparedness.
3.5. Community health awareness	Health information and education associated with the interventions increased the community's maternal health awareness.
4.0. Perceived undesirable effects of incentive	ves
4.1. Increased workload for health workers and beyond	Increased utilisation of maternal health services led to an increased workload for health workers and transporters. Concerns over the sustainability of the workloads.
4.2. Sustainability of the interventions	Concerns about the sustainability of the interventions beyond the project period.
4.3. Encouraging 'increased fertility'	Interventions could encourage more births. Family planning messages not included in the interventions.
4.4. Encouraging dependency	Long-term use of the interventions could encourage dependency.
5.0. Implementation issues and lessons learn	nt
5.1. Information gaps and consequences	Information gaps during the implementation of interventions leading to confusion, mistrust and discontent among users and transporters.
5.2. Transport voucher design, implementation and payment issues	Transport vouchers designed in English, yet most beneficiaries were illiterate. Uncooperative transporters who demanded immediate refunds instead of monthly refunds, delayed refunds, overcharging at night, double payments and the preferred costing method (negotiable price vs flat rate).
5.3. Insecurity and effects on transport voucher system	Refusal by some transporters to operate at night because of insecurity. Overcharging to 'compensate' for a perceived increased insecurity risk at night.
5.4. Poor attitudes and poor quality of care	Poor attitudes of some health workers towards transporters and women and their partners. Some community leaders lost interest in the interventions because of unfriendly behaviours of some midwives.
5.5. Shortage of baby kits	Shortages of baby kits. Some women had to make repeat visits to the facility to collect their kits.
	Continued

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Table 2 Continued	
Coding tree	Key findings
5.6. Community suggestions for improvement	Community dialogues generated useful suggestions to address implementation challenges.

ANC, antenatal care; HC, health centre

For us, we move around the district [for trade] and when we are in [labour]pain, maybe we are in a different sub-county, so we prefer the whole district. (Female FGD participant, HC III)

Although most of the respondents, particularly women, preferred transport vouchers over baby kits, due to poverty and the geographical inaccessibility to health facilities, simultaneous use of the two interventions was perceived to be necessary to improve the utilisation of maternal health services.

The vouchers are very helpful to us, and with baby kits, we don't have to buy the equipment. So, we need the two schemes. (Female FGD participant, HC III)

Health-seeking behaviours postintervention

The interventions were perceived to have increased the use of ANC and institutional delivery services, promoted 'bypassing' of resident health facilities in favour of intervention facilities, facilitated positive collaborations between some traditional birth attendants (TBAs) and HCs, encouraged men's involvement in maternal and newborn healthcare services, and improved community health awareness. Views regarding increased health services utilisation were expressed mainly by key informants, some of them with access to routine data.

Since the beginning of the implementation of the baby kits scheme in the facility, the number of deliveries per month has fast increased. Some of these mothers come just for ANC, but while here, they become aware that they are in labour. Moreover, some of them come without anything, so the presence of the baby kits in the facility helps them a lot. In addition, it encourages them to come to deliver here in the unit. (Male key informant, HC III)

The increased utilisation of maternal health services in the study subcounties might have resulted from the incentives themselves and from the community mobilisation that was associated with the implementation of the incentive schemes.

We have seen a real increase in the utilisation of ANC and deliveries in these facilities. Even the advocacy within the community using the VHTs, the midwives, and the peer mothers themselves has increased, so it has created awareness and knowledge that facility deliveries are best and attending antenatal care is good. (Male key informant, Member of DHMT) The transport voucher system was perceived to have increased referrals by facilitating the transport of women to the nearest health facilities or to the referral centres for the management of pregnancy and labour-related complications.

The transport voucher is good for immediate transportation and management of pregnancy-related complications. (Male FGD participant, HC II)

In the past, they had problems to go to Anyeke HC IV, but now the coupon [transport voucher] is also helping them a lot with the referral system. (Female key informant, District Local Government)

The incentives were perceived to have encouraged some women in the neighbouring subcounties to by-pass health facilities in their resident subcounties for services at HCs in the intervention subcounties.

...we have mothers coming from the neighbouring sub-counties, like Abok. You also find someone coming from Abok leaving the HCs there and coming to Ngai here thinking she will go back with something. Maybe you could do it in all the sub-counties so that they can deliver also from there because most of them come here because of the baby kits. (Female key informant, HC III)

We know some mothers who travel from other sub-counties to come here [Acaba sub- county] because of the vouchers. If they also have the vouchers there, it will be better. (Female FGD participant, HC II)

The voucher system was perceived to have promoted positive collaboration between some TBAs and HCs resulting in a reduction in home deliveries. Following dialogues with some community leaders and health workers, some TBAs were happy to receive incentives and in return refer and escort pregnant women to HCs for childbirth instead of assisting them to deliver at home.

With this programme, even some TBAs are escorting pregnant mothers to the health centre. (Female FGD participant, HC II)

Transport vouchers motivated men to transport or escort their wives to health facilities for ANC and delivery, and to participate in birth preparedness.

The voucher system has encouraged husbands to transport their wives to the nearest HCs for ANC

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and delivery.' (Male FGD participant, Abere Trading Centre)

They [interventions] motivate couples from the period of conception to delivery to actively seek health services. (Male FGD participant, HC II)

Health information and education messages associated with the baby kits and transport voucher schemes sensitised the communities and improved community health awareness beyond improving the use of facility delivery services.

...the educative message they receive from there [HCs] will make them understand the importance of bringing mothers to the health facility. It is mainly important for men. Secondly, they spread the message about what they received to the community. (Male key informant, Myene Sub-County)

Perceived undesirable effects of the incentives

Perceived undesirable effects of the schemes included increased workload for health workers and beyond, sustainability of the interventions, encouraging 'increased fertility', and encouraging dependency. Unlike the other views, these views were expressed exclusively by key informants. The interventions were perceived to have increased utilisation of maternal health services as well as the workload of transporters and health workers. Whereas this was a good effect for transporters, it was perceived to have led to overwork and stress among health workers. To cope with the situation, it was suggested that the number of staff working in the facilities implementing the interventions should be increased.

We need an additional midwife and regular supplies to meet the workload. (Female key informant, HC II)

In terms of human resources, the [number of] health staff is not enough; it makes an overwork. The workload has increased, giving stress. The midwives in those health facilities are working alone, and current workloads are not sustainable. (Male key informant, Member of DHMT)

There were concerns about the sustainability of the interventions and their effects beyond the funding period.

The biggest challenge for me is the issue of sustainability. We are dealing with vulnerable and poor people, and we are giving it like a handout; so, the greatest challenge is the issue of sustainability. When the programme stops, are we able to sustain it? (Male key informant, Member of DHMT)

The bad part is the sustainability because when people are used to certain things, when they are used to gifts, you need to maintain it. (Male key informant, HC III)

Considering the low family planning uptake and the high fertility rate in the district, some leaders were concerned that the interventions could increase fertility.

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You know how much we have advocated for family planning, but it is still the second-lowest activity in the district, so the rate of reproduction is too high. (Female key informant, District Local Government)

...the family planning messages are not included in the intervention because sometime this intervention could be a motivating factor to produce more children. (Male key informant, Loro Sub-County)

Although the interventions were considered useful in the short term, there were concerns that long-term implementation would encourage dependency in the community.

It is a useful system, but if the initiative continues the community will become too much dependent on NGOs. I think it should be stopped after some time because it will encourage dependency among our community. (Male key informant, Myene Sub-County)

Improving the socioeconomic status of the community, for example, by setting up income generating activities for women, was a potential solution to dependency.

I think that after delivering, women should be encouraged to have another source of income to take care of the baby so that in caseincentives will not be there, they will be able to go to the facility even without vouchers. (Male key informant, Loro Sub-County)

Implementation issues and lessons learnt

Several issues emerged with the implementation of the interventions. They included: information gaps and consequences, transport voucher design, implementation and payment, poor attitudes and poor quality of care, insecurity and its effects on transport voucher system and shortage of baby kits. The community suggested ways to improve the implementation of the schemes.

Information gaps, mainly at the start of the interventions, led to undesirable consequences such as confusion, mistrust and discontent, principally related to payment of the transporters.

Two transporters of Akaoidebe village were not paid for two times after transporting pregnant mothers to deliver at Ngai HC. One of the transporters was told the money was only paid to transporters who use motorbikes to transport mothers, not bicycles, and the other transporter was told that he delayed and so the organisation took back the money. All major complains are on staff attitudes: bad language and refusal to pay money. (Male FGD participant, Abere Trading Centre)

The staff concerned with the payment of the vouchers are reluctant to pay the transporters even after the time expected has passed. (Male FGD participant, HC III)

The implementation of the transport voucher system was associated with several issues, primarily about the

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amount of money to be paid and the timing of refunds. The vouchers were designed in English, but most beneficiaries could not read English. Some transporters were uncooperative and demanded immediate refunds instead of monthly refunds according to the voucher system guidelines. Other issues included delayed voucher refunds, overcharging at night, double payments and the preferred method to determine the cost (ie, a negotiable amount vs a flat amount).

From my experience with the local community, the main challenge that we are facing is the management of the money for the refund. Some men who transport patients [pregnant women and mothers] here ask for money immediately even before we have seen the patient, or they ask for money while you are working with other patients, and they do not like to wait. (Male key informant, HC II)

Sometimes the transporters are paid twice due to lack of awareness. Some boda bodas ask mothers to pay for fuel to be transported to the health unit and later sign for the voucher refund at the HC. (Male FGD participant, HC II)

Inadequate sensitisation, miscommunication and poor health worker attitudes often resulted in poor quality of care.

Some women fear to attend ANC and delivery at the facility because of the aggressive character and unwelcome attitudes of some midwives. The issues with the voucher system have been abandoned by some community members because of the bad attitudes and language used against men and women by the health workers. (Male FGD participant, Abere Trade Centre)

Staff, especially health centre midwives should be trained on how to handle mothers and transporters because there are complaints of harsh treatment. (Male FGD participant, HC III)

Some transporters refused to operate at night because of insecurity. Alternatively, the transporter would overcharge women to 'compensate' for the perceived increased insecurity risk at night.

Some boda bodas don't like to come to our villages in the night because they are afraid of robbers. (Female FGD participant, HC II)

Transporters overcharge mothers, especially at night, when labour occurs. (Male FGD participant, HC III)

Increased facility deliveries led to shortages of baby kits and some women had to make repeat visits to the facility to collect their kits.

For the challenges, let me start from the baby kits. The rate of reproduction is too high, so the demand is still too high, and those things are there, but you find it is not enough. (Female key informant, District Local Government)

Sometimes the midwives tell us that the kits are finished so we have to come and collect them when they bring more. (Female FGD participant, HC III)

Community dialogues provided platforms for open discussions to address implementation challenges such as information gaps, regulation, selection of transporters and adherence to the voucher system guidelines, voucher refund and personal conduct.

A copy [records] of the baby kits supplied should be available to the sub-county to guarantee easy monitoring and supervision. (Male key informant, Ngai Sub-County)

There should be a clear separation between mothers who pay their transporters immediately and those unable to pay immediately. Mothers who negotiate and pay their transporters before reaching the health facility should later sign for the transport refund to avoid double payment. (Male FGD participant, Abere Trade Centre)

A copy of the voucher given to the person escorting the mother should be translated into Luo [Lango] language for easy and better understanding. (Male FGD participant, Abere Trading Centre)

DISCUSSION

We examined community perceptions on the use of baby kits and transport vouchers to improve the utilisation of facility-based delivery services in Oyam district. Generally, participants perceived the interventions to be improving the utilisation of maternal health services through addressing major barriers such as geographical inaccessibility to health facilities and delays in transferring obstetric emergencies from the lower level health facilities to the higher levels of care.

Distance to health facilities is known to be inversely associated with the utilisation of skilled birth care in SSA.²⁸ Given the high poverty levels in the district, the cost of transport frequently emerged as a barrier to accessing health services. This is consistent with what has been reported in a recent review on barriers to obstetric care access in SSA.²⁹ In many rural settings, considerable delays in reaching health facilities have resulted in avoidable maternal deaths.²⁸ The schemes were also seen to be very helpful to the most vulnerable and disadvantaged groups such as single mothers.³⁰ These findings are consistent with those of the quantitative study that evaluated the effects of the incentives.²³ Notwithstanding, this study provides further insights into the pathways through which the interventions helped to achieve the effects that is, through changing the role of TBAs, the involvement of men in maternal health issues, and community involvements in the interventions. We also elaborate on

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the community concerns related to the perceived negative impacts of the interventions.

The voucher system promoted unexpected collaborations between some TBAs and formal health workers. The TBAs who referred and escorted pregnant women to deliver at the health facilities implementing the voucher system were recognised as 'transporters' and received voucher refunds. This collaboration might have contributed to reduced home deliveries. Studies show that TBAs can change their role from attending to home births to promoting institutional childbirth if given the right incentives, training and a conducive working environment.^{11 31–34} Thus, there is a great potential to achieve higher utilisation of maternal health services in this context through the appropriate involvement of TBAs.

Community health awareness of maternal health issues was perceived to have improved during the implementation of the incentive schemes. The implementation of the incentive schemes was associated with community sensitisation and mobilisation using diverse strategies, individuals and community structures. These included community dialogues, local radio broadcasts, health facilities and health workers, VHT members, transporters and peer mothers. In both the FGDs and KIIs, respondents said that there had been behavioural changes such as men escorting their wives to the HCs for antenatal and delivery services, which was uncommon before the interventions. Thus, the various forms of community involvements may explain the perceived improvements in maternal health awareness and perceived behavioural changes over a relatively short period.

By improving the utilisation of maternal health services, the interventions also increased workloads for transporters, health workers, social workers and VHT members. Even though transporters experienced an increased workload, which translated into more economic gains, some villages had a shortage of transporters, especially at night. Among health workers, midwives were the most affected, as no additional staffs were recruited during the project. In line with our findings, a review has pointed out that demand-side incentive schemes can improve the utilisation of maternal healthcare services but there is a need to simultaneously strengthen the supply side to achieve the desired outcomes.⁵

Given the concerns of some community leaders regarding sustainability of the interventions beyond the funded period, CUAMM (the implementing non-governmental organisation (NGO)) initiated dialogues with the district local government, health authorities and community leaders to explore ways of mitigating some of the potential untoward effects of the interventions.¹⁴ Furthermore, the organisation commissioned a study to investigate the feasibility of setting up a community health insurance scheme that could support the transport voucher scheme in the district.³⁵

Oyam district has high poverty and fertility levels with low uptake of family planning services. Consequently, some key informants were concerned that the interventions

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could increase fertility. A survey conducted in conflict-affected areas of Sudan, Northern Uganda and the Democratic Republic of Congo found low knowledge and use of family planning services. Major barriers to family planning use included health system inadequacies, fear of side effects of the methods and insecurity. As a postconflict setting with high maternal, newborn and child deaths,¹⁹ the desire for large family sizes in Oyam is understandable. Therefore, improving maternal and child survival can sustain the demand for family planning services in the district.^{36–39} Although, the incentive schemes were not vertical interventions that needed separate family planning promotion, concerted efforts to strengthen family planning services across the district may resolve the low uptake of family planning services.

There were also concerns that long-term implementation of the interventions could encourage dependency in the communities. In 2013, the district reported a maternal mortality ratio of 500/100 000 live births, which was one of the highest in the country. Moreover, the district is under-resourced and depends regularly on donors to provide basic services.¹⁹ Therefore, donor-supported interventions such as the incentive schemes, which may improve utilisation of maternal health services and reduce maternal and newborn deaths may continue to be a 'necessary evil' until such a time when the district can afford to provide adequate services to improve its health indicators.

Community dialogues were crucial in dealing with a wide range of issues related to the implementation of the schemes. Information gaps led to inadequate sensitisation and miscommunication while poor attitudes of some health workers resulted in a poor quality of care. Of all these concerns, poor health worker attitudes were the most lamented about. Studies show that fear of being maltreated by health workers constitutes a barrier to using facility delivery services.^{24 40} In some communities, health workers were perceived as obstacles to the smooth implementation of the incentive schemes. Hence, it may not be surprising that some community leaders lost interest in the interventions out of frustration.

Nonetheless, as community involvement gradually strengthened, it encouraged ownership and resulted in communities taking on more direct roles in the regulation and implementation of the voucher system, as has also happened elsewhere.¹²⁻¹⁴ For example, some villages selected and registered their transporters who were willing to operate within the existing transport voucher guidelines. Because transporters played a central role in the voucher system, many of the implementation issues revolved around them. Hence, having the communities regulating their transporters was a vital achievement that addressed several key issues in operating the voucher system. Community dialogues also provided suggestions to improve the design of the transport voucher system and to phase out baby kits and replace them with vouchers, which were found to be more useful and less costly.



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Strengths and limitations

The FGDs and KIIs engaged different categories of study participants and collected a wide range of perceptions to ensure a cross-sectional representation of viewpoints. Triangulation of the results from different categories of respondents and data collection methods and the use of two coders to analyse the data increases the validity and reliability of our findings. FGDs were conducted mainly in HCs, which might have restricted the freedom of expression. To mitigate this problem, all the discussions were performed in a quiet and closed room in the absence of any health facility staff. Participants were assured of confidentiality and were encouraged to freely express themselves without fear of victimisation or future prejudice. Despite these precautionary measures, it is possible that some of the participants might have been reluctant to voice negative aspects of the intervention as staff members of the NGO that implemented the intervention and funded the study, carried out the data collection while the intervention was ongoing. In addition, some information might have been lost during note taking for the few FGD and KII sessions that were not audio recorded.

Even though we made efforts to achieve a gender-balanced representation for the KIIs, this was not possible as most key informants were male. Additionally, even though there were more female participants than males in the FGDs, analysis of the viewpoints that we captured show male dominance. This observation may be reflective of the largely male-dominated society where the study was conducted. This situation might have led to potential biases in some of the perceptions elicited. Furthermore, increasing the utilisation of health services in a health resource-limited setting such as Oyam may not necessarily lead to improved maternal and newborn health outcomes, particularly if the quality of care is substandard.⁴¹ Finally, this study could have benefited from the views of TBAs concerning the influence of the schemes on their roles. Information on their changed role emerged mainly from mothers and key informants.

CONCLUSIONS

This study provides further insights into the implementation of incentive schemes to improve maternal health services utilisation in Uganda. For a successful implementation of similar interventions, we recommend the active involvement of the beneficiary communities and stakeholders throughout the design and implementation of the schemes. Moreover, working with beneficiaries and stakeholders can mitigate potentially undesirable effects of such schemes. The findings of this study are relevant for planning and implementing similar schemes in low-income countries.

Author affiliations

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¹Doctors with Africa CUAMM, Aber Hospital, Lira, Uganda

²Maternal and Child Wellbeing Unit, African Population and Health Research Center, Nairobi, Kenya

³Division of Epidemiology and Prevention, National Cancer Center Japan, Chuo-ku, Japan

⁴School of Economics and Development, University of Florence, Florence, Italy
 ⁵District Health Office, Oyam District Local Government, Loro, Uganda
 ⁶Doctors with Africa CUAMM, Kampala, Uganda

⁷Operational Research Unit, Doctors with Africa CUAMM, Padua, Italy

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PAPER

Authors

Fattorini M., Wilunda C., Raguzzoni G., Quercioli C., Messina G., Fantini M.P., Putoto G.

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Article

Strengthening Routine Immunization Services in an Angolan *Comuna*: The Fight against the Burden of Unvaccinated Children in the Sustainable Development Goals Era

Mattia Fattorini ^{1,*}, Calistus Wilunda ², Gloria Raguzzoni ³, Cecilia Quercioli ^{1,4}, Gabriele Messina ^{1,5}, Maria Pia Fantini ⁶ and Giovanni Putoto ⁷

- ¹ Post Graduate School of Public Health, Department of Molecular and Developmental Medicine, University of Siena, Via Aldo Moro 2, 53100 Siena, Italy
- ² African Population and Health Research Center, Manga Close, Off Kirawa Road, P.O. Box 10787-00100, Nairobi, Kenya
- ³ Post Graduate School of Public Health, Department of Biomedical and Neuromotor Sciences, University of Bologna, Via San Giacomo 12, 40126 Bologna, Italy
- ⁴ Healthcare Management, Campostaggia Hospital, Local Health Unit Tuscany Southeast-Siena, 53100 Siena, Italy
- ⁵ Department of Molecular and Developmental Medicine, University of Siena, Via Aldo Moro 2, 53100 Siena, Italy
- ⁶ Department of Biomedical and Neuromotor Sciences, University of Bologna, Via San Giacomo 12, 40126 Bologna, Italy
- ⁷ Operational Research Unit, Doctors with Africa CUAMM, Via S. Francesco 126, 35121 Padua, Italy

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* Correspondence: fattorini7@student.unisi.it; Tel.: +39-0577-234084



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Abstract: In May 2018, the non-governmental organization (NGO) *Doctors with Africa CUAMM* began to implement an intervention to strengthen Chiulo Hospital's public health section to deliver immunization services in Mucope *Comuna*, Ombadja District. We aimed to evaluate the effect of this intervention. During the intervention period, actions such as staff training, improvement in the monitoring of vaccine stockpile, and the involvement of Community Health Workers were performed. The effects of the intervention on the number of vaccine doses administered were examined using negative binomial regression. Doses administered were 14,221 during the intervention period and 11,276 in the pre-intervention one. The number of administered doses was 26% higher (95% CI 9%–45%) in the intervention period than in the pre-intervention period. This was driven by vaccine doses administered during outreach sessions, where a statistically significant increase of 62% (95% CI 28%–107%) was observed. Regarding individual vaccines, statistically significant increases in the number of doses were observed for OPV2 (76%), OPV3 (100%), Penta3 (53%), PCV3 (53%), and Rota2 (43%). The NGO interventions led to improved delivery of immunization services in the study area. Greater increases were observed for vaccine doses that are more likely to be missed by children.

Keywords: vaccination; vaccine preventable diseases; routine immunization services; project evaluation; Angola

1. Introduction

Immunization represents one of the most important tools to contain global mortality: It has been estimated that childhood vaccination for 10 diseases in 41 of the poorest countries could prevent

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36 million deaths between 2016 and 2030 [1]. Vaccines also show positive economic implications, with a US\$44 return in economic and social benefits for every dollar spent in childhood immunization [2].

In 2012, 194 countries endorsed the "*Global Vaccine Action Plan*", a roadmap that aims to achieve a >90% national coverage for all the vaccines in the schedule of each country by 2020 [3]. Moreover, the need to improve the control of vaccine-preventable diseases was reaffirmed by Members States of African WHO Region in the "*Regional Strategic Plan for Immunization 2014–2020*", which defines interventions strategies in particular for the sub-Saharan context, where many countries still exhibit gaps and deficiencies in the organization of immunization programs [4].

In the literature, several interventions have been proposed to improve routine immunization services in order to increase the number of vaccine doses administered and, consequently, to obtain higher immunization coverage [5,6]. Among these, providing information to caregivers about immunization and implementing of vaccination sessions regularly in hard-to-reach communities showed positive effects, in particular when these interventions are evaluated and tailored to the context and the needs at the regional, national, and local levels, as recommended by WHO [3,4,6].

Globally, since 1974, DTP3 (third dose of diphtheria-tetanus toxoids-pertussis containing vaccine) coverage increased from <5% to 86% [7]. Despite this remarkable progress, in 2018, WHO estimated that globally, 19.4 million children did not receive DTP3 in the first year of life, of which 11.7 million (60%) lived in 10 countries. Among these countries, Angola hosted 484,000 children not receiving DTP3 in 2018, with an estimated DTP3 coverage of 59% [8].

After the end of the civil war in 2002, Angola showed sustained economic growth. However, since 2014, a prolonged diminution of oil prices led to an economic crisis with growing inflation and a reduction of expenditure in social and health sectors, particularly affecting children and the most vulnerable people [9].

Doctors with Africa-CUAMM, hereafter referred to as *CUAMM*, is an Italian Non-Governmental Organization (NGO) that has been supporting health service management and delivery in Angola since 2000. From 2004, the NGO has been involved in strengthening health services delivery in the Ombadja District; in particular, *CUAMM* has been collaborating with the Catholic Mission Hospital of Chiulo, a village situated in the *Comuna* (i.e., the third Angolan administrative level after province and district) of Mucope. In May 2018, the NGO began to implement a multifaceted intervention to strengthen the activities of the Public Health section of the hospital, whose main role is to carry out, at the local level, the tasks described in the *Programa Alargado de Vacinação (PAV)*, the Angolan national routine immunization program. The intervention aimed to improve the organization and the delivery of the immunization services, focusing mainly on training, reorganization of the staff workload, and performance review.

According to PAV program and the available literature, routine immunization services are the key point of the implementation of the whole vaccination program [10,11]: Immunization sessions can be implemented at fixed sites (e.g., hospital, health centers) or at outreach sites in places with a shortage of health workers and local people rely on visits from the nearby health facility for vaccination.

This study aimed to evaluate the effect of the various actions performed during *CUAMM's* intervention to strengthen the routine immunization services delivered in the *Comuna* of Mucope. Specifically, the study aimed to assesses the effect of the intervention on the number of vaccine doses administered.

2. Materials and Methods

2.1. Setting

The project was implemented in the *Comuna* of Mucope located in Ombadja, a district with about 350,000 inhabitants in the southern Angolan province of Cunene. In 2018, Mucope *Comuna* (one of the 5 *Comunas* in Ombadja District) had an estimated population of about 88,000 inhabitants, of whom 15,000 were children under 5 years of age. The area was served by the Catholic Mission Hospital of



Chiulo, which also acted as a zonal referral hospital with a network of 41 peripheral health facilities (health centers and health posts). The hospital was a private non-profit facility, managed jointly by local diocese and the national government where vaccinations and other mother and child health services were provided free-of-charge. In 2018, Chiulo hospital (234 beds) performed 6182 antenatal visits and 1200 deliveries, of which 49 were caesareans.

2.2. Description of the Intervention

Routine immunization services were performed by the Public Health Staff (PHS) of Chiulo Hospital (5 skilled nurses, supervised by NGO expatriate medical doctors) during vaccination sessions conducted in the dedicated hospital outpatient clinic (fixed point, working 6 h per day from Monday to Friday) and in the territory of Mucope *Comuna*, with the execution of outreach sessions (usually twice a week, reaching about 8 different villages monthly). Communities served by outreach sessions were generally located in places more than 5 km away from the nearest vaccination point, difficult to be reached by walking. In 2018, 6 health facilities with a fixed immunization point (including Chiulo Hospital) were in the area of the *Comuna* of Mucope. Only the immunization point of Chiulo Hospital was able to carry out outreach sessions in the Mucope territory because of the availability of a vehicle and, an adequate number of staff to carry out both outreach and fixed sessions simultaneously. For all the vaccination points in the Ombadja District, vaccines, cold chain equipment, and other materials (syringes, safety boxes, etc.) were provided by the District Health Department (DHD) of Ombadja located in Xangongo, a town \approx 30 km away from Chiulo.

From May 2018, various actions were implemented by the NGO supervisors in collaboration with the Ombadja DHD and the Chiulo Hospital management, in order to improve immunization services performed by Chiulo Hospital PHS:

- Continuous training of the PHS, especially related to the data collection during the immunization sessions. Twice a month, a meeting between PHS and supervisors was held in order to address challenges faced during the implementation of routine immunization services, to clarify potential PHS doubts, to identify weaknesses in the activities carried out, and to share experiences and suggestions.
- Revision of PHS working time, with personnel rotation between fixed and outreach activities. Outreach sessions were usually more exhausting because of long road trips and the high number of children to be vaccinated on a single day (up to 250). Personnel alternation between fixed point and outreach sessions was perceived as necessary by PHS.
- 3. Improving the monitoring of vaccine stockpile, with the creation of a dedicated sheet for registering, at the end of each session, the number of available doses for each single vaccine. In this way, trips to the Ombadja DHD to resupply vaccines were more accurately planned, avoiding both vaccine stockouts and the accumulation in the refrigerators of unneeded doses to avoid expiry before use.
- 4. Strengthening of the collaborations with local Community Health Workers (CHWs) and Traditional Birth Attendants (TBAs). These figures represent an essential resource in the scenario of Mucope *Comuna*, where most of the territory is not reached by phone or internet connection, and the proportion of non-Portuguese speakers is high. CHWs and TBAs were involved in creating connections with community leaders of Mucope villages, in the distribution of sheets containing the plan of Chiulo PHS outreach activities and in translating to the local language.
- 5. Shared decision with PHS, Chiulo Hospital management, Ombadja DHD and CHWs of the localities targeted by the outreach sessions. Outreach activity plans for Mucope *Comuna* were drafted every 4 months, with the selection of 6 to 8 villages usually reached at least once a month. Decisions to add, remove, or confirm communities in the plan were made on the basis of the estimated target population of the various communities, the number of vaccinated children in the



villages in the 4 previous months, and the distances between Chiulo Hospital and the nearest immunization point.

6. Enhanced collaboration with Ombadja DHD, particularly in terms of sharing immunization data and health information of Mucope *Comuna* obtained during the outreach sessions performed by the Chiulo Hospital PHS.

2.3. Study Design

This study utilized a before-and-after intervention design based on routine immunization data. Our analysis was based on the number of vaccine doses administered by Chiulo PHS to children younger than 1 year in the study area.

2.4. Data Collection

The number of administered doses for each vaccine during fixed and outreach vaccination sessions was registered every working day by the PHS on dedicated sheets in the period of May–December 2018. Data were then entered into a Microsoft Excel[®] database. At the end of each month, data were reviewed by Chiulo PHS and NGO supervisors. In addition to the number of vaccine doses administered during the intervention period, monthly data from January 2017 to April 2018 were extracted from the hospital records and included in the database.

2.5. Definition of Intervention Periods

In order to assess the effect of the intervention on vaccination, data of the administered doses of the 2 years included in the study were divided in 2 different periods of the same duration (8 months): Pre-intervention period (from May to December 2017) and NGO intervention period (from May to December 2018).

2.6. Outcome Variables

Outcome variables were vaccine doses administered according to the immunization schedule as outlined in the Angolan PAV.

For children <1 year, the schedule was structured as follows:

- At birth: One dose of Oral Polio Vaccine (OPV0), one of Bacillus Calmette-Guérin (BCG) vaccine, and one of Hepatitis B (HepB_BD, Hepatitis B Birth Dose);
- At months 2, 4, and 6: One dose of OPV (OPV1-3), one of Pentavalent vaccine (Penta1-3, containing vaccine in DTP plus *Haemophilus influenzae* and Hepatitis B vaccine) and one of Pneumococcal Conjugate Vaccine (PCV1-3);
- At months 2 and 4, one dose of Rotavirus vaccine (Rota1-2);
- At month 4, one dose of Inactivated Polio Vaccine (IPV);
- At month 9, one dose of Measles-Containing Vaccine (MCV, from February 2018 combined measles/rubella vaccine was introduced in PAV) and one of Yellow Fever (YF) vaccine.

IPV was excluded from analysis because the vaccine was introduced in the routine immunization program in the whole district in January 2018.

2.7. Statistical Analysis

Descriptive statistics were used to summarize data on vaccine doses administered according to the intervention time period. Because the data on the number of vaccine doses administered were over dispersed, i.e., the conditional variance was greater than the conditional mean—the effect of the intervention on the total number of vaccine doses administered was examined using negative binomial regression, with an incidence rate ratio option. The model contained only the exposure and outcome variables. Negative binomial regression was a generalization of the Poisson regression method suitable



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for over-dispersed count data. We also used negative binomial regression to examine the effect of the intervention on individual vaccine doses administered. We then pooled vaccine-specific effects using inverse variance-weighting fixed-effects meta-analysis. Because the observed effect of the intervention on the number of vaccine doses administered may be due to a secular trend, we conducted additional analysis by including data from a longer pre-intervention period (from January 2015 to April 2018). To make reasonable comparisons, we divided this extended pre-intervention period into 5 8-month periods (January–August 2015, September 2015–April 2016, May–December 2016, January–August 2017, and September 2017–April 2018). We then used negative binomial regression to assess changes in the number of vaccine doses administered over time with reference to January–August 2015 period. Data were analyzed using Stata[®] version 14 (StataCorp, College Station, TX, USA) and two-sided *p* values <0.05 were considered statistically significant.

2.8. Ethical Considerations

This study involved counting the number of vaccine doses and did not contain data involving human subjects.

3. Results

Following the guidelines of the Angolan PAV immunization schedule for children younger than one year, Chiulo PHS administered a total of 19,746 vaccine doses in 2018 (the year including the 8 months of the NGO intervention period) compared with 15,349 doses in 2017, which was an increase by 4397 (+28.7%) doses. Of these doses, 13,149 (11,090 in 2017, +18.6%) were administered at Chiulo Hospital fixed point, and 6597 (4259 in 2017, +54.9%) were administered during outreach sessions performed in the Mucope *Comuna* territory.

The number of vaccine doses administered was 14,221 during the NGO intervention period and 11,276 in the comparable pre-intervention period. Vaccine doses administered at the hospital fixed point were 8880 in the NGO intervention period and 7988 in the pre-intervention period, while the number of doses administered during the outreach sessions was 5341 in the NGO intervention period and 3288 in the pre-intervention period.

Based on negative binomial regression, the number of administered doses was 26% higher (95% CI 9–45%, p = 0.001) in the NGO intervention period than in the pre-intervention period. The number of doses administered during outreach session showed a statistically significant increase of 62% (95% CI 28–107%, p < 0.001), while the increase in the number of doses administered in the NGO intervention period in the hospital was not statistically significant (11%; CI –4%–29%, p = 0.16).

Regarding individual vaccines, regression analyses showed statistically significant increase in the number of doses in the NGO intervention period for OPV2 (76%; 95% CI 15%–170%, p = 0.009), OPV3 (100%; 95% CI 24%–224%, p = 0.005), Penta3 (53%; 95% CI 2%–127%, p = 0.037), PCV3 (53%; 95% CI 7%–119%, p = 0.021) and Rota2 (43%; 95% CI 1%–105%, p = 0.047) as shown in Figure 1. The pooled results showed a 29% (95% CI 17%–42%) higher total number of administered vaccine doses in the intervention period than in the pre-intervention period, with no evidence of heterogeneity across vaccine types.



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Figure 1. Effect of the intervention (expressed as incidence rate ratios) on individual and total vaccine doses administered by Chiulo PHS. The number of vaccine doses in the NGO intervention period (May–December 2018) is compared to the number administered in the pre-intervention period (May–December 2017). The number of vaccine doses administered in the pre-intervention and intervention periods is represented by Inter_0 and inter_1, respectively. The bars represent 95% confidence intervals around point estimates.

Figure 2 clearly shows an increase in the number of vaccine doses administered in the intervention period and no significant trend in the extended pre-intervention period (from January 2015 to April 2018).



Figure 2. Change in the number of vaccine doses administered by Chiulo PHS from 2015 to 2018. The 48-month period was divided into 6 periods of 8 months each. The incidence rate ratios represent the relative change in the number of vaccine doses in each period with reference to the period January 2015 to August 2015. May 2018 to December 2018 represents the NGO intervention period. The bars represent 95% confidence intervals around the point estimates.



4. Discussion

The control of vaccine-preventable diseases will continue to play a key role in the Sustainable Development Goals (SDGs) era. In order to contain the under 5 mortality rate to no more than 25/1000 live births in every country by 2030 (SDGs target number 3), actions to strengthen immunization programs will be essential [12]. These interventions are now more compelling in the WHO African Region, where the burden of unvaccinated and under-vaccinated children is almost as high as in all the other Regions combined [7].

To strengthen the immunization activities of Chiulo PHS, the NGO and the local health authorities carried out a multifaceted intervention aimed at improving the activities of the hospital and/or the outreach services. Regarding the outreach sessions, the implemented interventions were inspired by the "Reach Every District" (RED) approach, which aims to strengthen immunization programs through actions (e.g., planning and management of resources, linking health services with the health community, etc.) focused on a district level [13]. In this study, villages served by outreach sessions were located at variable distances from Chiulo Hospital (from 6 to 70 km), and the implemented actions in the NGO interventions period were mainly focused on the reduction of the burden of unvaccinated children in these communities. This approach, tailored on the complexity of the territory of Mucope (a rural *Comuna* with a shortage of fixed immunization points and a population distributed sparsely in small villages), as recently suggested by WHO, is shifting from a RED to a REC ("Reaching Every Community") approach, and it appears to be the most effective pathway to improve the access and the quality of vaccination programs especially in rural and hard to reach areas [5,11].

Our analyses show that interventions implemented by the NGO during the project intervention period were more effective in delivering vaccine doses to children in need, especially through outreach services. These could be related to the NGO's approach, which, with the support of CHWs and TBAs, strengthened relationships with communities in the Comuna. On the other hand, Chiulo Hospital registered a decrease of 800 deliveries in 2018 compared to 2017, leading to a diminution of HepB_BD administered during the NGO intervention period. According to the PAV schedule, this vaccine should be administered within the first day of the life of a child, and this can be done more easily when childbirth occurs in a hospital, rather than at home. Moreover, regression analysis highlighted a statistically significant increase in the number of administered doses in NGO intervention period for the last scheduled dose (i.e., completion of the immunization series for a single vaccine) of OPV, Penta, PCV, and Rotavirus vaccines. Thus, it is clear that the intervention contributed to the completion of the immunization schedule and hence reduction of vaccine drop-out rates. Completion of a vaccination series is essential for adequate immunity against a specific disease. During the routine training of the PHS, the project emphasized the need to inform caregivers about the benefits of vaccines and the importance of not missing future vaccinations in order to minimize the dropout rate. Differences in the number of doses of vaccines that should have been administered at the same time (e.g., Penta3, OPV3, and PCV3) were primarily related to vaccine stockouts that affected the District of Ombadja during our study period.

Outreach sessions can represent an opportunity to integrate immunization services with several other health interventions, such as deworming and vitamin A supplementation, distribution of insecticide-treated nets, screening for acute malnutrition, and antenatal care (ANC) especially in remote rural areas [5,14]. During outreach sessions, the PHS usually integrates some of these services in routine immunization activities, and during the NGO intervention period, this integration was improved in order to provide a more comprehensive public health package for the territory of Mucope *Comuna*. Vitamin A Deficiency (VAD) represents one of the most assessed micronutrient deficiencies in the world, and it is a major cause of preventable childhood blindness [15]. VAD level in children <5 years old in Angola has been defined as "severe", with an estimated VAD prevalence of 65% [16]. For Angolan children aged less than 1 year, it has been scheduled the administration of two doses of vitamin A, at months 6 and 9. During 2017, 760 doses of vitamin A were administered by Chiulo PHS during outreach sessions, while in 2018, the number of doses increased to 807 (+5.8%) despite a



stockout at the district level, which stopped vitamin A administration for 50 days in September/October. In addition, during the NGO intervention period, a skilled nurse was integrated into the PHS team to provide ANC during outreach sessions. Communities visited by immunization outreach sessions were often located far away from the nearest health facility with personnel skilled in ANC. Thus, women living in those villages are more likely to deliver at home with no ANC contacts. From July to December 2018, there were 527 ANC contacts during outreach sessions, and these were accompanied by the distribution of the recommended nutritional supplements and delivery of malaria intermittent preventive treatment in pregnancy [17]. Moreover, several women with high-risk pregnancy identified during outreach were referred to the Chiulo Maternity Waiting Home (MHW): A structure located close to the hospital where women with high-risk pregnancy are referred for close monitoring. In 2019, Chiulo PHS, collaborating with the staff of the Pediatric Unit, started to implement the delivery of extra services such as screening for malnutrition and nutritional education during outreach sessions. To be successful, the integration of these health services must be carefully planned and monitored in collaboration with key stakeholders (local health staff, NGOs, community leaders, etc.) [18,19].

Comparing district immunization experiences in three different countries (Ethiopia, Cameroon and Ghana), the adaptation of vaccination services accordingly to community needs and conditions was identified by LaFond et al. [20] as one of the four direct drivers of immunization coverage improvement; the other three were the involvement of CHWs, the promotion of partnership between health system and community, and the regular review of the performance both of the immunization program and healthcare staff. In this study, interventions performed by the collaboration of the NGO, the local health authorities, and the hospital management were all implemented following these drivers. Although the contribution of every single driver in the improvement of immunization services varies depending on each district context, they act in a synergistic way to overcome the most common barriers of good quality vaccination services in rural areas. These include lack of trained health staff and materials, transportation difficulties in reaching remote villages, vaccine stockouts, cold chain maintenance and language barriers [21].

Since 1978, the concept of Primary Health Care has been reinterpreted in different ways: Recently, 40 years after the Alma Ata Declaration, a more comprehensive definition of PHC delineate it as an approach aiming to provide health and well-being with equitable distribution according to people's preferences and needs, in a continuum of care from health promotion and disease prevention until palliative care [22]. To achieve this vision of PHC in the 21st century, specific transformational actions in healthcare policies are required. Among these actions, WHO and UNICEF highlight the need for a different role of hospitals in the future of PHC, in order to end the dichotomy between these structures and the first levels of care ensured outside them [23]. In this vision, hospitals should move towards a people-centered organization responsible for population health jointly with other care providers, and not only focused on patients requiring acute and highly specialized treatments. Moreover, in the 21st century, hospitals should play an important role in education, promotion, and prevention, becoming prominent providers of public health services. The interventions implemented by the NGO to strengthen immunization services were geared at shifting Chiulo Hospital towards the new role of a hospital in PHC, for example the actions targeted at PHS education and the integration of different healthcare services (e.g., ANC visits, vitamin A supplementation, etc.) during vaccination sessions.

Angolan economic crisis and the consequent inflation led to a more than 50% reduction in health care expenditure in 2018 compared to 2014, despite population growth of 3.4 million in the 2014–2018 period [24]. In addition, in 2017, Angola transitioned out of the support of the Global Alliance for Vaccines and Immunization (GAVI, a public-private partnership for the increase of access to immunization services in poorest countries) [25]. The end of this support was planned before the start of the economic crisis (when Angola abandoned the status of low-income countries required to be eligible for GAVI support), which primarily affected the availability of skilled health staff. Nowadays, national immunization programs of several middle-income countries such as Angola are facing unprecedented financial problems because the end of the levels of funding and support guaranteed when classified as



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low-income [26]. For these reasons, Angolan PAV now requires support, especially in the delivery of immunization services and the contribution offered by the private sector could be effective in reducing the burden of unvaccinated children [27].

This study has several limitations. First, the results concerning administered doses may have been influenced by reporting bias: For example, Ombadja District borders with Namibia, and local people often access health services (including immunization) across the borders in both countries [28]. This particular situation could also lead to difficulties in the interpretation of vaccination cards due to different schedules and languages, resulting in errors in data collection regarding the number of doses administered. Second, this study did not account for other factors and secular trends that might have influenced the number of vaccine doses administered. Nonetheless, Chiulo Hospital's immunization data from 2015 did not reveal any major change in the immunization trend in the pre-intervention period, as highlighted in Figure 2. Thus, the observed increased in immunization doses in the intervention period is unlikely to be due to a secular trend. Moreover, there was no other specific intervention to increase immunization during the study period in the Mucope *Comuna*.

5. Conclusions

The NGO interventions led to an improvement in the delivery of immunization services by Chiulo Hospital PHS in Mucope *Comuna*. Greater increases were observed for vaccine doses that are more likely to be missed by children. The integration of immunization services during outreach with other health services may increase the accessibility of primary health services in hard-to-reach rural areas.

Author Contributions: M.F. had conceived the study, performed literature research, collaborated in performing the study and in writing the manuscript; C.W. performed the statistical analysis and collaborated in writing the manuscript; G.R. collaborated in performing the study and in writing the manuscript; C.Q., G.M., and M.P.F. contributed to the conceptualization of the study. G.P. supervised the whole study. All the authors contributed to the interpretation of the results and approved the final version of the manuscript.

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Conflicts of Interest: The authors declare no conflict of interest.

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A survey on a rural in-hospital population diagnosed with Atrial Fibrillation in west Shewa region, Ethiopia

PAPER

Authors Bregani E.R., Valcarenghi C., Conti M.

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Topic Universal coverage and equity

Focus country Ethiopia





A survey on a rural in-hospital population diagnosed with Atrial Fibrillation in west Shewa region, Ethiopia

Field research

Enrico Rino Bregani^{1,2,3}, Caterina Valcarenghi⁴, Matilde Conti⁵

¹U.O.C. di Medicina Generale, Emostasi e Trombosi, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, 20122, Milano, Italy

Doctors with Africa CUAMM

Address correspondence to Enrico Rino Bregani, E-mail: rino_bregani@yahoo.it.

ABSTRACT

Background Atrial fibrillation (AF) is the most common sustained arrhythmia seen in clinical practice. It has been extensively studied in Western countries but less is known about developing countries.

Methods We collected data on a rural population afferent to Wolisso hospital in Ethiopia, analysing epidemiology, clinical and cardiac ultrasound profile. We enrolled 54 patients with first diagnosis of AF who undertook cardiac ultrasound and a questionnaire about personal and clinical profile.

Results Enrolled patients were younger than reported in the African urban population (mean age 51 years) and females were symptomatic at a younger age than males (61.8% of females were <50 years old versus 30% of males) and had complicated disease (100% of females had CHF). Rheumatic heart disease (RHD) was found in 38.9% of patients, especially in females (41.1%) and young patients, whereas hypertension (HTN) and degenerative valvular disease were predisposing to AF in old patients.

Conclusion Low socio-economic level may explain findings we observed, particularly male to female ratio, more relevant than in urban subsets. RHD and HTN are many etiological factors of AF in our small population, so low-cost strategies to prevent their complications are surely cost-effective in rural catchment area of Wolisso hospital.

Keywords atrial fibrillation, Ethiopia, rural population, rheumatic heart disease, hypertension

Introduction

Atrial fibrillation (AF) is worldwide the most prevalent sustained arrhythmia and it is associated with increased morbidity and mortality and elevated cardiovascular and cerebrovascular risk.¹ Congestive heart failure (CHF) and valvular heart disease (VHD) were reported as the main predictors and precursors of AF, while age, sex (males being more affected), diabetes mellitus (DM), hypertension (HTN), ischaemic heart disease (IHD), sleep apnoea, obesity, metabolic syndrome and chronic kidney disease (CKD)^{1,2} are assessed risk factors. A lower prevalence and incidence of AF in African Americans compared with Caucasian population despite high prevalence of traditional risk factors has been established from prospective and retrospective cohorts.^{3–6} The African American Heart Failure trial (A-HeFT) subgroup analysis found AF to occur at higher rates in black males than black females but with worse impact on survival for women.⁷ Aetiology of racial differences in AF burden is uncompletely understood, but lower cardiovascular risk and genetic factors are under investigation. AF has been extensively studied in developed countries on white or African American populations.^{3,5,6} Most studies conducted in Africa deal with urban subsets,^{8–10} while there is dearth of information about African rural population. Traditionally, AF in sub-Saharan Africa is related to rheumatic heart disease (RHD). However, with economic transition AF risk factors and complications are likely to change.^{2,8} The literature concerning AF epidemiology in developing countries⁸ showed a prevalence in general population ranged

Enrico Rino Bregani, Specialist in hematology, tropical medicine, cardiology Caterina Valcarenghi, specializing anesthesiologist Matilde Conti, specializing emergency doctor

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²Medicine Department and Outpatient Department, St. Luke Catholic Hospital, Wolisso, Ethiopia

³Operational Research Unit, Doctors with Africa Cuamm, 35121, Padova, Italy

⁴S.d.S di Anestesia, Rianimazione, Terapia Intensiva e del Dolore, Università degli Studi di Milano, 20122, Milano, Italy ⁵S.d.S di Medicina di Emergenza e Urgenza, Università degli Studi di Milano-Bicocca, 20126, Milano, Italy

Sustainable partnership for development: improving quality of maternal care in Wolisso, Ethiopia

POSTER PRESENTATIONS

Conference

6th CUCS Congress – Coordinamento Universitario per la Cooperazione allo Sviluppo

Presentation date 19th – 21st September 2019

Location

Trento, Italy

Authors Atzori A., Brighenti M., D'Alessandro M.

Focus country Multi-Countries







Citizenship and common goods. University and international cooperation for safety, environment and sustainable development Trento 19-21th September 2019

SUSTAINABLE PARTNERSHIP FOR DEVELOPMENT: IMPROVING QUALITY OF MATERNAL CARE IN WOLISSO, ETHIOPIA

Author 1: Andrea Atzori, Doctors with Africa CUAMM Author 2: Maria Brighenti, Doctors with Africa CUAMM Author 3: Michele D'Alessandro, Doctors with Africa CUAMM

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Government authorities, private companies, civil society organizations and research institutions all have different goals, tasks and responsibilities, but they can benefit from working together.

Goal 17 of the UN Sustainable Development Goals (SDGs) states that a successful sustainable development agenda entails partnerships between governments, the private sector and civil society. According to SDG17, inclusive partnerships built upon principles and values, a shared vision, and shared people-centred solutions, are needed at the global, regional, national and local level. These partnerships entail complementary roles, where a multi-stakeholder approach is needed in order to mobilize and share knowledge, expertise, technology and financial resources.

Partnership between profit and non-profit organizations is thus key for achieving better results in development cooperation. Within this context, Doctors with Africa CUAMM is cooperating with Merck for Mothers and MSD Italy to tackle maternal and neonatal mortality in Africa.

Since 2017, Doctors with Africa CUAMM, MSD Italy and Merck for Mothers have confirmed their partnership to **improve access to health care services for mothers and children in Ethiopia**. In Africa, women and adolescent girls face great obstacles when seeking to access health services due to distance, lack of transportation and cultural factors. The resulting **lack of healthcare is one of the main causes of high mortality** among **girls and women** of reproductive age. In Ethiopia, maternal and neonatal mortality rates remain high, being 353/100,000 live births and 41/1,000 live births respectively.

With the support of **MSD Italy and Merck for mothers**, CUAMM is implementing a **3-year project** in the area of **St. Luke Hospital of Wolisso**, in Oromia region, **Ethiopia**. Aim of the project is to introduce innovative approaches to **reduce maternal and neonatal mortality**, while increasing the quality of health services and at the same time addressing key bottlenecks in accessing health services (distance, lack of transportation and cultural factors). Overall, beneficiaries of the intervention will be more than





42,500 adolescent girls and young women as well as the entire community living in the catchment area of Wolisso Hospital of about 250,000 people.

More specifically, the intervention aims to:

- Perform 10,200 antenatal visits
- Conduct 222,600 paediatric consultations
- Assist about 4,000 deliveries
- Create a referral system for pregnant women from the community to the hospital
- Strengthen data gathering and foster operational research

Furthermore, with a long-term development approach, in order to increase the quality of services, the partners involved are **supporting the Nursing and Midwifery school of Wolisso Hospital**, with an output of about 25 new midwives graduating every year.

Doctors with Africa CUAMM firmly believes in the importance of creating strategic partnership and seeking integration within the local system in a complex and changing environment to achieve better results in guaranteeing the right to health for all, especially the most vulnerable populations. Indeed, Doctors with Africa CUAMM is supporting a local institution (Wolisso Hospital) through a differentiated support coming from private foundations, the Italian Cooperation and the local government. The experience of Wolisso is a concrete example of how different stakeholders with different roles and a shared vision can work together to tackle global challenges, contributing to SDG3 *Good Health and Wellbeing*, SDG10 *Reduced Inequalities* and SDG17 *Partnerships for the Goals*.

Is this abstract submitted for one of the proposed sessions (see list on website)? If so which one?

Yes, it is submitted for Topic 1: Evolution of developmental cooperation. *II legame profit-non profit: un cambiamento per la cooperazione allo sviluppo?*

Please identify one or more frames for your contribution

- **Conference Dimensions**
 - 1. Common goods
 - 2. Citizenship
 - 3. Security
 - 4. Environment
 - 5. <u>Sustainability</u>

Other Keywords:

Partnership, Inequalities, Maternal Health

Academic Perspective

- a) Education and Trainings
- b) Research and Innovation
- c) Partnership and Projects



Finding alternative roles for Traditional Birth Attendants: an experience from the south of Angola

POSTER PRESENTATIONS

Conference 12th European Public Health Conference

Presentation date 20th – 23rd November 2019

Location Marseilles, France

Authors Fattorini M.

Focus country Angola







of women's presences during these educational talks was 57504, and 15379 of them (26.7%) were pregnant. TBAs referred to health facilities 226 pregnant women for a delivery assisted by SBAs. (404, 17.8%) and malaria (370, 16.3%) were the most debated topics. The total References - World Health Organization. WHO recommendation on partnership with traditional birth attendants (TBAs). 2015 represent an effective way to improve maternal and neonatal outcomes.

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fattorini7@student.unisi.it



One-year activity of a ''Casa de Espera'' (Maternity Waiting Home) in the south of Angola

POSTER PRESENTATIONS

Conference 12th European Public Health Conference

Presentation date 20th – 23rd November 2019

Location Marseilles, France

Authors Fattorini M.

Focus country Angola







hospital, and 593 (43.5%) concerned women hosted in the MWH. abortion and/or caesarean. In 2018, 1364 deliveries were performed in the attendants. Most assessed family members and 8.7% by community health workers/traditional birth were invited to join the MWH by personnel of local health facilities, 22.8% by between 14 and 17 years of age, while 73 (10,4%) RESULTS: In 2018, 703 women were admitted in the MWH. 40 (5.7%) were tactors for high risk pregnancy were previous were ≥36 years old. 68.6%

> collection could lead to a better comprehension of the efficacy of the facility. represent an effective tool. Regarding Chiulo's MWH, an improvement of data regarding maternal and neonatal mortality, the implementation of MHWs could Reterences **Development Goals targets**

CONCLUSIONS: To

achieve the 2030 Sustainable

and meta-analysis. BMIC Health Serv Res. 2018, 18(1):748. developing countries and its contribution for maternal death reduction in Ethiopia: a systematic review World Health Organization. Maternity waiting homes: a review of experiences. WHO, Geneva. 1996. Dadi TL et al. Role of maternity waiting homes in the reduction of maternal death and stillbirth in attorini7@student.unisi.it



Engaging Persons Living with HIV groups to Improve Retention of Clients in HIV Care: Experience of USAID RHITES N Lango Project

POSTER PRESENTATIONS

Conference 6th Annual National Quality Improvement Conference of MoH

Presentation date 26th – 28th November 2019

Location Kampala, Uganda

Authors Aguze G.

Focus country Uganda





Strengthening Nutrition service delivery to improve treatment outcomes for malnourished children in Inpatient Therapeutic Care (ITC): A case of Pope John's Hospital-Aber, Oyam District

POSTER PRESENTATIONS

Conference 6th Annual National Ouality

6th Annual National Quality Improvement Conference of MoH

Presentation date 26th – 28th November 2019

Location Kampala, Uganda

Authors Nambuya E.

Focus country Uganda





Working Through Community Health Structures to Improve First Trimester ANC visit, Among Pregnant Women: A case of Orum HCIV, Otuke District

POSTER PRESENTATIONS

Conference 6th Annual National Quality Improvement Conference of MoH

Presentation date 26th – 28th November 2019

Location Kampala, Uganda

Authors Bosco Orech J.

Focus country Uganda





University on the front line: how Ngos and academies can work together for a better education on global health

ORAL PRESENTATIONS

Conference

6th CUCS Congress – Coordinamento Universitario per la Cooperazione allo Sviluppo

Presentation date 19th – 21st September 2019

Location

Trento, Italy

Authors

Cavagna C.

Focus country Multi-Countries







Citizenship and collective goods. University and international cooperation for safety, environment and sustainable development Trento 19-21th September 2019

TITLE of the ABSTRACT: UNIVERSITY ON THE FRONT LINE: HOW NGOS AND ACADEMIES CAN WORK TOGETHER FOR A BETTER EDUCATION ON GLOBAL HEALTH

Chiara Cavagna, Medici con l'Africa Cuamm; Chiara Di Benedetto, Medici con l'Africa Cuamm

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Context

International health cooperation is seldom included in the official curricula of the faculty of Medicine, although it can represent a concrete opportunity for professional and human empowerment, in addition to a job possibility for future clinicians.

Students often report the lack of practical experience during the academic path; on the other side NGOs can be interested in engaging young students in international and global health issues and make them become interested in health cooperation.

For the above-mentioned reasons the meeting point between medicine students and health cooperation NGOs could be fertile.

Cuamm as "university on the front line"

Doctors with Africa Cuamm, based in Padova and working in 8 sub-Saharan countries, since 2006 has been implementing different educational offers addressed to young people: students, residents, young researchers.

Currently there are three main on-going projects:

WOLISSO PROJECT: an educational proposal addressed to Medical Students (enrolled in the 5th or 6th year of Medicine curriculum) that gives them a first professional experience in Tanzania or Ethiopia: the student, led by a Cuamm coordinator, will spend 1 month in Africa observing the work in rural hospitals. Wolisso Project has been implemented since 2006: 323 students have been involved from all over Italy (until August 2019). A recent monitoring research (Parise, 2008) states that 95% of them are satisfied and would repeat the experience with Cuamm. Furthermore, the 75% of them declare that the experience in Africa made him/her more motivated and resolute in carrying on his/her studies, once back. Eventually, the 20% of the students have already had other experiences in Low and Middle Income Countries after participating in the project (working with Cuamm and other international health organizations).





- JUNIOR PROJECT OFFICER JPO: an educational proposal addressed to medical residents (branches: infectious diseases, maternal and child health, public health, surgery). Residents can spend 6/12 months of their academic curriculum in Africa, working with Cuamm and supervised by a specialist of the same branch. The African period is fully recognized by the Italian University. The project was born in 2002 and 203 residents have left with Cuamm (until August 2019)
- OPERATIONAL RESEARCH: as NGO, Cuamm carries out implementation research projects in Africa, aimed at implementing evidence-based results and improving the medical work. Residents who take part in the JPO program and young researchers are involved in Cuamm's research. It is a unique opportunity to improve skills in that area, very useful but infrequent for clinicians. Results of operational research are published in international peer-review journals and often students are among the authors. In 2018, 10 out of the 23 main authors of the research are residents in medicine or under 35.

Thanks to the multiple ways of collaboration, the relationship between Cuamm and Italian universities is very fruitful and we can consider Cuamm as a "university on the front line" that often contributes to that lack of an institutional path.

Lessons learned.

- University and NGOs can be collaborative partners in a common educational path aimed at the human and professional empowerment of youngsters
- Former exposure to cooperation reveals an impact on students' approach to health as professionals
- Experiences in the field can bring to students some skills that are not part of the traditional curriculum (i.e. data analysis, operational research) but that can become an ability for their future job.

Is this abstract submitted for one of the proposed sessions (see list on website)? Yes If so which one?

Practices for engaging students in international development cooperation activities

Please identify one or more frames for your contribution

- **Conference Dimensions**
 - 1. Common goods
 - 2. Citizenship
 - 3. Security
 - 4. Environment
 - 5. Sustainability

- a) Education and Trainings
- b) Research and Innovation

Other Keywords:

Study programs, internship, global challenges, international development cooperation.



- **Academic Perspective**
- - c) Partnership and Projects

Global health as theatre performance: a masterclass on public awareness with university students

ORAL PRESENTATIONS

Conference

6th CUCS Congress – Coordinamento Universitario per la Cooperazione allo Sviluppo

Presentation date 19th – 21st September 2019

Location Trento, Italy

Authors Di Benedetto C.

Focus country **Multi-Countries**







Citizenship and collective goods. University and international cooperation for safety, environment and sustainable development Trento 19-21th September 2019

GLOBAL HEALTH AS THEATRE PERFORMANCE: A MASTERCLASS ON PUBLIC AWARENESS WITH UNIVERSITY STUDENTS

Chiara Di Benedetto, Medici con l'Africa Cuamm; Chiara Cavagna, Medici con l'Africa Cuamm

Requested presentation form

X oral

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Max 800 words in Calibri 11

Context

The public communication of science is one of the most challenging issues in our "knowledge society": lack of interest from citizens, fake news, difficulty in access clear information are only some factors that make science far from citizens (Annuario Scienza e Società 2016 -2017 – 2018). The question becomes still more difficult when our communication is aimed at raising awareness on specific science issues, with the objective of making people aware of contents and stimulate them to act differently (Bucchi-Neresini 2010¹; Bauer 2014²). In these cases traditional communication formats do not work, because they attract mainly people who are already "sensitive" to the topics (let's think about public conferences or journalistic articles) and do not succeed in attracting new audience segments. Innovative formats of communication, using creativity and culture, can help in attracting a wider audience, in order to make people curious and closer to themes usually perceived as distant.

Doctors with Africa Cuamm and the Global Health Festival

We want to propose here a specific case of science communication that Doctors with Africa Cuamm presented last April in the context of the Global Health Festival held in Padova (<u>www.festivalsaluteglobale.it</u>). Doctors with Africa Cuamm has a long experience on Global Health issues, specifically with University students and schools: since 2011 the NGO has been carrying out outreach seminars, academic courses for students, trainings for health professionals in the field of global health and has reached more than 2800 persons in Italy.

Thanks to this experience, Cuamm has decided to organize an event addressed to young people (aged 19-30) in order to raise awareness on global health topics. Usually youngsters do not know what global health is or, possibly, they think it is something very distant from their everyday experience.



¹ Bucchi M, Neresini F, Which indicators for the new public engagement activities? An exploratory study of European research institutions, in Public Understandig of Science, 2010.

² Bauer M, A word from the Editor on the special issue on 'Public Engagement', in Public Understanding of science, 2014 Jan.

p. 176



The project: "global health theatre masterclass"

For these reasons, Cuamm decided to propose a "global health theatre masterclass", a cross-cultural activity aimed at involving both students already aware of global health importance and students who were mainly attracted by a cultural opportunity (and who had not been exposed before to global health issues).

The activity was a masterclass composed by 6 meetings for 12 university students from different faculties led by a theatre director and a final performance held in a popular theatre of Padova during the Global Health Festival.

The masterclass on one side gave students basic skills about acting, on the other side it encouraged students to discuss about global health issues: students were free to bring their own experiences, doubts and thoughts. No narrative plot was decided *ex-ante*, but the theatre performance was decided thanks to the contributions of each student. The themes students brought to attention and discussion have been: nutrition, social determinants of health (i.e. richness/poverty or living in cities/living in suburbs), role of education on health, recycling and environmental pollution.

With the help of the artistic director, all the above-mentioned themes conveyed in the plot of a theatre performance, written by a playwright and played by 12 students and 3 professional actors.

The performance took place on Saturday night in a popular theatre of the city center and all the 250 seats (mainly young people) were sold out.

The performance is replicable.

Lessons learned:

- **Cross-cultural projects allow to reach a wider public**: on one side people interested in scientific issues (in this case global health) and on the other side people interested in cultural format (in this case acting classes) who otherwise would never get in contact with the theme.
- Involving students in the construction of the performance make them closer to the themes and make them act as ambassadors of the project: audience development has been the key success of the initiative.
- Science and art/culture should not be perceived as alternative/dichotomous: they can work together in order to create innovation in communication of science.

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Please identify one or more frames for your contribution

- **Conference Dimensions**
 - 1. Common goods
 - 2. Citizenship
 - 3. Security
 - 4. Environment
 - 5. Sustainability

- Academic Perspective
 - a) Education and Trainings
 - b) Research and Innovation
 - c) Partnership and Projects

Other Keywords:

Public outreach, public engagement, public awareness, science communication, university students, engagement through arts



Multiple interventions to strengthen immunization services in an Angolan district

ORAL PRESENTATIONS

Conference 12th European Public Health Conference

Presentation date 20th – 23rd November 2019

Location Marseilles, France

Authors Fattorini M.

Focus country Angola





Multiple interventions to strengthen immunization services in an Angolan district Mattia Fattorini

M Fattorini¹, G Raguzzoni², C Cuccaro¹, N Nante^{1,3}, C Quercioli⁴, JMN Ndilimondjo⁵, C Caresia⁶, G Putoto⁷ ¹Post Graduate School of Public Health, Department of Molecular and

¹Post Graduate School of Public Health, Department of Molecular and Developmental Medicine, University of Siena, Siena, Italy ²Post Graduate School of Public Health, University of Bologna, Bologna, Italy ³Department of Molecular and Developmental Medicine, University of Siena, Siena, Italy

Siena, Siena, Italy ⁴Hospital Val d'Elsa, Local Health Unit Tuscany South-East, Siena, Italy ⁵Hospital Management, Catholic Mission Hospital of Chiulo, Chiulo, Angola ⁶Local Health Coordination, Doctors with Africa CUAMM, Padua, Italy ⁷Operational Research Unit, Doctors with Africa CUAMM, Padua, Italy ⁶Context: fattorini7@student.unisi.it

Background:

Immunization represents one of the most effective intervention in public health. In the Sustainable Development Goals era, adequate vaccination services are still crucial for the prevention of infectious diseases and the reduction of under-5 mortality. However, in 2017 WHO estimated that children <1 year who did not receive the third dose of Diphtheria-Tetanus-Pertussis (DTP3) vaccine were 19.2 million globally, and 600000 of these were located in Angola, a Sub-Saharan country with an estimated DTP3 coverage of 52%. Since 2000, Italian Non-Governmental Organization (NGO) Doctors with Africa CUAMM supports the activity of the hospital of Chiulo in the commune of Mucope (district of Ombadja, south of Angola). Aim of the study is to describe the interventions implemented to strengthen the immunization services performed by the hospital Public Health Staff (PHS).

Methods:

In May 2018 the NGO started to implement multiple interventions to enhance the number of vaccine doses administered. Firstly, outreach immunization sessions were reorganized and reinforced, for example involving local Community Health Workers in the identification of villages with a high burden of unvaccinated children. Other actions were the continuous training of the PHS in data collection and the increased collaboration with the Ombadja District Health Department in order to develop a more efficient vaccine supply chain at local level.

Results:

In 2018, among children <1 year the PHS administered 19746 doses, with a 22.3% growth compared to 2017 (15349 doses). Doses administered during outreach sessions increased by 35.4% (6597 versus 4259 doses). Estimated DTP3 coverage in Mucope commune was 71% (2017, 59%).

Conclusions:

The WHO "Reaching Every Community" strategy emphasizes the importance of high quality immunization services in hardto-reach areas. The organisation of well-functioning immunization services requires a multifaceted approach by the involved stakeholders.

Key messages:

- In 2017, globally 19.2 million of children <1 year did not receive the recommended three DTP doses. Six-hundred thousand were located in Angola.
- To obtain and sustain an adequate vaccination coverage, especially in hard-to-reach areas, multiple and well-coordinated actions should be implemented by all the involved stakeholders.






Supportive supervision to improve the quality and outcome of outpatient care among malnourished children: a cluster randomized trial in Arua district, Uganda

PAPER

Authors

Lazzerini M., Wanzira H., Lochoro P., Muyinda R., Segafredo G., Wamani H., Putoto G.

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https://gh.bmj.com/content/4/4/e001339

Topic Nutrition

Focus country Uganda





Research

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Supportive supervision to improve the quality and outcome of outpatient care among malnourished children: a cluster randomised trial in Arua district, Uganda

Marzia Lazzerini,⁶¹ Humphrey Wanzira,⁶¹ Peter Lochoro,² Richard Muyinda,² Giulia Segafredo,² Henry Wamani,³ Giovanni Putoto²

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For numbered affiliations see end of article.

Correspondence to Dr Marzia Lazzerini; marzia.lazzerini@burlo.trieste.it

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ABSTRACT

Introduction Suboptimal quality of paediatric care has been reported in resource-limited settings, but little evidence exists on interventions to improve it in such settings. This study aimed at testing supportive supervision (SS) for improving health status of malnourished children, quality of case management, overall quality of care, and the absolute number of children enrolled in the nutritional services.

Methods This was a cluster randomised trial conducted in Arua district. Six health centres (HCs) with the highest volume of work were randomised to either SS or no intervention. SS was delivered by to HCs staff (phase 1), and later extended to community health workers (CHWs) (phase 2). The primary outcome was the cure rate, measured at children level. Quality of case management was assessed by six pre-defined indicators. Quality of care was assessed using the national Nutrition Service Delivery Assessment (NSDA) tool. Access to care was estimated with the number of children accessing HC nutritional services.

Results Overall, 737 children were enrolled. In the intervention arm, the cure rate (83.8% vs 44.9%, risk ratio (RR)=1.91, 95% CI: 1.56–2.34, p=0.001), quality of care as scored by NSDA (RR=1.57, 95% CI: 1.01–2.44, p=0.035) and correctness in complementary treatment (RR=1.52, 95% CI: 1.40–1.67, p=0.001) were significantly higher compared with control. With the extension of SS to CHWs (phase 2), there was a significant 38.6% more children accessing care in the intervention HCs (RR=1.26, 95% CI: 1.11–1.44, p=0.001) compared with control.

Conclusion SS significantly improved the cure rate of malnourished children, and the overall quality of care, SS to CHWs significantly increased the crude number of children enrolled in the nutritional services. More studies should confirm these results, and evaluate the cost-effectiveness of SS.

INTRODUCTION

Under-nutrition is a major cause of morbidity and mortality in children under 5 years.¹

Key questions

What is already known?

- Under-nutrition is a major cause of morbidity and mortality in children under 5 years especially in lowand middle-income countries (LMICs).
- Quality of care delivered to malnourished children has been reported as substandard in several LMICs.
- Supportive supervision (SS) has been suggested as a promising intervention to improve quality of paediatric care, but there is very limited evidence of its impact on health outcomes and in children with malnutrition.

What are the new findings?

This study shows that SS was an effective intervention to improve the overall cure rate and quality of care, quality of case management and access to care of malnourished children, at outpatient level, in a setting with very low resources.

What do the new findings imply?

These findings contribute to the growing body of evidence from other studies in similar settings that suggest SS as a possible effective intervention to improve quality of paediatric healthcare and the health status of children.

According to recent global estimates, 52 million children are wasted and 17 million are severely wasted and approximately 26.9% of these cases occur in sub-Saharan Africa.² In Uganda, national estimates indicate that 3.6% of children suffer from moderate acute malnutrition (MAM) while 1.3% have severe acute malnutrition (SAM).³ However, in the humanitarian settings of the West Nile region, currently hosting refuges from South Sudan and DR Congo,^{4 5} the prevalence of MAM and SAM in children is significantly higher, having being estimated at 10.4% and 5.6%,



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respectively.⁶ This is far above the target identified by the World Health Assembly (WHA), which adopted the goal of reducing and maintaining the prevalence of wasting in children to under 5% by year 2025.⁷⁸

In Uganda, under-nutrition is recognised as a condition of public health importance.69 The latest National Development Plan¹⁰ and in the Nutrition Action Plan for multi-sectoral support¹¹ have set national targets that are a crucial part of the national strategy for becoming a middle-income country by 2040.¹² Such targets include achieving the WHA goal, and ending all forms of malnutrition by 2030. To operationalise the strategy, the Integrated Management of Acute Malnutrition (IMAM) guidelines have been developed by the Ministry of Health, in line with the WHO recommendations, detailing the management of children with both SAM and MAM and including recommendations for screening and follow-up at community level.913 Training and essential equipment are provided, with the support of development partners.¹⁴¹⁸

However, several studies have shown that developing guidelines, providing training and basic equipment per se do not actually ensure that care is delivered according to the standards.^{16–20} Previous assessments of the quality of nutritional service in low- and middle-income countries (LMICs) have highlighted that poor adherence to guidelines and poor quality of care are common findings.^{17 18 21 22} Supportive supervision (SS) has been suggested as a promising intervention for achieving higher adherence to guidelines and better quality of care in LMICs such as South Africa, India and Bangladesh.^{23–25} SS is a process that promotes quality at all levels of the health system by strengthening the relationships within that system, with an emphasis on identifying and solving problems and contributing to the optimisation of the allocation of resources, promotion of high standards, teamwork and better communication.²⁶ There is currently limited evidence of the impact of SS on health outcomes, and in particular for children with malnutrition.²⁷ This study tested the hypothesis that SS delivered to staff at health centre (HC) level and to community health workers (CHWs) may improve the quality, number of enrolled children and outcomes of outpatient care among malnourished children. Given that the intervention could only be delivered at the health facility level and not the individual patient level and to minimise study contamination, a cluster randomised design was chosen.

METHODS

Study design

This was a cluster randomised control trial (RCT), with HCs as the unit of randomisation. The manuscript is reported according to the Consolidated Standards of Reporting Trials statement (CONSORT)²⁸ (see online supplementary material 1 for the CONSORT checklist). Online supplementary appendix 1 details study timelines and activities. Patients were enrolled in the

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period between February 2017 and February 2018. The study protocol was registered in ClinicalTrials.gov (NCT03044548).

Study setting

The study was conducted in Arua district, in the West Nile region of Uganda. According to the 2014 national census, Arua has an estimated population of 808 745 residents. By May 2017, the district also hosted 174 396 refugees from South Sudan and Democratic Republic of Congo.⁴ The prevalence of MAM and SAM in children has been estimated at 10.4% and 5.6%, respectively.³ Out of 79 facilities located in Arua District, 50 (63.3%) provide nutritional care. Most of HC only treat few children. Recent assessments of the quality of care delivered in the district to malnourished children at HC level highlighted substandard quality and poor health outcomes, with an average cure rate of 52.9%, which was far below the SPHERE standards of 75%.²²

Selection of health facilities and randomisation

Health facilities were selected based on their volume of work: the six HCs with the highest reported number of children accessing the nutrition services—according to the official 2016 Health Managment Information System (HMIS) data²⁹—were included in the study. After stratification by characteristics (online supplementary appendix 2)—such as HC level, setting (urban vs rural), number of staff assigned to the nutritional unit—the study team randomly allocated HCs by blind extraction ('urn randomisation'³⁰) to either SS or standard care (no intervention). HC staff and CHW were aware of the allocation group while patients were blinded.

Patient and public involvement statement

The patients parents/guardians were interviewed during the baseline assessment of the project²² and some of the information derived was used during the design and implementation of the study intervention. Additionally, the patient views of the intervention were taken into account and documented as a part of a study video that was uploaded on the website link (https://www.youtube. com/watch?v=6DYdc9ofpBc&t=145s). Once the trial results have been published, the HCs and patients will be informed of the study findings through dissemination meetings that will be conducted in collaboration with our implementing partners, CUAMM Doctors with Africa. We are also planning to develop study dissemination material such as a policy brief written in non-specialist language to be shared with all stakeholders including the patients.

Study participants

The primary outcome (cure rate) was measured at patient's level, among children accessing the nutritional services in the HCs involved in the study. Children fulfilling all the following criteria were included: diagnosis of SAM or MAM according to the national criteria⁹; aged between 6 and 59 months; a documented HIV status as per the national HIV guidelines.³¹ Exclusion criteria

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were those with any of the following: guardians refusing participation or unable to adhere to study procedures.

Sample size

The sample size was calculated by taking into account a fixed number of clusters (six HCs), the intra-cluster correlation coefficient (ICC) resulting from the baseline data (online supplementary appendix 3), the expected control event rate, the expected effects, and the level of significance and power of the study.³² An estimated sample size of 716 children was calculated based on the assumptions that in the intervention HCs, the mean cure rate would have been 85% compared with 45% in the control HCs, with an ICC of 0.2, a power of 80%, an alpha of 5%.

Intervention

The intervention consisted of SS, delivered at a high frequency and specific to the nutritional services. SS was delivered by a team of two trained local staff (a local nutritionist, recruited by the study and district health team officer, from the existing district health structure). In phase 1 (February 2017 to August 2017), SS was provided only to HC staff. In our setting, on average, HC staff had approximately 8.7 (SD:8.0) years as health professionals and 1.5 (SD 3.9) years specifically under nutritional services. Staff were mostly diploma holders (45%) or certificate holders (34%) with one degree holder and with rest as secondary school certificate holders. SS was conducted bi-monthly in the first 2 months, and then monthly for the next 4 months. Each SS session lasted approximately 2 hours. The main activities included the following: an initial 3-day training to introduce the concept of SS, followed by continuous mentorship on the key concepts of the IMAM guidelines (including patient screening, diagnosis, treatment, follow-up, assignment of outcomes and data recording), monitoring the availability of equipment and supplies, and evaluating overall quality of care and case management. Tools included a checklist, to enable the supervisors provide guidance in a standardised way (online supplementary appendix 4). The national IMAM guidelines⁹ were used as reference standards. Based on the deficiencies identified, the supervisors discussed problems, provided technical support and facilitated the development of solutions, in a participatory manner.³³ Complementary activities included the following: (i) facilitation of networking among staff of different HCs, with the objective building ownership in the process and (ii) tools for tracing of defaulters such as telephone credit and location maps. The study protocol also included the delivery of essential key equipment if needed, but since all key equipment were already available, only regular checks for accuracy of the weighing scales for calibration were performed.

In phase 2 (August 2017 to February 2018), SS was extended to include CHWs (monthly for HCs and weekly for CHWs), with the objective of improving community screening and case-referral. Every week, a selection of

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and district health team officer. Overall, every CHW was involved in SS at least twice during the duration of the project. Specific activities implemented included the following: on-site training on the key concepts of the IMAM guidelines, enhanced supervision during work and provision of a small financial incentive. Control No intervention was delivered in the control group. which was therefore considered as 'standard care'. Accordingly, these facilities received the basic nutritional-related supplies such as therapeutic foods, equipment

villages associated with the intervention HCs was visited

by the same SS team that comprised of a nutritionist

(Mid-upper-arm -circunference (MUAC) tapes, weighing scales) and job aids such as the z-score charts from the central government and partners such as Unicef. During the study period, there were no other activities in the HCs involved in the study (such as training, or additional SS) from any provider, that could impact the quality of care.

Data collection tools, procedures and variables

Health status was measured using six pre-defined indicators (cured, defaulters, non-responders, transferred to inpatient care or to another outpatient care facility, died), based on the national case definitions⁹ (online supplementary appendix 5). Data were collected prospectively every week for each child enrolled in the study, using a pilot tested tool (online supplementary appendix 6) and standard operating procedures (SOP), by six trained staff (each assigned to one HC). In line with the national guidelines,⁹ the duration of follow-up for each child with malnutrition was up to 3 months (4 months for the patients with HIV/tuberculosis). Children not cured within this time frame were classified as 'non-responders' (online supplementary appendix 5). All children who defaulted were followed up to ascertain their living status.

Quality of case management was assessed from the official nutritional registers using six pre-defined process indicators as defined in the national guidelines⁹ (online supplementary appendix 5): (1) correct diagnosis; (2) correct ready to use food (RTUF) treatment; (3) correct complementary treatment; (4) correct evaluation of HIV; (5) correct patients' counselling and (6) correct exit outcome assignment. Data were collected prospectively for each child enrolled in the study, using a pilot tested data collection tool (online supplementary appendix 7) and SOP, at fixed intervals, by two external data monitors (HW and RM).

Quality of nutritional services was measured at three time points (baseline, mid-term and end of the study) using the Nutrition Service Delivery Assessment (NSDA) tool, the official national instrument for assessing performance of nutritional services.34 The NSDA assesses 10 key capacity areas of nutrition service relevant at outpatient level (online supplementary file 1). For each chapter, using strict criteria specified in the tool, a final



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judgement on the quality of the services is made and a final scoring is assigned in the form of one of four pre-defined categories: poor, fair, good and excellent. The study team involved in the NSDA assessment included a senior paediatrician, a nutritionist and a public health expert all experienced in the national nutritional guidelines⁹ and in the use of the tool.

To evaluate the additional effectiveness of SS to CHWs on the number of malnourished children (with SAM or MAM) enrolled, the absolute number of children in phase 1 was compared with phase 2. The choice of absolute numbers was based on the lack of an accurate reliable estimate of the reference population for each HC and the assumption that total population in the coverage area did not change.

Data management and quality control

Details of data quality control procedures are outline in online supplementary appendix 9. All tools for data collection were pre-defined and pilot-tested, SOP were developed and tested, and performance of data collectors was verified before the start of the study. Data collectors were trained in key aspects of the IMAM guidelines⁹ and in data quality assurance procedures, and constantly supervised by a study manager (HW) and a study coordinator (RM). Quality of data in both the intervention and control group were regularly monitored for each enrolled case using the following three pre-defined indicators: (a) data completeness; (b) accuracy and (c) internal consistency (online supplementary appendix 9). The filled data collection forms were checked daily for completeness and accuracy and errors were corrected before data entry. Data were cleaned and double-entered into Epidata V.3.1. Range, consistency and validity checks were built in to the entry programme to minimise errors. Data were collected at fixed intervals and entered in the databases in real time. The databases were also monitored for completeness and internal consistency and any problem was discussed in real time. An interim data analysis was performed at fixed intervals of 6 weeks and checked by an independent analyst.

Data analysis

Data were analysed with STATA V.14. Categorical variables were presented as frequencies and percentages with 95% CIs. This was a cluster randomised trial and therefore correlated observation analysis techniques were used for analysis for the main study outcomes. The proportion of children with specific health outcomes or for which a correct case management process outcome was conducted were first estimated at each the health facilities (clusters). These summary measures were then used to estimate the overall mean proportion (95% CI) for each of the randomisation arms. The significance of the difference of the mean proportion between the intervention and control arms was estimated using the t-test. To evaluate the effect of imbalances in baseline

characteristic to the primary outcome (cure rate) crude and adjusted OR and 95% CI were estimated by the forward fitting conditional logistic regression model, taking effect modification into consideration (online supplementary appendix 10). All statistical tests were two-sided. A p value of less than 0.05 was considered statistically significant. Results were interpreted looking both at the level of statistical significance and at plausibility and consistency of results across different outcomes.

Ethical considerations

The study was approved by the Makerere University School of Public health ethical committee, Uganda National Council of Science and Technology and the ethical committee of the IRCCS Burlo Garofolo, Italy. Health authorities were informed of the authorisation received to carry forward the study. At the cluster level, staff was informed on the objectives and methods of the study, and their written consent was obtained. At the individual level, children and their parents/guardians were informed, and enrolled if providing written consent to participation and for the information derived to be published. Consent was administered in English and a local language of Lugbara.

RESULTS

Access to care

Children enrolment flow is shown in figure 1. Overall, 765 children were screened and 737 were included. All enrolled children were included in the final analysis.

The monthly average number of children enrolled in phase 1 of the study was 27.5 versus 26.5 children between the intervention and control arm (overall total 165 in intervention group vs 159 in control arm, p=0.517). However, this rose to 44.2 (all three facilities recording an increase) versus 24.5 children in phase 2 when SS was



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Table 1 Characte

enrolment

Variable

6-12

Sex

12–24

Male

Female

Child status

Single

Multiple

feeding

feeding

Mother status

Pregnant

Lactating

Unknown

MAM

SAM HIV status

Positive

Negative

Unknown

Exposed

severe acute malnutrition.

Nutritional status

Uncomplicated

Died or abandoned

Non-lactating

Feeding practice

Exclusive B/F

Replacement

Mixed feeding

Complimentary

No longer B/F

Vaccination status

Not up to date

Never vaccinated

Up to date

Above 24

Age categories (months)

6

extended to include CHWs (overall total: 265 in intervention group vs 147 in control arm, risk ratio (RR)=1.26, 95% CI: 1.11 to 1.44, p=0.001) (figure 1).

Baseline characteristics

Characteristics of enrolled children are reported in table 1. There were some significant differences in children characteristics between the study arms, and specifically more children in the intervention group had SAM (p=0.005), were twins (p=0.001), were HIV positive (p=0.001), had a mother no longer breastfeeding (p=0.014) or died were abandoned children (p=0.023).

Baseline characteristic of HCs did not show significant differences (online supplementary appendix 2-3).

Health outcomes

Table 2 presents the health outcomes during the intervention phase of the study. In the HCs receiving SS, the cure rate was significantly higher than in the control facilities (83.8%, 95% CI: 71.0 to 96.6 vs 44.9%, 95% CI: 38.2 to 51.6), mean difference 38.9% (RR=1.91, 95% CI :1.56 to 2.34, p=0.001).

On the other side, defaulting rate was significantly lower in the intervention HCs compared with control facilities; (1.4%, 95% CI: 1.1% to 1.8% vs 47.2%, 95% CI: 37.3% to 57.1%) in the control, mean difference—45.8%(RR=0.03, 95% CI: 0.0 to -0.06, p=0.001). All defaulting children were ascertained to be alive when they were followed up. Overall less than 5% of children had any of the other outcome (non-responder, transfer, dead), and for these outcomes there were no statistical significance differences among allocation groups.

Quality of case management

Quality of case management did not significantly differ between the two groups for most indicators (table 3): diagnosis, treatment with RTUFs, HIV evaluation, counselling and assignment of the exit outcomes were correctly performed in most cases in both groups. On the other side, complementary treatment was correctly assigned only in 58.8% (95% CI: 43.2 to 74.3) of control facilities, compared with 94.0% (95% CI: 83.7% to 100%) of intervention facilities (RR=1.52, 95% CI: 1.40–1.67, p=0.001).

Quality of nutritional services

Figure 2 shows the trend of NSDA scores for each facility. At baseline, all facilities except one scored, in any of the 10 assessment areas of the NSDA tool, either poor or fair, without significant difference between the intervention and control groups. At the end of the study, both groups had increased the total number of area scoring either good or excellent, with a significant difference between intervention and control arm $(24/30 \ (80\%) \ vs \ 14/30 \ (46.6\%), RR=1.7, 95\% CI: 1.1 to 2.6, p=0.015).$

DISCUSSION

This cluster RCT has shown that SS significantly improved the cure rates of malnourished children at outpatient

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	E	SMJ GIODA	I Healt
ris	tics of malnour	ished childrer	n at
	Randomisatio	n arm	
	Intervention	Control	χΡ
	N=430	N=307	value

122 (39.7)

118 (38.4)

0.114

0.156

0.085

0.001

0.014

0.023

0.005

0.001

0.001

67 (21.8)

133 (43.3)

174 (56.7)

249 (81.1)

0

58 (18.9)

290 (94.5)

17 (5.5)

0

0

4 (1.3)

201 (65.5)

102 (33.2)

18 (5.9)

204 (66.5)

18 (5.9)

64 (20.9)

117 (38.1)

190 (61.9)

1 (0.3)

302 (98.4)

0

4 (1.3)

3 (1.0)

203 (47.2)

139 (32.3)

88 (20.5)

209 (48.6)

221 (51.4)

369 (85.8)

59 (13.7)

2 (0.5)

373 (86.7)

57 (13.3)

7 (1.6)

5 (1.2)

241 (56.1)

177 (41.2)

18 (4.2)

256 (59.5)

55 (12.8)

97 (22.6)

4 (0.9)

122 (28.4)

308 (71.6)

17 (4.0)

413 (96.0)

B/F. breast feeding:MAM. moderate acute malnutrition: SAM.

level, increasing it above the SPHERE standard. This result was observed, despite the fact that the children in

the intervention group had more risk factors. The inter-

vention also resulted in a significant decrease in the rate

of defaulters, and a significant improvement in general

0

0

Bold text represent only significant p values

0

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wn that SS signifi



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	Randomise	ation arm			0					
	Interventio	n HCs			Control HC	s				
	HC 1 n (%)	HC 2 n (%)	HC 3 n (%)	Mean % (95% CI)	HC 4 n (%)	HC 5 n (%)	HC 6 n (%)	Mean % (95% CI)	Difference in mean %	P value
	182	114	134		140	82	84			
Cured	153 (84.1)	110 (96.5)	95 (70.9)	83.8 (71.0 to 96.6)	52 (37.6)	40 (48.8)	41 (48.8)	44.9 (38.2 to 51.6)	38.9	0.010
Non-responders	13 (7.1)	2 (1.8)	9 (6.7)	5.2 (2.2 to 8.2)	4 (2.9)	5 (6.1)	5 (6.0)	5.0 (3.1 to 6.8)	0.2	
Defaulters	2 (1.1)	2 (1.8)	2 (1.5)	1.4 (1.1 to 1.8)	82 (58.6)	33 (40.2)	36 (42.9)	47.2 (37.3 to 57.1)	-45.8	0.001
OTC transfer	5 (2.8)	0	4 (3.0)	1.9 (0.3 to 3.6)	0	0	1 (1.2)	0.4 (-0.3 to 1.1)	1.5	
ITC transfer	9 (5.0)	0	24 (17.9)	7.6 (-1.6 to 16.9)	2 (1.4)	3 (3.7)	1 (1.2)	2.1 (0.7 to 3.5)	5.5	
Dead	0	0	0	0	0	1 (1.2)	0	0.4 (-0.3 to 1.1)	-0.4	
Bold text represent c HC, health centre; IT	nly significant μ C, inpatient care	o values ∋; OTC, outpati∈	ent care.							

nutritional service delivery, and access to care. These findings contribute to the body of evidence from other studies in LMIC suggesting that SS can be an effective strategy to improve quality of care at the facility level.^{23 24 35-37} However, this is the first study that specifically tested SS to improve health status of children. The study was conducted in a setting with low resources, where baseline quality of care was reported to be highly substandard.²² In such settings, identifying effective intervention capable to improve child survival, especially for malnourished children who have a very high risk of death, is crucial. As such, study findings are extremely relevant: this study adds to the previous knowledge that, in a setting with very low resources, SS may be a highly effective strategy for improving the cure rate—and thus survival—of malnourished children.

Different components of the intervention may have contributed to the final results: both SS and complementary networking activities may have played a role. In regards to the decrease in children defaulting, the provision of practical tools such as telephone credit and localisation map, as a part of the intervention, may have played a major role. Additionally, the improvement in overall quality and organisation of care may have been positively perceived by service users, who may have been more prone to return, rather than to default.

Of notice, two interesting phenomena were observed in this study. First, over time we observed that the control HCs recorded a relative improvement in general nutritional service delivery (NSDA tool³⁴), cure rates and case management (table 3) notwithstanding that the intervention facilities performed better. This may be due to the 'study effect' where the presence of well-trained data collectors at the facility level positively affected the overall performance of the health facility staff.

Second, despite some of the process indicators indicated good case management in both groups—except for complementary treatment, which remained substandard in the control group—the cure rate was significantly higher in the intervention group compared with the control (83.8% vs 44.9%). This higher cure rate in the intervention could be explained either by the low rate of children defaulting in the intervention group compared with control, or by the importance of a correct complementary treatment (amoxicillin, vaccinations, vitamin A, iron and folic acid, mebendazole) for achieving the state of being cured.

The finding that some areas of the health service assessment (NSDA), such as human resources, still performed as either 'poor or fair', irrespective of the intervention, is not surprising. Obviously, SS alone cannot solve all gaps in quality of care. Some of the required improvements, such as increasing the number of human resources working in the nutrition services, require financial resources, and actions from the district and central government authorities which were beyond SS and the actual mandate of the supervisors.

When SS was extended to include CHWs, combined with a small financial incentive, it also increased the number of malnourished children in each of the

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,	Randomisat	tion arm HCs			Control HCs					
	HC 1 n (%)	HC 2 n (%)	HC 3 n (%)	Mean % (95% CI)	HC 4 n (%)	HC 5 n (%)	HC 6 n (%)	Mean % (95% CI)	Difference in mean %	P value
	182	114	134		140	82	84			
correct diagnosis	182 (100)	114 (100)	134 (100)	100 (100)	140 (100)	75 (91.5)	84(100)	97.2 (92.3 to 100)	2.8	I
Correct RTUF	182 (100)	114 (100)	134 (1000	100 (100)	140 (100)	82 (100)	84(100)	100 (100)	0	I
correct omplementary eatment	182 (100)	114 (100)	110 (82.1)	94.0 (83.7 to 100)	105 (75.0)	47 (57.3)	37 (44.0)	58.8 (43.2 to 74.3)	35.3	0.001
orrect HIV valuation	182 (100)	114 (100)	134 (100)	100 (100)	140 (100)	82 (100)	84(100)	100 (100)	0	I
atient ounselling	182 (100)	114 (100)	134 (100)	100 (100)	140 (100)	82 (100)	84(100)	100 (100)	0	I
orrect exit utcome	182 (100)	114 (100)	134 (100)	100 (100)	140 (100)	82 (100)	84(100)	100 (100)	0	I

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Figure 2 Total number of areas with either good or excellent Nutrition Service Delivery Assessment score, by group, over time.

intervention facilities who were admitted to the facility. This is extremely important, since delay in accessing care has been shown to contribute to increase in mortality rates among vulnerable malnourished children.³⁸ Of note, our study combined a small financial incentive with SS, and this model proved to be effective. Indeed, other studies have suggested that providing some sort of economic recognition is crucial for ensuring CHWs' performance.³⁹⁻⁴¹

There were a number of study limitations that need to be acknowledged. At baseline, there was a limitation of data accountability (online supplementary appendix 2), from historical data in the HMIS and in the nutritional registers. We recognise that data from HMIS and registers may not be fully accountable. However, these were the only official data with no alternative sources. Study findings show that there was a clear improvement in cure rate according to the before and after comparison, in addition to the comparison of the intervention and control groups, although with a significant improvement in the intervention arm, thus suggesting that the intervention is actually effective.

We used a simple approach to estimate access to care, that is, estimating it with the crude number of those accessing care, irrespective of the total population. This was opted for given the circumstances, where no accurate estimate of total reference population existed.

Heterogeneity in quality of care at baseline was observed in our sample, despite no observed significant differences in the mean cure rate among groups. Heterogeneity in quality of care, even among facilities is in the same setting, is a common finding²¹ ²² ²⁴ and should not be perceived as unusual. Similar to other previous studies, ²⁴ this study showed that SS can reduced heterogeneity in health outcomes.

This study had a few health facilities included however, these facilities contributed over 45% of the total annual

cases of malnourished children in Arua district based on the official reports from the HMIS. $^{\rm 22}$

It is also important to acknowledge that part of the effect observed in the study was due to other study components, beside the intervention, such as the presence of data collectors. However, the study could not be conducted without data collectors. These data collectors were present in both study groups, but the observed difference in effect between groups suggests that SS was actually effective

Strength of the study include the cluster randomised trial design, and the quality assurance procedures used to ensure data quality. Quality of data was over 99% on all indicators (data of completeness, accuracy, consistency), in both groups (online supplementary appendix 11). Even though the study was not blinded, the use of objective outcomes measures limited the potential for assessment bias. Imbalance among groups in patient characteristics did not favour a positive effect of the intervention, thus resulting in a possible under-estimation, and not in an over-estimation, of the treatment effect.

The current IMAM guidelines in Uganda⁹ recommends SS, without much detail on specific activities or tools for SS. Therefore, this study is of interest of policy makers, by providing both evidence in support of the effectiveness of SS, and experience on dedicated tools.

Generalisability of this study findings needs to be placed in the contexts that the study was conducted with well trained, highly motivated local staff and SS was provided at a relatively high frequency. This suggests that when the above described factors are present, quality of care can be achieved. These characteristics need to be kept in mind, when planning to replicate the intervention.

Finally, the use of local staff already under district employment as providers of SS and of local guidelines as reference standard may facilitate the sustainability of this model. However, external coordination and monitoring need to be ensured, and appropriate resources need to be allocated.

CONCLUSION

SS was an effective intervention to improve the cure rate of malnourished children at outpatient level in a setting with very low resources. This approach also improved the overall quality of care, and increased the number of enrolled children. As such, SS may be considered among the strategies to improve nutritional outcomes of children in Uganda, and in other similar settings. Future studies could document the effectiveness and cost-effectiveness of SS when implemented in other LMICs.

Author affiliations

¹WHO Collaborating Centre, Institute for Maternal and Child Health IRCCS Burlo Garofolo, Trieste, Italy
²Doctors with Africa, CUAMM, Kampala, Uganda
³Department of Community Health and Behavioural Sciences, School of Public Health, Makerere University, Kampala, Uganda

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Contributors LM conceived the study idea, in collaboration with HW, MR, GP, GS, WH and PL. LM, HW and MR lead the design and acquisition of data, LM and HW conducted the analysis and interpreted the data. LM and HW lead the drafting of manuscript, all authors were involved during critical revision for important intellectual content. All authors read and approved for the final manuscript to be published and are accountable for all aspects of the work

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Nutritional services for children in Beira, Mozambique: a study reporting on participatory use of data to generate quality improvement recommendations

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Authors Lazzerini M., Chhaganlal K., Macome A.C., Putoto G.

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Marzia Lazzerini ⁽¹⁾, ¹ Kajal Chhaganlal, ² Augusto Cesar Macome, ³ Giovanni Putoto⁴

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¹Institute for Maternal and Child Health IRCCS Burlo Garofolo, WHO Collaborating Center for Maternal and Child Health, Trieste, Italy ²Research Centre, Faculty of Health Science, Catholic University of Mozambique, Beira, Mozambique ³Quelimane Central Hospital, Quelimane, Mozambique ⁴Cuamm Medical Doctors for Africa, Padova, Italy

Correspondence to Dr Marzia Lazzerini; marzia.lazzerini@burlo.trieste.it

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ABSTRACT

Background Existing literature suggest frequent gaps in the quality of care (QoC) provided to children with malnutrition in low-income and middle-income countries. Beira is the second largest city in Mozambique. This study included two phases: phase 1 was a systematic assessment of the QoC provided to malnourished children in Beira; phase 2 aimed at using findings of the assessment to develop recommendations, with a participatory approach, to improve QoC.

Methods In phase 1, all facilities offering nutritional care to children in Beira were included, and exit health outcomes were reviewed against international SPHERE standards. A sample of four (66%) facilities was randomly selected for a comprehensive assessment of all areas contributing to QoC using an adapted WHO tool. In phase 2, key stakeholders were identified, and using a participatory approach, a list of actions for improving the QoC for malnourished children was agreed.

Results In phase 1, outcomes of 1428 children with either severe acute malnutrition or moderate acute malnutrition (MAM) were reviewed. In-hospital recovery rate (70.1%) was almost in line with the SPHERE standard (75%), while at outpatient level, it was significantly lower (48.2%, risk ratio (RR) 0.68, p<0.0001). Recovery rate was significantly lower in HIV seropositive compared with seronegative (39.2% vs 52.8%, RR 1.34, p=0.005). High heterogeneity in MAM recovery rate was detected among facilities (range 32.5%-61.0%). Overall, out of all domains contributing to QoC in the sample, 28/46 (60.8%) indicated suboptimal care with significant health hazards and 13/46 (28.2%) indicated totally inadequate care with severe health hazards. In phase 2, a list of 38 actions to improve QoC for malnourished children was agreed among 33 local and national stakeholders

Conclusions Large heterogeneity in QoC for malnourished children in Beria was detected. The study documents a concrete example of using data proactively, for agreeing actions to improve QoC.

BACKGROUND

Undernutrition is the main underlying cause of child mortality and morbidity in low-income countries, especially in sub-Saharan Africa.¹² According to most recent global estimates, in 2017, globally 151 million children under 5 years of age were stunted, and 51 million were wasted. $^{\!\!\!1\,2}$

In Mozambique, malnutrition is a serious concern: 16.9% of babies are born with low birth weight; 5.9% children under 5 years suffer from acute malnutrition (moderate or severe) and 42.6% are chronically malnourished.³ Mozambique also ranks in the eighth position among the top 10 countries with the highest population prevalence of HIV with 12.3% of adults infected. Nearly 1 million women and about 200 000 children are living with HIV, with only 39% of HIV-positive children having access to life-saving antiretroviral treatment,⁴ a coverage sensibly lower than the regional estimate for East and Southern Africa (67%).⁵ The two conditions are closely connected: children affected by HIV compared with HIV negative have a higher risk of undernutrition and, if malnourished, they have a higher risk of not recovering and die despite treatment; malnutrition also affects the HIV status by increasing the risk of disease progression.6-

National guidelines on the management of malnutrition in children were developed by the Ministry of Health in 2011.⁹ According to the national guidelines, children with severe acute malnutrition (SAM) and complications are treated at hospital level, while the treatment of children with SAM and no complication or moderate acute malnutrition (MAM) is performed at outpatient level, in the health centres (HCs), integrated with the treatment of children at risk.⁹

Beira is the second largest city in Mozambique, with a population of about 530 700, accounting for about one-third of the total population in the Sofala province.^{10 11} In this province, the prevalence of MAM and SAM in children is estimated to be significantly higher compared with the national

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average (7.4% and 1.6%, respectively).¹² Child mortality in Sofala is also above the national average (105 vs 90 per thousand),¹² despite a rate of children accessing health services also higher than the average (69.7% vs 56.5% of children with fever and 69.2% vs 55.5% of children with diarrhoea access care),¹³ thus suggesting possible deficiencies in the quality of care (QoC) provided to children at facility level.

Previous studies highlighted major gaps in the QoC provided to children with malnutrition in low-income and middle-income countries (LMIC), although so far only few assessments were published.¹⁴⁻¹⁸ A participatory use of data to generate recommendations to improve the OoC for mother and children has been widely promoted by the WHO.¹⁹ This approach creates awareness, stimulates dialogue, supports ownership and fosters local commitment in improving quality of the health services.¹⁹ However, it has been relatively poorly documented in literature.²⁰ We could not retrieve any study reporting on the use of quality assessments to develop recommendations, with a participatory approach, to improve QoC for malnourished children. Generating data on the quality of the nutritional services in LMIC, as well as on participatory approaches to improve QoC, is important for researchers and for policy makers. This paper aims at documenting the findings of an assessment of the QoC for malnourished children in the city of Beira, Mozambique, and how these data were used for generating, with a participatory approach, recommendations to improve the QoC.

METHODS

Study design

The study was designed as a quality improvement study and is reported according to the Standards for Quality Improvement Reporting Excellence Guideline V.2.0²¹ (online supplementary table 1).

The study included two phases: phase 1 was a systematic assessment of the QoC provided to malnourished children in Beira; phase 2 aimed at using findings of the assessment to develop, with a participatory approach, quality improvement recommendations.

Study setting

The study was conducted in the city of Beira. At the time of the assessment, only 5 out of the 10 existing HCs in Beira were offering nutritional services to children, while inpatient treatment was provided only by the Beira Central Hospital. Overall the activities were conducted from July 2015 to 2016.

Phase 1: assessment of the QoC Health outcomes review

All facilities offering nutritional care to children at the time of the study were included. All children with SAM or MAM enrolled in the nutritional services in the 18 months before the study start, with no exclusion, were included in the health outcomes review. In line with the 6

national guidelines,⁹ children with a weight for height below <-3SD from the mean according to WHO growth reference standards WHO 2006^{22} and/or bilateral pitting oedema were identified as cases of SAM, while children with a weight for height between -3SD and -2SD, respectively, and no oedemas were identified as cases of SAM. An exit health outcome was assigned to each child, according the five predefined categories: recovered, not-recovered, transferred, died and defaulted (for case definitions, see online supplementary table 2).

Characteristics and health outcomes of children were extracted at hospital level from the official patient forms and registers and at outpatient level from the official nutritional register of each HC. These are national forms, used for all children at time of hospitalisation/entry in the nutritional programme and during follow-up. The national guideline for treatment of malnourished children⁹ provides clear instructions on how to fill these forms/registers, and staff is trained accordingly.

Data were collected by a team of six data collectors either nutritionist or doctor or nurses with experience in the management of children with acute malnutrition. They were trained and supervised by three expert paediatricians with long-term experience in the management of malnutrition in children.

Comprehensive assessment of the quality of nutritional services

A sample of four (66%) facilities was randomly selected for the comprehensive assessment of all areas contributing to QoC. The sample included the only hospital in the city providing inpatient care and and three HCs.

Health services were evaluated using an adaptation of the WHO tool for assessing the quality of child healthcare¹⁹ and its subsequent versions,²³ which were widely used in different countries.^{24–26} The tool evaluates three domains that contribute to QoC: support services, case management and policies, and organisation of care. These are further divided in 16 subdomains for the evaluation of hospitals and 10 subdomains for the HCs. Using structured checklists, the assessment team attributed a score to each item of the tool, using predefined reference standards as the WHO recommendations.^{27–30} The checklists resulted in a summary score, ranging from 0 (totally inadequate care) to 3 (appropriate care),

The assessment team included: five paediatricians (three locals and two expatriates), three paediatric nurses (local), one nutritionist (local) and two public health experts/programme managers (one local and one expatriate). All the team had previous long-term experience in the management of malnutrition in children.

The assessment focused on the health system rather than on the single individual, in line with WHO methodology.^{19 23} Practical solutions to the problems encountered were discussed at each facility with a participatory approach (peer-to-peer review model) for facilitating a better understanding of the underlying causes of the observed problems and in preparation for the workshop where findings from all facilities were discussed.

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Data quality assurance procedures

A list of data quality assurance procedures was adopted to ensure accurate data collection. These included, for the health outcome review: categories of exit were predefined; detailed case definitions were provided; simple data extraction tools were developed and tested; data collectors with previous experience were selected; standard operating procedures were developed and staff was trained accordingly; data were reported in real time in a predefined excel spreadsheet database; and data completeness and consistency was monitored in real time by the expert supervisors.

Data quality assurance procedures adopted for the comprehensive assessment of the nutritional services included: the WHO suggested methodology was strictly followed,^{19 23} the assessment tool was translated into the local language (Portuguese) and quality of the translation was double-checked by a bilingual native speaker prior to the assessment; the tool was circulated within the team 1 month before the visit to ensure adequate knowledge by all team members; results of the evaluation were recorded point by point in predefined checklists, and scores were calculated and agreed in the same day of the evaluation.

Data analysis

Data were entered in an electronic database and analysed using Open Epi. Health outcomes were assessed against the international SPHERE standards, which define performance indicators for the management of acute malnutrition.^{31 32} We explored with subgroups analyses how health outcomes changed by HIV status (HIV positive vs HIV negative), by severity of malnutrition (SAM vs MAM), by type of malnutrition (marasmus vs kwashiorkor vs marasmic-kwashiorkor) and by facility. We assessed whether there was an association between the rate of recovery and abandons and the total number of children treated in the facility, or the coverage population, by univariable logistic regression. Categorical variables were presented as absolute numbers, percentages and risk ratios with 95% CIs and compared using the Fisher's exact test or Yates corrected χ^2 , as appropriate. Quantitative variables were expressed as means and SD and compared using the t-test for unpaired data. All statistical tests were two sided. A p value of less than 0.5 was considered statistically significant.

Phase 2: participatory development of quality improvement recommendations

Identification of key stakeholders

Key stakeholders were preidentified and actively sensitised to participate to a 1-day workshop for its full duration. Participants to this meeting included clinical and managerial staff, both those in the position to be decision makers (eg, representative of Ministry of Health, regional and local health authorities, chiefs of units), development partners (UNICEF and other NGOs), academia and staff working in the facilities assessed (both clinical work and

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responsible for data collection). Overall, 33 participants attended the workshop.

Workshop preparation and conduction

The agenda and the objectives of the workshop were clarified to participants in the days before the meeting. It was made clear that during the workshop, results of the quality assessment were going to be presented, main gaps in the QoC were going to be collectively identified and actions for improvement were going to be proposed by participants and agreed in plenary.

The expected outputs of the workshop were summarised again at its start. During the workshop, a non-blaming, supportive, action oriented and participatory approach was facilitated by the coordinators. Results of assessment were presented, and time was allowed for plenary discussion. Key information from similar studies in other low-income settings¹⁴⁻¹⁷ were also reported to increase commitment through comparison with other experiences. After the plenary discussion, participants were divided into three working groups (actions at hospital level, HC level and at community level). Each group was supported by a moderator who facilitated team dynamics. Groups were allowed time for agreeing a list of recommendations for improving the quality of nutritional services in Beira. The summary of each group discussion was presented, synthesised in posters, discussed and further agreed in plenary.

Ethical considerations

This study did not imply any experiment in human subjects. This assessment was planned together with local health authorities, which were informed in detail about the methods of the evaluation, including all sources of data, tools for data collection and types of data collected. The assessment did not imply any direct intervention. Individuals (health staff and children care taker) were involved in the evaluation only as source of data related to the health system and not related to their individual health. All individuals involved in the assessment were duly informed and gave their verbal consent to participate. The privacy of all individuals involved in the assessment was protected by not recording any single detail related to their personal identity. Given all the above, the need for a formal ethical approval was deemed unnecessary from local health authorities.

Patients and public involvement statement

Patients were involved in phase 1 of the study as source of data for the comprehensive assessment of the quality of nutritional services. Their views were collected and considered.

RESULTS

Phase 1: assessment of the QoC

Six facilities (one hospital and five HCs), accounting for 100% of facilities providing nutritional care in Beira, were assessed for the exit health outcomes (figure 1). Records





Figure 1 Study flow diagram. HCs, health centres; QoC, quality of care.

of 1428 children (492 outpatients; 936 inpatients) were analysed (figure 1) for the health outcomes. Four facilities (one hospital and three HCs) were assessed for all components relevant to quality of nutritional services. The three selected HCs covered a population of 190 000 out of 249 000 (76%) total population covered by outpatient nutritional services in Beira. Additional characteristics of the facilities are reported in the online supplementary table 3.

Health outcomes review

Overall, at inpatient level 656 (70.1%) children recovered, 139 (14.9%) died and 110 (11.8%) defaulted. When compared with the SPHERE standards,²³ the recovery rate was significantly below the SPHERE (70.1% vs 75%, p=0.01), while the death rate and the abandon rate were both significantly higher (14.9% vs 10% p=0001 and 11.8% vs 15% p=0.04, respectively) (table 1).

At outpatient level, overall, 237 (48.2%) recovered, 210 (42.7%) defaulted and 17 (0.6%) died. When compared with the SPHERE standards^{22 23} the recovery rate was far below the standard (48.2% vs 75%, p<0.0001), while the rate of abandons was significantly higher than the standards (42.7% vs 15% p<0.0001).

Statistics also revealed that few cases of malnourished children were enrolled in the nutritional programme, when compared with the coverage area and to the estimated local prevalence of malnutrition, thus suggesting possible problems in case detention or into access to care.

Subgroup analyses of children with malnutrition treated at inpatient are reported in online supplementary table 4. When children where stratified by type of malnutrition, about half (52%) of children had marasmus, one-quarter (26%) had kwashiorkior and the remaining (22%) had marasmic-kwashiorkor. The recovery rate did not significantly differ among groups. Children with marasmus and with marasmic-kwashiorkor showed a trend for higher risk of death compared with children with kwashiorkor, although the difference was not statistically significant (16.1%–11.3%, risk ratio (RR) 1.42, 95% CI 0.94 to 2.14, p=0.08; 16.1% vs 11.3%, RR 1.43, 95% CI 0.89 to 2.30, p=0.1).

Overall 303 (32.4%) children treated at hospital level were HIV seropositive. The rate of HIV infection was significantly higher in children with marasmus (194/492 (39.4%), RR 2.42, 95% CI 1.78 to 3.30, p<0.0001) and marasmic-kwashiorkor (70/204 (34.3%), RR 2.11, 95%

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Table 1 Health outcomes	s of malı	nourished childrei	า				
	Inpat	ent		Outpa	atient		
	Ν	%	SPHERE standard	Ν	%	SPHERE	E standard
Recovered	656	70.1	>75%	237	48.2	>75%	
Abandons	110	11.8	<15%	210	42.7	<15%	
Died	139	14.9	<10%	3	0.6	<3%	
Not recovered	0	0	NA	17	3.5	NA	
Transferred	0	0	NA	25	5.1	NA	
Unknown*	31	3.3	NA	0	0	NA	
TOTAL	936	100		492	100		

*Children for which the outcome was unclear were classified as 'unknown'.

NA, not applicable (there is not a SHPERE standard for these indicators⁹.

CI 1.49 to 2.97, p<0.0001)) compared with those with kwashiorkor $(39/240 \ (16.3\%))$.

Subgroup analyses of children with malnutrition treated at outpatient level are reported in online supplementary table 5. When stratified by severity of malnutrition, 209 (42.5%) had SAM and 283 (57.5%) had MAM, and outcomes did not significantly differ among groups, except for the rate of children transferred, which was higher in children with MAM compared with SAM (7.4% vs 1.9%, p=0.008). When stratified by HIV status, 166 (33.7%) children were classified as HIV infected, without significant difference in the population of children with SAM or MAM (33.0% vs 34.2% p>0.05). Recovery rate was significantly lower in HIV-positive children compared with HIV negative (39.2% vs 52.8%, p=0.004). Rate of non-recovery in SAM and rate of abandons and deaths in MAM were also significantly worst in HIV-positive children compared with HIV negative.

When health outcomes where stratified by HC (online supplementary figure 1), the total number of children treated in each facility varied among HCs from 187 to 56. Low heterogeneity was detected on the outcomes of children with SAM, while significant heterogeneity was found among different HCs for children MAM, with rates of recovery ranging from 32.5% to 61.0% (RR 1.87, 95% CI 1.16 to $3.03, p{=}0.006$) and rates of abandonment ranging from 27.3% to 65.0% (RR 2.38, 95% CI 1.25 to $4.53, p{=}0.009$). Neither the rate of recovery nor rate of abandons were significantly associated with the total number of children with malnutrition treated in each facility or with the population in the coverage area.

Comprehensive assessment of the quality of nutritional services

Table 2 reports the summary evaluation scores for the four (66%) facilities selected for this direct comprehensive assessment. Overall, among all domains contributing to QoC, 28/46 (60.8%) indicated suboptimal care with significant health hazards, and 13/46 (28.2%) indicated totally inadequate care with severe health hazards.

A full list of priority gaps observed in QoC is reported in table 3, while the key aspects are described below, following the assessment tool structure: (A) support services; (B) case management; and (C) policies and organisation of care.

Gaps in the support services included the lack of staff (eg, one nurse alone in each HC, one single nurse alone for 28 beds during weekends and night shifts at hospital level) and a high staff turnover especially among nurses. Substandard physical structures were detected especially at hospital level, with one single room for all children with SAM including infectious cases (tuberculosis and salmonellas) and severe problems in water supply (at time of the site visit running water was lacking from most taps at hospital level) and power supplies. Availability of equipment and supplies was on average fair; however, serious failures in the technical maintenance systems often prevented the use of equipment (eg, most power plugs were found out to work, with subsequent difficulty in using electric equipment).Examples of poor maintenance included relatively simple problems that were left without a solution, such as uncalibrated weighting scales and lack of tape on the length measuring board.

With respect to case management, emergency treatment was seriously substandard both at hospital and at HC level. Low adherence to existing national recommendations, despite the existence of a very comprehensive national guideline and despite previous training was common especially at outpatient level. Inappropriate use of relatively simple devices, such as the length measuring board or the mid-upper arm circumference tape, was observed. A serious lack of comprehension and use in practice of the existing systems for statistical reporting was observed.

In regards to support services, serious deficiencies in basic services for personal hygiene (water, soap or hand disinfectant), with risk of transmission of infections both among health staff and patients were detected in some facilities. Lack of maintenance included substandard cleaning of the water reservoirs of the oxygen delivery systems. However, there were also some excellent examples of good hygiene practices, with some staff very attentive to infection prevention. Complete lack of supervision and lack of effective audit systems were identified among

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Table 2 Summary	evaluation scores					
		Hospital	HC1	HC2	HC3	Mean score
Support services	1. Physical structures staff, water and power	1	1	1	2	1.2
	2. Statistics and medical records	1	1	0	0	0.5
	3. Pharmacy and medicine availability	1	1	1	2	1.2
	4. Equipment and supplies	1	1	0	1	0.7
	5. Laboratory support	1	1.5	1.5	2.5	1.5
	6. Layout of the ward	1	NA	NA	NA	NA
	7. Food preparation area	1	NA	NA	NA	NA
Case management	8. Case identification, triage and emergency treatment	1	1	0.6	0.6	0.8
	9. Case management	1.5	2	0.5	0.8	1.2
	10. Monitoring and follow-up	1	NA	NA	NA	NA
	11. Discharge and postdischarge follow-up	1.5	NA	NA	NA	NA
Policies and organisation of	12. Infection prevention	0	NA	NA	NA	NA
	13. Guidelines and training	1	1.5	0	2	1.1
Care	14. Audit systems	1	0	0	0	0.3
	15. Access to hospital and continuity of care	1	1	0	1	0.8
	16. Patients' rights	1	NA	NA	NA	NA

The table reports the summary scores of the direct assessment based on the assessment tools, for each of the key area assessed (16 for the hospital and 10 for the HCs). Scoring system: score 3=good care according to international standards; score 2–2.9=suboptimal care but low health hazard; score 1–1.9=suboptimal care with significant health hazard; score 0–0.9=totally inadequate care and/or harmful practice with severe health hazards.

HC, health centre; NA, not applicable.

the factors contributing to low QoC. Audits systems, when existing, tended to hide problems rather than point them out, with the consequence that problems remained largely unsolved. Heterogeneity in QoC within the same services—such as two units in the same HC with very different hygiene practices—suggested that quality was affected by specific factors (eg, human factors), but also that in principle, was achievable.

Overall, the following key strengths were observed: two HCs had been recently renovated; the national guideline⁹ and appropriate job aids (eg, algorithms on diagnosis and treatment, tables with recommended drug dosages, tools for statistical reporting and so on) were available in all facilities; most staff reported to have received training on the national guidelines; some staff showed very good knowledge, appropriate skills and high motivation to work; a group of 'activists' supported the staff by helping with the nutritional assessment and with counselling and cooking lessons; and access for patients into the nutritional programme did not imply any payment, at least officially (according to national regulations, all basic drugs and diagnostic tests to be provided for free).

Phase 2: participatory development of quality improvement recommendations

Overall, a list of 38 possible recommendations to improve the quality of nutritional services was identified (table 3). It was recognised that some of the actions clearly required dedicated funding (eg, procurement and maintenance of equipment and restructuring of buildings), while others (eg, strengthening the system of internal audits and supportive supervision by senior staff) could be implemented potentially at a reasonably low cost through internal reorganisation of work and division of responsibilities. Possible key drivers for changing behaviours were also identified, such as local champions who could act as supervisors.

DISCUSSION

This is one of the few studies reporting on the QoC of nutritional services in LMIC, and the first study reporting on the use of a quality assessment to develop recommendations, with a participatory approach, to improve QoC for malnourished children. The assessment, conducted based on predefined criteria (SPHERE and

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Table 3 Gaps in QoC ide	entified and proposed solutions agreed	
Area evaluated	Priority problems observed	Proposed solutions
1. Physical structure, staff, water and power	 Hospital level Lack of specialised doctors (1 doctor for 28 beds) and nurses (one single nurse for the night shifts) and high turnover among nurses. Lack of running water in most taps. Lack of basic services for hygiene of patients and staff. Irregular power supply/no efficient back up system (lamps broken). Serious lack of maintenance of power sources with impossibility to use available equipment for reanimation (aspirator and oxygen concentrator). Health centre (HC) Lack of staff in some HCs. Serious deficiencies in the emergency rooms. 	 Advocacy with funding partners to ensure funds for physical restructuring of the ward (water, power and toilets). Develop curricular training specific to health workers involved in management of malnourished children. Employ one additional doctor at hospital level. Reorganise nurses' shifts to ensure presence of at least two nurses at night. Reorganise the emergency room. When there is lack of running water, organise appropriate receptacles for water and use hand disinfectant.
2. Statistics and medical records	 Serious inconsistencies and frequent lack of data in the official registers and medical forms. Lack of adequate knowledge and use of existing instruments and tools for statistical reporting among the staff. Inadequate systems for statistical reporting at hospital level, with inconsistencies in annual reports. 	 7. Strengthen training on existing statistical reporting tools, as for the national guidelines. 8. Supportive supervision with periodical audits. 9. M&E as a priority.
3. Pharmacy and medicine availability	 Lack of an essential drug list. No temperature and humidity control in the pharmacy store. At hospital lack of mebendazole, phenobarbital, zinc, potassium, oral quinine oral and some drugs found expired. At HC lack of drugs for emergency treatment and other essential drugs. Lack of stable supplies of therapeutic foods: F75, F100, Resomal, MultiMix, Plumpy Nut, CSB and water with sugar. 	 Develop a list of essential drugs. On the job supportive supervision on pharmacy management. Compulsory preparation of water with sugar to be administered to each child at entry.
4. Equipment and supplies	 Serious lack of maintenance of essential equipment (eg, scales). Serious lack of appropriate use of existing equipment (Ambu bag, length measuring board and MUAC tape). Some lack in availability of equipment (scales for children). Breakdown in supplies of drugs and foods. 	 Create an effective system for technical maintenance (will need external support). Procure certain basic equipment.
5. Laboratory support	 Quality was very heterogeneous among different services. 	15. Strengthen the lab quality control systems.
6. Layout of the ward	 One single room for all children with SAM (no separation for TB cases and other infectious diseases cases such as salmonellas). 	16. Consider changing the ward layout (will need external support).
7. Food preparation	 Serious mistakes in preparation of F75 and F100 not according to the recipe (450 Kcal instead of 750 Kcal). Some problems in food storage. 	 17. On-the-job training and supportive supervision. 18. Presence of a nutritionist.
8.Case identification, triage and emergency treatment	 Low number of children identified in respect of expected prevalence of malnutrition. No triage implemented at HC level and serious lack in emergency treatment. 	 19. Train all personnel in triage and emergency treatment. 20. Strengthen collaboration with activists for case finding in the community.
9. Case management	 Lack of adequate knowledge and use of existing guidelines and tools (job aids, tables and so on). Lack of adherence to existing guidelines and frequent inconsistencies in case management. 	 21. Develop a 'plan of work' for each health worker. 22. Strengthen training on guidelines of management of SAM and MAM. 23. Print wall posters with clinical algorithms and other job aids. 24. Establish a system of routine audit of case managment.
10.Monitoring and follow-up	 Serious lack of adequate monitoring of hospitalised children, especially at night and during weekends 	25. On the job training and supervisions.26. Establish a system of routine audit M&E.
		Continued

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Table 3 Continued		
Area evaluated	Priority problems observed	Proposed solutions
11. Discharge and postdischarge follow-up.	 Lack of communication resulting in lack of continuity of care among services. 	27. Strengthen communication systems (consider pilot use of mobile phones).
12. Infection prevention	 Existing guidelines are not disseminated, implemented and monitored. Audit system not pointing out real problems. 	 28. Disseminate existing guidelines. 29. Strengthen the existing system of audits M&E.
13. Guidelines and training	 Most staff were trained, but in several cases, this was not effective. Lack of monitoring and of supportive supervision. 	30. On-the-job training and supervision.31. Establish a system of routine audit M&E.
14. Audit systems	 Serious lack of audits systems. 	32. Establish effective systems of routine audit with a real problem-solving attitude.33. Disseminate a culture against 'hiding of problems'.
15. Access to hospital care and continuity of care	 Serious deficiencies in communication among services, with gaps in continuity of care. 	 34. Strengthen collaboration with activists for case finding. 35. Develop alternative methods for community mobilisation on malnutrition, using different platforms (ie, activists, the health committees, 'agents for health preventions'). 36. Strengthen communication systems (consider pilot use of mobile phones).
16. Patients' rights	 Substantially substandard. 	37. Disseminate the chart on patient rights.38. Supportive supervision and periodical audit M&E.

CSB, corn and soy blended flour; F75, Formula F75 (this is a special food for children with SAM); F100, Formula F100 (this is a specially food for children with SAM); HC, health centre; MAM, moderate acute malnutrition; M&E, monitoring and evaluation; MUAC, mid-upper arm circumference; QoC, quality of care; SAM, severe acute malnutrition; TB, tuberculosis.

WHO standards),^{19 31 32} overall showed that, while health outcomes at hospital level were only slightly substandards, actions are needed to ensure that in the future better outcomes are achieved at outpatient level and for HIV seropositive children. The study also documents how findings of the quality assessment were used to generate and agree, in participatory manner, a list of recommendations for improving the quality of the nutritional services.

Results of the study may be of interest for both researchers and policy makers. First, this assessment contributes to the current debate on the need to improve QoC for children in LMIC by generating evidence on this topic. Overall, results of this study in Mozambique are in line with the few existing studies conducted in other LMIC. A study at hospital level in Kenya reported that only 4% of children received sugar at admission, only 25% had their temperature recorded, none received vitamin A and none of the feeds prescribed was correct both in type and volume.¹⁴ Similarly, an assessment in Benin¹⁵ observed that only 47.4% of the HCs were using the growth charts, 35% could not perform basic anthropometric measurements and no doctors provided nutritional counselling. A recent study in Uganda reported a mean cure rate among malnourished children treated at HCs of 52.9%.18 Lack of adherence to WHO recommendations was also reported in Brazil.¹⁷ Although results of the present study refer to year 2015-2016, a later assessment (unpublished) confirmed similar findings.³³ Taken together, the above described literature may be used for further advocating better QoC for children in Mozambique and in other LMICs.

Second, the model described in this study, that is, using the assessment proactively to develop a list of locally agreed recommendations, may be used in similar settings to build local ownership and facilitate implementation of changes. Future studies should explore what are the most effective follow-up strategies to achieve these changes.

High rates of abandons similar to what observed in this study were reported by other evaluations in sub-Saharan Africa.¹⁸ Abandons may be due to multiple underlying causes, including: low perception of the need/advantages for accessing care, difficulty in accessing care due to lack/ cost of transports, conflicting priorities for the mother such as the need for working and attending other children, poor information about service provision, perception of poor QoC and lack of effective systems for tracing defaulters. Some of these factors have been reported in literature,¹⁵ but none specific study investigated reasons for abandons from nutritional services in Mozambique and related effective interventions. A recent randomised study in Uganda reported that high intensity supportive supervision to staff of the nutritional services, combined with tools for tracing defaulters (maps and telephone credit), and incentives to community health workers, significantly decreased defaulter rate from around 40% to 2%.³⁴ Future studies should further explore factors affecting defaulters from nutritional services in Beira and related effective interventions.

The significant heterogeneity in health outcomes detected among HCs, in particular for children with MAM, is in line with previous observations, reporting large heterogeneity in QoC, even among nearby facilities. $^{17\,18\,35}$

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6

Nutrition

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Literature and experience in the field have showed that the identification of 'best performers', and their appointment as local drivers of a quality improvement process (ie, by actively engaging champions in diffusing best practices in the nearby facilities), can actually help implementing changes.³⁴ Significant differences in outcomes by HIV status and type of malnutrition have been previously reported in literature.^{36 37}

Results of this study may not be directly generalised to all health services in Mozambique neither to other countries. Notably, the high HIV prevalence among children with malnutrition in our sample (about one-third) may have affected results. However, similarly low recovery rates (around 50%) were recently observed in other settings, such as Uganda, where HIV prevalence in malnourished children is almost negligible (about 1%)³⁸ thus suggesting that other factors affected the health outcomes.

This study has the limitation that data on the health outcome review derive from historical data in the patients' files and in the nutritional registers, and we acknowledge that, in settings with low resources, these data may not be fully accurate. However, these are the only official data. Other systems of data gathering, such as direct evaluations of case management, or prospective data collection by on site data collectors, have other serious risk of bias (eg, the presence of external evaluators/data collectors can affect the QoC delivered, usually by increasing it compared with the 'standard'). Literature shows that investment in strengthening data collection can be important drivers in quality improvement projects.³⁸ Supportive supervision should also be implemented, with the aim of both monitoring practices-including data quality-and providing direct technical support.

In regards to the study sample, although this may be perceived as relatively small study, it must be stressed that for the evaluation of health outcomes, 100% of the facilities providing nutritional services in Beira at time of the study were included. Future evaluations may consider larger sample size, including also other regions in Mozambique.

To our knowledge at the moment in Mozambique, there are no official tools for assessing the quality of nutritional services. The tool that we used was adapted from a WHO tool¹⁹ and its subsequent versions,²³ which were widely used in different countries.²⁴⁺²⁶ It was a standard-based tool, using WHO guidelines as reference. It had the advantage of evaluating systematically, together with clinical case management, different dimensions affecting the QoC delivered, such as the supportive services, and organisational factors such as training policies and audit mechanisms. Methods of the assessment were in line with other assessments performed with similar WHO tools.^{39,40}

While the present study did not aim and did not have the resources to reassess changes in QoC in the long term, future studies should document progresses, together with system changes, over time.

Conclusions

Data on this quality assessment may be used for further advocating better QoC for children in Mozambique and in other LMIC. The model proposed in this study, that is, using the assessment proactively to develop a list of locally agreed recommendations, may be used to build local ownership and facilitate implementation of changes. Future studies should further explore and document what are the most effective and sustainable approaches to achieve these changes in different settings.

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Contributors ML conceived the papers, contributed to data collection, analysed data, drafted the paper and finalised it. KC, ACM and GP contributed to data collection and generation, contributed to data interpretation and revised the first and the final drafts.

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Competing interests None declared.

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ORCID iD

Marzia Lazzerini http://orcid.org/0000-0001-8608-2198

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Supportive supervision for improving health status and quality of care for malnourished children at out-patient level in Arua district, Uganda: cluster randomized trial and costeffectiveness analysis

ORAL PRESENTATIONS

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Lazzerini M.

Focus country Mozambique









The association between diabetes and cataract among 42,469 community-dwelling adults in six lowand middle-income countries

PAPER

Authors

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DIABETES RESEARCH AND CLINICAL PRACTICE I47 (2019) I02-II0



The association between diabetes and cataract among 42,469 community-dwelling adults in six low- and middle-income countries



Damiano Pizzol^{a,1,*}, Nicola Veronese^{b,c,1}, Gianluca Quaglio^d, Francesco Di Gennaro^e, Davide Deganello^f, Brendon Stubbs^{g,h,i}, Ai Koyanagi^{j,k}

^bNational Research Council, Neuroscience Institute, Aging Branch, Padova, Italy

^c Institute for Clinical Research and Education in Medicine (IREM), Padova, Italy

^d European Parliamentary Research Services (EPRS), European Parliament, Brussels, Belgium

^e Department of Infectious Diseases, University of Bari, Italy

^fDepartment of Neurosciences, Ophthalmology Unit, University of Padova, Italy

^g Physiotherapy Department, South London and Maudsley NHS Foundation Trust, Denmark Hill, London, United Kingdom

^h Health Service and Population Research Department, Institute of Psychiatry, Psychology and Neuroscience, King's College London, London, United Kinadom

ⁱ Faculty of Health, Social Care and Education, Anglia Ruskin University, Chelmsford, United Kingdom

^j Research and Development Unit, Parc Sanitari Sant Joan de Déu, Universitat de Barcelona, Fundació Sant Joan de Déu, Barcelona, Spain

^k Instituto de Salud Carlos III, Centro de Investigación Biomédica en Red de Salud Mental, CIBERSAM, Madrid, Spain

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ABSTRACT

Background: Cataract is a major cause of visual impairment in people with diabetes, yet a paucity of data is available in low- and middle-income countries (LMICs) on this comorbidity. Thus we assessed the association between diabetes and cataract in 6 LMICs. *Methods:* Cross-sectional, community-based data from the Study on Global Ageing and

Adult Health (SAGE) was analyzed (n = 42,469 aged \geq 18 years). Five years information on self-reported diagnosis of cataract was collected. Three definitions for cataract were used: (a) Self-reported diagnosis and/or past 12-month symptoms; (b) Solely self-reported diagnosis; and (c) Surgical treatment for cataract in the past five years. Diabetes was based on self-reported diagnosis. Multivariable logistic regression was conducted to assess the associations.

Results: Overall, the prevalence of diabetes was 3.1% (95%CI = 2.7-3.5%) and that of cataract based on the three different definitions was: (a) 13.3% (95%CI = 12.4-14.3%); (b) 4.4% (95% CI = 3.9-4.8%), (c) 1.7% (95%CI = 1.5-2.0%). After adjustment the association was significantly elevated: (a) OR = 2.10 (95%CI = 1.59-2.76); (b) OR = 2.62 (95%CI = 2.00-3.42);

* Corresponding author at: Operational Research Unit, Doctors with Africa CUAMM, Rua Fernao Mendes Pinto 165, Ponta Gea 1363, Beira, Mozambique.

E-mail address: d.pizzol@cuamm.org (D. Pizzol).

¹ These authors are joint first authors.

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^a Operational Research Unit, Doctors with Africa, Mozambique

Successful Surgery Management of Giant Periorbital Malignant Schwannoma in a Low-Income Setting

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CASE REPORT



Successful Surgery Management of Giant Periorbital Malignant Schwannoma in a Low-Income Setting

Serena Artuso¹ · Damiano Pizzol² · Giuliana Frasson¹ · Mario Antunes³

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Abstract Schwannoma can arise from any cranial, peripheral or autonomic nerve, except the olfactory and optic. About 25–45% of extracranial schwannomas lie in the head and neck. Data on malignant schwannoma from low-income settings are inconsistent. We reported a case of giant periorbital malignant schwannoma successfully treated in a low-income setting. The strength of our case is given not only by the rarity and the size of the disease but also for highlighting the weakness of health system in low-resource settings. It is mandatory to strengthen the health system with particular attention to physical, psychologic and social aspects and to promote comprehensive programs including all these aspects.

Keywords Schwannoma · Low-income settings · Head tumor · Malignant schwannoma

Introduction

Tumors involving the peripheral nervous system can be intrinsic or extrinsic, and both can be either benign or malignant [1]. Benign peripheral nerves sheath tumors include schwannomas (or neurilemmomas or neurinomas)

Damiano Pizzol d.pizzol@cuamm.org

¹ Department of Neurosciences, Otolaryngology Section, University of Padova, Padua, Italy

- ² Operational Research Unit, Doctors with Africa Cuamm, Rua Fernao Mendes Pinto 165, Ponta Gea, 1363 Beira, Mozambique
- ³ Department of Surgery, Central Hospital of Beira, Beira, Mozambique

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and neurofibromas. Most cases are sporadic, but can also be associated with neurofibromatosis or schwannomatosis [1].

Schwannoma can arise from any cranial, peripheral or autonomic nerve, except the olfactory and optic. About 25–45% of extracranial schwannomas lie in the head and neck [2]. There are four major forms of schwannoma: conventional, cellular, plexiform and melanotic. Malignant change in schwannomas of the head and neck is rare, with a prevalence of 8–13.9% [2].

Malignant peripheral nerve sheath tumors show variable differentiation toward one of the cellular components of nerve sheaths (Schwann cells, fibroblasts or perineurial cells) [3]. They account for 5% to 10% of soft tissue sarcomas and have an incidence of 0.001% in the general population. They can occur sporadically, as well as in patients with neurofibromatosis, and arise either de novo or from a preexisting benign tumor [3].

Malignant peripheral nerve sheath tumor occurs most frequently in the extremities, particularly proximally, followed by the trunk and head and neck [1]. Patients may present with a painful or rapidly enlarging mass with associated neurologic deficits. Poorer prognosis is associated with large tumors (with size varying from > 5 to >7 cm in different studies) and incomplete resection [1]. Radical surgery is the mainstay of current management, while radiotherapy may be used to control local disease and reduce recurrence, but it has little effect on long-term survival [3]. Chemotherapy is generally not effective, although some studies have shown that it may benefit patients with high-grade histology or children with unresectable tumors [3]. Data on malignant schwannoma from low-income settings are inconsistent. We reported a case of giant periorbital malignant schwannoma successfully treated in a low-income setting.

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Physical injury and depression in six lowand middle-income countries: A nationally representative study

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Research paper

SEVIER

Physical injury and depression in six low- and middle-income countries: A nationally representative study



Louis Jacob^{a,*}, Damiano Pizzol^b, Nicola Veronese^c, Brendon Stubbs^{d,e}, Ai Koyanagi^{f,g}

^a Faculty of Medicine, University of Versailles Saint-Quentin-en-Yvelines, 2 avenue de la Source de la Bièvre, Montigny-le-Bretonneux 78180, France ^b Operational Research Unit, Doctors with Africa, Mozambique

^c Aging Branch National Research Council, Neuroscience Institute, Padova, Italy

^d Department of Psychological Medicine, Institute of Psychiatry, Psychology and Neuroscience, King's College London, London, United Kingdom

^e Physiotherapy Department, South London and Maudsley NHS Foundation Trust, Denmark Hill, London SE5 8AZ, United Kingdor

^f Research and Development Unit. Parc Sanitari Sant Joan de Déu, Universitat de Barcelona, Fundació Sant Joan de Déu, Dr. Antoni Pujadas, 42, Sant Boi de Llobregat, Barcelona 08830. Spair

^g Instituto de Salud Carlos III, Centro de Investigación Biomédica en Red de Salud Mental, CIBERSAM, Monforte de Lemos 3-5 Pabellón 11, Madrid 28029, Spain

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ABSTRACT

Background: Studies on the association between physical injury and depression in low- and middle-income countries (LMICs) are scarce. Therefore, our goal was to analyze the association between physical injury and depression using nationally representative data from six LMICs. Methods: Cross-sectional data from the Study on Global Ageing and Adult Health (SAGE) survey (2007-2010) were analyzed (N = 42,489). Questions based on the World Mental Health Survey version of the Composite International Diagnostic Interview were used for the endorsement of past 12-month DSM-IV depression. Any injury in our analysis referred to having experienced traffic injury or other injury in the past 12 months. Multivariable logistic regression analysis and meta-analyses were used to assess associations. Results: Overall, the prevalence of depression was higher among those who had any injury compared to those without injuries (9.0% vs. 3.7%). Compared to having no injury, any injury without disability was associated with a 1.72 (95%CI = 1.18-2.50) times higher odds for depression, while the odds for injury with disability was much higher (OR = 3.81; 95%CI = 2.16-6.73). The pooled estimate (OR) for the association between any injury and depression based on a meta-analysis using country-wise estimates was 3.28 (95%CI = 1.71-6.31) and a moderate level of between-country heterogeneity was observed ($l^2 = 63.1\%$). Limitations: Causality or temporal associations cannot be established due to the cross-sectional nature of the study. Conclusions: Personalized mental health care to victims of physical injury may reduce risk for depression. Treating disability as the result of injuries may also be effective in the prevention of depressive disorders.

1. Introduction

Major depressive disorder accounted for 8.2% of years lived with disability in the world in 2010 (Ferrari et al., 2013), and this psychiatric condition is responsible for an important share of the total burden attributable to non-communicable diseases (Patel, 2007). Furthermore, depression is positively associated with low quality of life (Zeng et al., 2013), chronic diseases (Kilzieh et al., 2008), and mortality (Kozela et al., 2016). Depression is now a major problem in low- and middle-income countries (LMICs), as these countries bear more than 80% of the global years lost to disability due to depression (World Health Organization, 2017), while the majority of people with depression in LMICs do not receive appropriate treatment (Cuijpers et al., 2018). Therefore, there is an urgent need to better understand the risk factors for depression in LMICs to establish effective prevention measures for this disorder.

Numerous factors that can increase the risk for depression have been identified in LMICs. These factors include female gender (Tomlinson et al., 2009), age (Geldsetzer et al., 2018), low socioeconomic status (Fernández-Niño et al., 2014), lack of social support (Cheng et al., 2014), low self-esteem (Azizi et al., 2013), stressful life events (Tao et al., 2011), family history of psychiatric disorders

* Corresponding author. E-mail address: louis.jacob.contacts@gmail.com (L. Jacob).

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Successful Trauma Penis Management with Foreskin Flap in a Limited Resource Setting

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EC CLINICAL AND MEDICAL CASE REPORTS Guest Editorial

Successful Trauma Penis Management with Foreskin Flap in a Limited Resource Setting

Mario Antunes¹, Damiano Pizzol^{2*} and Anna Claudia Colangelo^{2,3}

¹Department of Surgery, Central Hospital of Beira, Beira, Mozambique ²Operational Research Unit, Doctors with Africa, Mozambique ³Department of Surgery and Organ Transplantation, University of Padua, Padua, Italy

*Corresponding Author: Damiano Pizzol, Operational Research Unit, Doctors with Africa, Mozambique.

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A 41-year-old man presented to our attention with a history of penile trauma at work. Penis was entangled in the mill transmission belt and underwent to heavy tearing with exposure of corpora cavernosa and scrotum laceration (Figure 1A). Fortunately, both corpora cavernosa and urethra did not face rapture. Considering that the patient had never been circumcised and that the foreskin had been preserved by trauma, we proceeded with a covering of the lesion with the preputial tissue. The ventral peripheral ring was excised and removed in addition to excess ventral preputial tissue. All inner preputial tissue dorsally and laterally was preserved and unfolded for use as an advancement flap. Using the proximal cut end of the foreskin as an entry point the preputial skin was undermined. The vascularized flap obtained allowed coverage of partial length of the injured penile shaft and, finally, we saturated the wound of the scrotum (Figure 1B).

Many disease conditions as trauma, burn injuries, resection of cancer or genital lymphedema and infections, can lead to penile skin loss resulting in severe functional disability other than cosmetic disfigurement and necessitating surgery intervention [1]. In case of extensive penile denudation, split-thickness skin graft is c demonstrated to be satisfactory for the reconstruct of wounds for reasons of easy harvest and valid coverage [2]. However, skin grafts frequently develop scar contracture which may have side effects on the aesthetic and function of the penis [3]. So, attempts have been made to develop alternative procedures and, in particular, scrotal skin flap, although little has been published about it, seems to allow a better sensory and erectile function with good long-term results [4]. Still less studies exist on the utilization of the foreskin flap, although, this technique, whenever preputial skin is available, may have many advantages as coverage with similar well vascularized tissue, flap thickness similar to native penile skin, ease of flap harvest, minimal donor-site morbidity, avoidance of late scar contracture, and ability of the flap to grow proportionally with the patient [5].

This last technique can be particularly useful in limited resources setting, considering the lacking of specialized health worker as plastic surgeons, and the frequency of infectious complications.

To the best of our knowledge, this is the first described case in low income countries and, although we cannot predict if he will recover the sexual function, we are considering a successful management due to the absence of complication 10 days after surgery (Figure 1C).



Figure 1: Penis trauma at presentation (A), after foreskin flap restoration (B), and 10 days after surgery (C).

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Successful Trauma Penis Management with Foreskin Flap in a Limited Resource Setting

02

Conflict of Interest

No conflicts of interest.

Funding

None to declare.

Ethical Approval

NA.

Consent

Written informed consent was obtained.

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Diabetes in active tuberculosis in low-income countries: to test or to take care?

PAPER

Authors

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Торіс

Chronic diseases

Focus country Multi-Countries





Correspondence

Diabetes in active tuberculosis in low-income countries: to test or to take care?

Tuberculosis and diabetes are a topical example of an association between communicable and non-communicable diseases. These diseases are mutually linked, increasing each other's complications, making diagnosis and management more difficult and worsening disease course and outcomes. Furthermore, each disease is a risk factor for the occurrence and exacerbation of the other.¹

In their Article in The Lancet Global Health, Jean Jacques Noubiap and colleagues² highlighted that the global prevalence of diabetes among patients with tuberculosis is almost twice as high as that reported by the International Diabetes Foundation, which predicted a 2017 prevalence of both of 8.8% in the global adult general population.³ However, Noubiap and colleagues concluded that screening for diabetes in patients with tuberculosis might be recommended in high-income settings whereas, in low-income countries, where the prevalence of diabetes is lower and fewer health-care resources are available, more studies are needed, to determine the most systematic approach for diagnosis.² In Mozambique, we have found a low prevalence of diabetes in people with active tuberculosis,4 but we firmly believe that the development of a systematic approach to treat noncommunicable diseases, particularly diabetes, in low-income countries is urgent and necessary. However, it would be too simplistic to use a single blood glucose test as a screening method without considering other factors, such as education, the availibility and skills of health professionals, context, and social aspects. First, education is crucial for patients dealing with chronic diseases, such that they understand the importance of efficacious and regular prevention and therapy. Moreover,

the dearth of qualified health workers and the excessive workload that these staff have prevents adequate patient-doctor communication, further limiting the wellbeing of the patient. Notably, the community and the traditional healers in low-income countries have a crucial role in the health system, making it necessary to develop collaborative systems, possibly involving traditional healers as entry points for the community. Community awareness regarding facts and myths of tuberculosis and diabetes might also be important, since discrimination and stigma can substantially affect general health and social life. Finally, particular attention should be paid to social determinants of health that affect health inequities, and which can have an immediate effect on health. Indeed, in light of these considerations, to solely perform systematic blood glucose tests in patients with active tuberculosis, especially in low-income countries, seems inappropriate not only in terms of health expenditure, but also because of the poor efficacy that this approach would have. It is crucial and urgent that we treat non-communicable diseases in patients with tuberculosis. Although fasting blood glucose tests should be done in patients with active or suspected tuberculosis who present with risk factors for diabetes, it is our duty to care for all patients with tuberculosis, not only in terms of their tuberculosis diagnosis, but also with consideration for their increased risk of diabetes (and other non-communicable diseases). In conclusion, screening for diabetes in patients with tuberculosis should be considered in low-income countries. and it should be done in an integrated, culturally-sensitive, social determinantdriven manner

We declare no competing interests.

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Francesco Di Gennaro, Claudia Marotta, Mario Antunes, *Damiano Pizzol d.pizzol@cuamm.org Operational Research Unit, Doctors with Africa CUAMM, 1363 Beira, Mozambique (FDG, CM, DP), Department of Infectious Diseases, University of Bari, Bari, Italy (FDG); Department of Science for Health Promotion and Mother to Child Care, University of Palermo, Palermo, Italy (CM); and Department of Surgery, Central Hospital of Beira, Beira, Mozambique (MA)

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Use of particulate corticosteroid injections to treat low back pain in a low-income setting: 8 years of experience in Mozambique

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COMMENTARY



Use of particulate corticosteroid injections to treat low back pain in a low-income setting: 8 years of experience in Mozambique

Serguei Otchirov¹ · Damiano Pizzol² · Mario Antunes¹

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Introduction

Low back pain (LBP) is one of the most prevalent musculoskeletal conditions in both developed and developing countries, ranking highest of the 291 conditions studied in terms of years lost to disability in 2010 [1]. Worldwide, the prevalence of LBP is 30–80% among the general population, increasing with age and lower socioeconomic status and education levels [2]. Although data are missing, it is estimated that the burden of LBP in low-income countries is relatively high due to their low overall socioeconomic status, lack of work protection, and restricted access to medical care [2]. In African countries, in particular, patients may not have access to adequate health care due to economic reasons, as well as the distance to referral hospitals, and thus to health specialities, such as physiotherapy, physical rehabilitation, and pain medicine.

Corticosteroids are used widely for the medical treatment of LBP. Lumbar epidural injections of corticosteroids are the most commonly performed intervention, although data regarding their effectiveness, indications, medical necessity, and risks are conflicting [3]. Complications related to the procedure include dural puncture, trauma to the spinal nerve, infection, and allergic reactions to corticosteroids [4].

Moreover, a recent systematic review found no statistically significant differences between particulate (triamcinolone, methylprednisolone, betamethasone) and nonparticulate (dexamethasone) corticosteroid formulations in terms of pain reduction or improved functional outcome [5]. This suggests that the use of non-particulate corticosteroids

Damiano Pizzol d.pizzol@cuamm.org

- ¹ Department of Surgery, Central Hospital of Beira, Beira, Mozambique
- ² Operational Research Unit, Doctors with Africa CUAMM, Rua Fernao Mendes Pinto 165, Ponta Gea 1363, Beira, Mozambique

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should be favoured over that of particulate formulations to avoid the potential for particulate embolization [5]. A possible explanation for the reported complications related to particulate compositions is their larger size. Indeed, the larger particulate size, which allows a half-life of 36-72 h, is likely to lead to the occlusion of vessels that lie in the path of a transforaminal injection, causing ischaemia or infarction of the supplied area [6].



Association between sarcopenia and diabetes: a systematic review and meta-analysis of observational studies

PAPER

Authors

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REVIEW



Association between sarcopenia and diabetes: a systematic review and meta-analysis of observational studies

Nicola Veronese¹ · Damiano Pizzol² · Jacopo Demurtas³ · Pinar Soysal⁴ · Lee Smith⁵ · Cornel Sieber⁶ · Timo Strandberg^{7,8} · Isabelle Bourdel-Marchasson^{9,10} · Alan Sinclair¹¹ · Mirko Petrovic¹² · Stefania Maggi¹ · on behalf of the Special Interest Groups of Systematic Reviews and Meta-Analysis for Healthy Ageing, Diabetes, Sarcopenia of European Geriatric Medicine Society (EuGMS)

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Key summary points

Aim To summarize the prevalence of diabetes in people with sarcopenia (and vice versa) through a meta-analytic approach of available observational studies.

Findings In this work, we have presented the findings of the first full methodological systematic review and meta-analysis of observational studies exploring the relationship between diabetes and sarcopenia. Our findings overall emphasize the reciprocal relationship between diabetes and sarcopenia in terms of risk of occurrence, that is sarcopenia increases the risk of diabetes being present and vice versa.

Message This study provides support for further research into the prognosis of people with both diabetes and sarcopenia and the value of interventional strategies in sarcopenia to minimize adverse outcomes such as premature death, hospitalization, and disability.

Abstract

Purpose Sarcopenia and diabetes are two common conditions in older people. Some recent literature has proposed that these two conditions can be associated. However, to date, no attempt has been made to collate this literature. Therefore, we aimed to summarize the prevalence of sarcopenia in diabetes (and vice versa) and the prevalence of sarcopenia in people with diabetes complications, through a systematic review and meta-analysis.

Electronic supplementary material The online version of this article (https://doi.org/10.1007/s41999-019-00216-x) contains supplementary material, which is available to authorized users.

Nicola Veronese ilmannato@gmail.com

- ¹ National Research Council, Neuroscience Institute, Aging Branch. Via Giustiniani 2, 35128 Padua, Italy
- ² Operational Research Unit, Doctors with Africa, Dar es Salaam, Mozambique
- ³ Primary Care Department, Azienda USL Toscana Sud Est, 58100 Grosseto, Italy
- ⁴ Department of Geriatric Medicine, Bezmialem Vakif University, Istanbul, Turkey
- ⁵ The Cambridge Centre for Sport and Exercise Sciences, Anglia Ruskin University, Cambridge CB1 1PT, UK
- ⁶ Institute for Biomedicine of Ageing (IBA), Friedrich-Alexand er-Universität Erlangen-Nürnberg (FAU), 90408 Nuremberg, Germany

- ⁷ University of Helsinki, Clinicum and Helsinki University Hospital, Helsinki, Finland
- ⁸ Center for Life Course Health Research, University of Oulu, Oulu, Finland
- ⁹ CNRS, University of Bordeaux, RMSB, Bordeaux, France
- ¹⁰ Pôle de Gérontologie Clinique, CHU de Bordeaux, Bordeaux, France
- ¹¹ Diabetes Frail Ltd and King's College, London, UK
- ¹² Department of Internal Medicine and Paediatrics, Section of Geriatrics, Ghent University, Ghent, Belgium







Integrating TB and non-communicable diseases services: Pilot experience of screening for diabetes and hypertension in patients with Tuberculosis in Luanda, Angola

PAPER

Authors

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Integrating TB and non-communicable diseases services: Pilot experience of screening for diabetes and hypertension in patients with Tuberculosis in Luanda, Angola

PLOS ONE

Integrating TB and non-communicable diseases services: Pilot experience of screening for diabetes and hypertension in patients with Tuberculosis in Luanda, Angola

Giulia Segafredo , Anil Kapur , Claudia Robbiati , Nsuka Joseph , Joseth Rita de Sousa , Giovanni Putoto Fabio Manenti , Andrea Atzori , Ugo Fedeli

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Abstract

Background

In the face of the rising burden of non-communicable diseases like diabetes mellitus (DM) and hypertension in sub-Saharan Africa, where infectious diseases like Tuberculosis (TB) are still endemic, the double burden of communicable and non-communicable diseases appears to be increasing rapidly. However, the size of the problem and what is the proper health system approach to deal with the double burden is still unclear. The aim of this project was to estimate the double burden of DM hypertension and TB and to pilot the integration of the screening for DM and hypertension in the TB national programs in six TB centers in Luanda, Angola.

Methods

All newly diagnosed pulmonary TB (PTB) patients accessing six directly observed treatment (DOT) centers in Luanda were screened for diabetes and hypertension. TB diagnosis was made clinically and/or with sputum microscopy DM diagnosis was made through estimation of either fasting plasma glucose (FPG) (considered positive if ≥ 7.0 mmol/l) or random plasma glucose (considered positive if ≥ 11.1 mmol/l). Uncontrolled hypertension was defined as systolic blood pressure (SBP) of ≥ 140 mm of Hg and/or diastolic blood pressure (DBP) of ≥ 90 mm of Hg, irrespective of use of antihypertensive drug.

Results

https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0218052



Integrating TB and non-communicable diseases services; Pilot experience of screening for diabetes and hypertension in patients with Tuberculosis in Luanda, Angola

Between January 2015 and December 2016, a total of 7,205 newly diagnosed patients with PTB were included in the analysis; 3,598 (49.9%) were males and 3,607 females. Among 7,205 PTB patients enrolled, blood pressure was measured in 6,954 and 1,352 (19.4%) were found to have uncontrolled hypertension, more frequently in females (23%) compared to males (16%). In multivariate logistic regression analysis uncontrolled hypertension was associated with increasing age and BMI and ethnic group. The crude prevalence of DM among TB patients was close to 6%, slightly higher in males (6.3%) compared to females (5.7%). Age adjusted prevalence was 8%. Impaired fasting glucose (>6.1 to <7.0 mmol/L) was detected in 414 patients (7%). In multivariate logistic regression analysis DM prevalence was higher in males and increased with increasing age and BMI.

Interpretation

TB patients have a considerable hypertension and diabetes co-morbidity. It is possible to screen for these conditions within the DOTs centres. Integration of health services for both communicable and non-communicable diseases is desirable and recommended.

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Competing interests: AK receives Honorarium as member of WDF Board and owns shares in Novo Nordisk A/S. This does not alter our adherence to PLOS ONE policies on sharing data and materials.

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Integrating TB and non-communicable diseases services: Pilot experience of screening for diabetes and hypertension in patients with Tuberculosis in Luanda, Angola

Introduction

Despite substantial progress in the last two decades, Tuberculosis (TB) remains a considerable global public health concern, particularly among the poor and vulnerable populations [1]. However, even if low and middle-income countries still struggle to gain control over communicable diseases, they are being confronted with a new health-challenge. Non-communicable diseases (NCDs) are now the leading global cause of death and are responsible for 70% of deaths worldwide and approximately 80% of all NCD deaths in 2008 occurred in low and middle-income countries also prematurely. [2]

Rapid demographic, sociocultural, nutrition and economic transitions are driving an increase in the risk and prevalence of NCDs, such as diabetes, cardiovascular diseases and cancer, especially in sub-Saharan Africa. [3,4]

The 2017 Global Burden of Disease, showed a 2-fold increase in terms of disability-adjusted life year (DALYs) and deaths attributable to diabetes between 1990 and 2017 in sub-Saharan Africa [5]. The impact of this transitions and their health consequences, therefore, are going to be massive and health-systems, still very fragile, will need to find effective and sustainable approaches to address the multi-faceted challenge of infectious diseases while also addressing NCDs. [6] In order to better understand how to address this double burden, it is important to improve the understanding of how communicable and noncommunicable diseases are linked. Questions regarding the burden of the co-morbidity, the increased risk that the co-morbidity imposes, what sustainable health-system approaches can be taken to address both communicable and non-communicable diseases, especially in fragile countries, are not yet fully answered. The link between tuberculosis and diabetes has been widely described. The evidence showing the association between the two diseases is now robust and WHO refers to the interaction as an 'intersecting epidemic'. [7] Diabetes increases the risk of active tuberculosis, of progression from latent to active infection and of TB transmission. In addition to this, DM patients have a poorer response to TB treatment, resulting in a higher risk of treatment failure and, as a consequence, a higher risk of worse TB outcome. [1,7-9] On the other hand, being a systemic infection, TB can worsen glycemic control and make the clinical management of DM more complicated. [10,11] However, diabetes is not the only disease, among NCDs, with an increasing prevalence in sub saharan Africa. Cardiovascular diseases (CVD) are expected to be the biggest cause of death for most developing countries by 2020, similar to the current epidemiology of CVD in developed nations. [12,13] The increase in prevalence of traditional risk factors such as obesity, kidney diseases and hypertension explains much of this increase, but studies indicate that the burden of infectious diseases may also contribute to the development of CVD. [13,14, 15] The relationship between hypertension and TB is less clear than the one between TB and DM. [16]. However, it has been suggested that the triggering of immunological response due to a systemic infection, can cause an impairment of the endothelial function and increase the risk of CVD and, possibly, hypertension. [17,18] On the other hand, hypertension may have some effect on the immune system. [19] Irrespective of what is the actual pathological pathway that links TB and NCDs, it clearly appears that in the coming years, Sub-Saharan Africa will face the challenge of dealing with high burden of infectious diseases while also needing to

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address the increasing burden of NCDs. [6] Bidirectional screening and integrated management can help to improve early diagnosis and health outcomes for both conditions [1.7] but there is inadequate evidence, so far, on the feasibility and effectiveness of this approach.

Doctors with Africa CUAMM, the first Italian non-governmental organization, carried out this pilot project, aimed at defining the burden of co-morbidity and to explore the feasibility of integrating screening for diabetes and uncontrolled hypertension in newly diagnosed TB patients in an urban population of Luanda the capital city of Angola, receiving treatment within the Angolan National Tuberculosis program.

Materials and methods

Settings

The project was carried out in Luanda, the capital of Angola. According to the last census, about 3 million inhabitants live in the capital, although unofficial sources estimate that at least one third of the country population (30 millions) lives in the capital. The National TB Prevention and Control Program (NTP) relies on Directly Observed Therapy, Short-Course (DOTS) centers for the detection and follow up of TB patients. Six DOTS centers were purposively included in the project, namely: Hospital Divina Providencia, Municipality of Kilamba Kiaxi; Hospital do Sanatório, Municipality of Kilamba Kiaxi; Centro de saúde de Cacuaco, Municipality of Cacuaco; Centro de Saúde do Cariango, Municipality of Cazenga; Dat-Dispensário Anti Tuberculosis Municipality of Luanda; Centro de Saúde da Boa Nova, Municipality of Viana. By virtue of their location in the city, the 6 DOTS centers provide a representative sample of the urban population of Angola.

Patients and procedures

All newly diagnosed TB patients aged \geq 15 years who attended one of the six DOT centers from January 2015 to December 2016 were offered the opportunity to be screened for DM and hypertension and sensitization about TB comorbidities. Sample size was not pre-determined as the screening was offered to all patients attending the selected clinics. Patients unwilling to participate or unable to give informed consent were excluded.

Once that the patient accepted to participate, a structured questionnaire addressing socio-demographic and clinical information was administered by the study personnel (nurses and LAB technician). (S1 and S2 Files) After the questionnaire was completed patients underwent clinical examination.

Capillary blood glucose was determined using STATSTRIP XPRESS GLU/KET (Nova Biomedica) blood glucose meters which are calibrated to provide plasma equivalent results.

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Based on the time from the last food intake, capillary blood glucose was considered fasting glucose, FBG, if >8 hours had elapsed since last meal or capillary random glucose, RBG, if the last meal was <8 hours at the time of blood collection.

A patient was considered as having DM if at least one of these criteria was satisfied: fasting plasma glucose ≥126 mg/dL; random plasma glucose ≥200 mg/dL; previous diagnosis of DM. We considered impaired glucose tolerance if FBS was ≥110 mg/dL, but <126 mg/dL. Blood pressure was measured using an automatic digital blood pressure monitor: PIC Classic Check (Artsana S.p.a). Uncontrolled blood pressure was defined as diastolic blood pressure ≥90 mm of Hg and/or a systolic blood pressure ≥ 140 mm of Hg, irrespective of use of any antihypertensive drug. Weight and height were measured with Eye-Level Mechanical Physician Scales Cardinal DETECTO 2391 (Cardinal Scale Manufacturing Co.). BMI was calculated according to the WHO international classification and patients were considered underweight if BMI was <18-5 kg/m2, within the normal range if BMI was 18-5–24·9 kg/m2, overweight if BMI 25–29·9 kg/m2, and obese if BMI ≥30 kg/m2. [19]

After clinical examination the patient received proper and exhaustive information on risk factors for DM-HTN and healthy lifestyle by community health workers at DOTS centres.

Statistical analysis

Associations between categorical variables were assessed by means of the Chi-square test. Demographic and clinical factors significantly associated with presence of diabetes mellitus or to uncontrolled hypertension were selected by means of stepwise logistic regression models constrained to keep gender and age as determinants; the final models provided the associated Odds Ratios with 95% Confidence Intervals.

Ethical approval

According the National regulation, the protocol was approved by the ethical committee of the National Directorate of Public Health. All patients provided a written informed consent before inclusion in the study.

Role of funding source

The funding source did not participate to study design, data collection and analysis or the interpretation of data.

The corresponding author had full access to all the data in the study and had final responsibility for the decision to submit for publication.

Results

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Between January 2015 and December 2016, a total of 7,205 newly diagnosed TB patients were included in the analysis, of which, 3,598 (49,9%) were males and 3,607 females.

759 patients were enrolled at the Hospital Divina Providência, 540 in the Hospital do Sanatório, 815 in the Centro de saúde de Cacuaco, 1,714 in the Centro de Saúde do Cariango, 2,103 in the Dat-Dispensário Anti Tuberculosis and 1,274 Centro de Saúde da Boa Nova.

62% patients were smear positive, and 48% of reported at least four TB-related symptoms (cough, hemoptysis, fever, asthenia, dyspnea, weight loss, night sweat, chest pain).

30% of the patients were in the 25–34 year-age-category and 54% belonged to the the Kimbundu etnic group. 61% of the study population had at least a secondary level of education and illiteracy was more frequent in females.

Smoking and alcohol consumption were more frequent among males than females. Table 1 provides the characteristics of the study subjects.

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Table 1. Characteristics of the study population overall and segregated by gender.

n is the absolute number (%) indicate the proportion in the general population or among male/female population. https://doi.org/10.1371/journal.pone.0218052.t001

Previous diagnosis of hypertension and DM was reported by 18% and 1% of the study subjects respectively. As regards BMI class distribution, 40% of the patients were underweight (more men than women) while 13% were overweight or obese (more women than men).

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Among 7,205 TB patients enrolled, 6,954 had valid documented blood pressure record. Of these 1,352 (19·4%) had uncontrolled blood pressure, more women (23%) compared to men (16%). In multivariate logistic regression analysis hypertension was associated with age, BMI and ethnic group. (Table 2)

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 Table 2. Factors associated with the probability of having uncontrolled blood pressure.

 Odds Ratios estimated by logistic regression analysis.

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Four-hundred-thirty-one TB patients satisfied at least one of the criteria for DM; of these 14% were known cases of DM and 86% were newly diagnosed on testing. The crude prevalence rate for DM was 6%, slightly higher in males ($6\cdot3\%$) than females ($5\cdot7\%$). When DM prevalence was age-standardized (WHO 2011 criteria), it reached 8%.

368 (85%) patients were diagnosed based on raised fasting plasma glucose, 23 patients resulted to have random blood sugar \geq 200 and only 61 patients with DM were previously diagnosed for the disease (<u>Table 3</u>).

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Table 3. Prevalence of previous diagnosis of DM, FBS, RBS. https://doi.org/10.1371/journal.pone.0218052.t003

Impaired fasting glucose (IFG) was detected in 414 patients (7%). Thus almost 12% of the study population had dysglycaemia.

The prevalence of diabetes increased with age and lower literacy. Minor variations were found based on ethnicity, with Kimbundu and Makongo ethnic groups displaying a higher prevalence. A slightly higher prevalence of DM was seen among TB patients who smoked.

The prevalence of DM was two-times higher among subjects with uncontrolled hypertension, and was significantly higher in overweight or obese subjects (Table 4).

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 Table 4. Prevalence of DM by main study variables.

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In multivariate logistic regression analysis DM prevalence was higher in males than females and increased with increasing age and BMI (<u>Table 5</u>).

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Table 5. Factors associated with the probability of having DM.Odds Ratios estimated by logistic regression analysis.https://doi.org/10.1371/journal.pone.0218052.t005

Discussion

The aim of the project was to explore the feasibility of integrating screening activities for uncontrolled hypertension and diabetes mellitus within routine TB activities rolled out by the NTP and to better understand what is the burden of the two conditions among newly diagnosed TB patients in an urban population of Luanda, the capital of Angola.

The crude prevalence of DM among TB patients observed in the selected DOTS centres in Luanda was 6·3% for males and 5·7% for females, and the age-standardized prevalence was 8%. The International Diabetes Federation [20] estimates a prevalence of 3·2% in the general Angolan population, however further national data report figures ranging from 2·8%-3·3% [21] to 5·9% [22,23]. The difference in terms of population tested and the wide range of prevalence data, make the understanding of the actual burden very difficult. Despite this uncertainty, our findings suggest that TB population could have a higher risk of DM compared to that of the general (Non-TB) population as reported from other developing countries both in Africa [24,25] and other parts of the world. [26–28] Only 1% of the newly diagnosed TB population had previously known DM, underlining the importance and utility of integrating screening for diabetes in patients with TB. Patients with TB and DM tended to be older and had a higher BMI, which is in line with what is already known.

In addition 414 patients had impaired fasting glucose, which is associated with impaired suppression of hepatic glucose output and impaired insulin secretion and is considered a precursor for diabetes (a pre-diabetes stage), suggesting a high risk for future DM in this population.

Almost one in five (19·4%) of the newly diagnosed TB patients also had uncontrolled hypertension. The prevalence rose to one in three (33%) in TB patients with co-morbid DM. The prevalence of hypertension among newly diagnosed TB patients in our study is similar to that reported by Pires et al. in a community-based survey also in an urban setting in Dande in northern Angola. [29] They

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reported a 23% prevalence of hypertension and, as in our data, HTN seemed to be significantly associated to age and BMI and inversely associated with the level of education. Other studies have reported a much higher rate of hypertension in the general population in Angola. Paquissi et al. reported hypertension prevalence of 38.5% in patients attending the outpatient clinic of the general hospital of Huambo [30]. In this study hypertension was significantly associated with age and female gender. Evaristo-Neto carried out a cross-sectional study in a rural community in Bengo found 38.7% prevalence of hypertension in this community [21]. Lastly, Capingana et al. detected a hypertension prevalence of 45% of among public workers in Luanda. [23] All these data confirm the generally high burden of hypertension in the general population of Angola. Our data does not suggest any linkage between TB and higher prevalence of hypertension per se other than through the linkage of DM and hypertension.

The project underwent through several implementation challenges that should be taken into consideration in case a scale up is planned. To our knowledge, this was the first experience of integration of the two services within the country. Therefore, no national guidelines or protocols are available for the integrated diagnosis and management of the two diseases. This could be overcome through the creation of a functional TB/DM working group at national level to develop clear strategies and structure a common training of TB and DM healthcare workers. Integration of the two services could be further exploited to improve the follow up of DM patients which resulted very difficult both for the lack of human resources dedicated to the recall of the patients but also for the lack of free services and for the national stock out of medication both for TB and DM.

Finally, data collection system and data quality should be strengthened, the creation of a common framework of key performance indicators could be helpful to achieve these objectives.

Our study had a few limitations. Despite the substantial size of the study sample, we cannot consider our data fully representative of the general population of Angola. DOTs centres involved in the project are located in urban areas, therefore rural population was excluded. Only TB patients referred to DOTs center were invited to the screening, so TB patients not referred to health services are not represented. Our population only included TB patients, we did not study a control population without TB so our data does not allow direct comparison of DM and hypertension prevalence between TB and non-TB patients. We used glucometers to measure blood glucose and this certainly is not the most appropriate way to diagnose DM and blood glucose measurement was only done once. This approach was adopted because this is perhaps the only feasible way in low-resource settings and has been used in other studies in the developing world. However, to our knowledge, this is the first analysis of the TB-NCD co morbidity ever made in Angola.

Although further evidence needs to be generated, our study shows the considerable high burden of comorbidity of TB, DM and hypertension in an urban setting in Angola. This double-burden (infectious and non-communicable diseases) represents a huge public health challenge which requires more research to better understand the association between TB and NCDs and to develop a model of care that includes primary prevention and health education activities and is able to provide integrated health-services for both communicable and non communicable health conditions. Our pilot project demonstrates that integration of TB program and

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NCDs activities for the detection of DM and hypertension is feasible and confirms the need of further strengthening the implementation of policies, guidelines and monitoring and ensuring availability of medicines, basic technologies and procedures in the public health sector to address the double burden of TB and DM as advocated in the Bali Declaration. [31]

Supporting information

S1 File. Survey questionnaire English.

https://doi.org/10.1371/journal.pone.0218052.s001 (DOC)

<u>S2 File.</u> Survey questionnaire Portuguese. <u>https://doi.org/10.1371/journal.pone.0218052.s002</u> (DOC)

S3 File. Anonymized data set.

<u>https://doi.org/10.1371/journal.pone.0218052.s003</u> (XLSX)

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Giant encephalocele: successful management in limited-resource settings

PAPER

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Authors

Antunes M., Pizzol D., Calgaro S., Di Gennaro., Colangelo A.C.

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Case report

GIANT ENCEPHALOCELE: SUCCESSFUL MANAGEMENT IN LIMITED-RESOURCE SETTINGS.

Mario Antunes¹, Damiano Pizzol², Serena Calgaro^{2,3}, Francesco Di Gennaro^{2,4}, Anna Claudia Colangelo^{2,5}

1. Department of Surgery, Central Hospital of Beira, Beira, Mozambique

2. Operational Research Unit, Doctors with Africa Cuamm, Mozambique

3. Department of Woman's and Child's Health, University of Padova, Padova, Italy

4. Clinic of Infectious Diseases, University of Bari, Bari Italy.

5. Department of Surgery and Organ Transplantation, University of Padua, Padua, Italy

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ABSTRACT

Article history: Received 16 July 2019 Revised 03 September 2019 Accepted 18 September 2019 Encephalocele is a rarely occurring cranial congenital malformation characterized by the formation of a sac in the cranial vault and herniation of the intracranial structures, at a rate of 0.8–5 per 10,000 live births worldwide. Large size encephaloceles, especially in limited-resource settings, present several preoperative, surgical, and postoperative challenges. We report the case of a newborn presenting giant parietal encephalocele who underwent a successful surgical intervention in a limited-resource setting.

Keywords:

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Encephalocele, congenital malformations, low-income countries.

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1. Introduction

Encephalocele is a cranial congenital malformation characterized by the formation of a sac in the cranial vault and herniation of the intracranial structures including meninges, cerebrospinal fluid, some parts of cerebral lobes, cerebellum, and brain stem [1-3]. Encephaloceles occur rarely, at a rate of 0.8–5 per 10,000 live births worldwide and constitute 8% to 19% of all craniospinal dysraphisms and about 15.6% of them are giant in size [2-3]. Several conditions have been described as potential risk factors: embryogenesis defects, viral infections, hyperthermia, irradiation, hypervitaminosis, and use of salicylates in early pregnancy [3-4]. Cesarean section is an absolute indication for giant encephaloceles in order to decrease mother and newborn complications⁴. Moreover, especially large size encephaloceles present several preoperative, surgical, and postoperative challenges. In limited-resource settings, the lack of specialized healthcare workers and adequate equipment. [5-6]

These cases are even more complicated when they happen in Africa, especially in Mozambique, one of the poorest countries in the world [5]. We report the case of a newborn presenting giant parietal encephalocele who underwent a successful surgical intervention in a limited-resource setting.

Corresponding author: Damiano Pizzol, *d.pizzol@cuamm.org* DOI: 10.3269/1970-5492.2019.14.26 All rights reserved. ISSN: 2279-7165 - Available on-line at www.embi.org

2. Case presentation, management and outcome

A 1-day-old female born at term was transferred from a peripheral health center to the Beira Central Hospital due to a significant parietal encephalocele (Figure 1 A). The child was the second-born by vaginal delivery and weighed 2.4 kg. The mother was a 20-year-old healthy individual, HIV negative with no known history of drug or alcohol consumption. The mother did not attend any prenatal visits. The patient underwent surgery on the 10th day of life. A transverse incision was given over the parietal mass, the gliotic, dysplastic tissue within the encephalocele was excised and the skin was closed. The post-surgical course was regular, and the 3-day follow-up showed a clean scar (Figure 1 B and C) and no sequela. She was discharged on the fourth day and never came back for further follow-up. Written informed consent was obtained from the parents of the child for publication of this case report and any accompanying images.



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Figure 1. Giant encephalocele at presentation (A) and 3 days after surgery (B and C).

3. Discussion

Encephaloceles, specifically those of larger sizes, present many challenges that should be addressed starting from the prenatal period with information and education of parents [3-6]. In our case, the mother never attended prenatal visits and she delivered in a peripheral health center without possibility to predict the malformation. Thus, the baby was born by vaginal delivery although cesarean section is an absolute indication in these cases. Moreover, the management of encephaloceles should involve a multidisciplinary team including radiologist, neurosurgeon, pediatrician, and anesthesiologist [7-9]. However, in limited-resource settings it is almost never possible due to the lack of specialists, drugs and equipment, A crucial preoperative examination is the magnetic resonance imaging (MRI) that provides useful information to plan the surgery and to assess the prognosis. [10] Since MRI is not available in our hospital, the baby underwent surgery without any of such information. Preoperatively, preparation for significant blood loss should be made because of potential bleeding from the suboccipital bone and the dural sinus. The ultimate prognosis, however, depends on various factors [11].

In general, children with encephalocele cause concern not only for respiratory difficulties, but also for possible associated congenital malformations, hydrocephalus, large size of sac, and hemodynamic disturbances [12]. Moreover, healthcare workers should consider other factors such as cosmetic issues, skin excoriation, risk of rupture, meningitis, size and necrosis of the sac, presence of torcula or sinus, presence of vascular formations and neurological status [13-14]. Unfortunately, considering the restricted conditions, we couldn't address all these issues and our aim was mainly to remove the sac, possibly without complications including meningitis, sepsis and neurologic sequela. We followed-up on the child for only three days, and in this short period we didn't observe infections, hypo- or hyperthermia and electrolyte disturbance. The histopathological examination, generally useful to reveal the sac content, was not performed because regardless of the results, nothing would have changed in the clinical practice for this context. Clearly, although we were satisfied by the surgical procedure, great concern remains for the prognosis. In fact, despite the surgery, prognosis is generally poor with an extremely high risk of mortality and morbidities including mental and motor disability.

This risk is much higher in limited-resource setting because, as in our case, a long-lasting follow-up is very difficult due to economic and distance barriers. In addition, such conditions represent a significant social barrier especially in rural areas where traditional healers and superstitions play a key role in the society. Therefore, it is mandatory to strengthen the health system in terms of healthcare workers' ability, networking and equipment and to reduce the gap between traditional and conventional medicine.

This report presents not only a rare case of Giant encephalocele successfully managed, useful for healthcare professionals in low-income countries facing similar situations, but it can also improve scientific discussion and movement in low-income countries, especially in Mozambique [15-20].

Recently in Mozambique, applied research with limited resources has provided the opportunity to develop scientific methods and to share experiences improving people's health [21]. For this reason, we would like to underline how case reports might help as a form of an experience sharing platform, especially for healthcare professionals in low-income countries, playing an important role in solving complex and uncommon clinical cases.

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Diabetes Mellitus in Elderly

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Papers





Diabetes Mellitus in Elderly

Damiano Pizzol, Doctors with Africa CUAMM, Beira, Mozambique

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Glossary

Diabetes mellitus (DM) is a chronic metabolic disease characterized by hyperglycemia and high glycated hemoglobin with or without glycosuria.

Elderly Is a heterogeneous group with different physiological profiles and varying functional capabilities and life expectancy.

Introduction

Diabetes mellitus (DM) is a growing problem worldwide, defined as a chronic metabolic disease characterized by hyperglycemia and high glycated hemoglobin with or without glycosuria (Chentli et al., 2015). World Health Organization (WHO) estimated that 422 million adults were living with diabetes in 2014 in the world, compared to 108 million in 1980 (WHO, 2016). Interestingly, the global prevalence (age-standardized) of diabetes has nearly doubled since 1980, rising from 4.7% to 8.5% in the adult population (WHO, 2016). Growing evidence highlights that age and age at diagnosis have varying effects on the risk of vascular complications leading to damage and failure of various organs as heart, blood vessels, eyes, kidneys, and nervous system (Zoungas et al., 2014; Maggi and Veronese, 2018). There is no general consensus about the definition of "elderly" that include different physiological profiles and varying functional capabilities and life expectancy. From a "diabetic" point of view, the International Diabetes Federations (IDF) divided elderly people into three categories: (1) characterized by people who are living independently and, although diabetes may be the main medical problem, this category includes those who have other medical co-morbidities which may influence diabetes care; (2) this category represents those individuals who, due to loss of function, have impairments of activities of daily living such as bathing, dressing, or personal care. This group includes a range of functionally dependent older people with diabetes; (3) finally, the subjects characterized by a significant medical illness or malignancy that have a life expectancy reduced to <1 year. Although in this last category DM does not represent the priority, it remains important to manage symptoms, comfort, and quality of life (Dunning et al., 2014). Thus, if on one hand DM is highly prevalent among the elderly due to important and specific factors, including the association of co-morbidities and geriatric syndromes, use of many medications, the presence of dependencies and frailty, on the other hand, the possibility of treatment has been shown to be as effective in the elderly as in younger patients. The aim of our study is to summarize the state of art of the scientific literature on the DM in elderly with specific focus on epidemiology, pathophysiology, complications, prevention, treatment and future perspective.



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- 1. Adile Biagio, Unit of Urogynecology, Villa Sofi a Cervello Hospital, Palermo, Italy
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- 4. Akec Gabriel, Yirol Hospital, South Sudan
- 5. Alfvén Tobias, Karolinska Institutet, Stockholm, Sweden
- 6. Amandi Simon, District Health Office, Oyam District, Uganda
- 7. Antunes Mario, Department of Surgery, Central Hospital of Beira, Mozambique
- 8. Artuso Serena, Department of Neurosciences, University of Padova, Italy
- 9. Atiba Kebbie, Department for Woman and Child Health, Pujehun Hospital, Sierra Leone
- 10. Atzori Andrea, Doctors with Africa Cuamm
- 11. Azzimonti Gaetano, Doctors with Africa Cuamm
- 12. Bavaro Davide Fiore, Clinic of Infectious Diseases, University of Bari "Aldo Moro," Bari, Italy
- 13. Betran Ana Pilar, UNDP/UNFPA/UNICEF/ WHO/World Bank Special Programme of Research, Geneva, Switzerland
- 14. Blennow Mats, Department of Neonatal Medicine, Karolinska University Hospital, Sweden
- 15. Bobbio Flavio, Doctors with Africa Cuamm
- 16. Bome David, Ministry of Health and Sanitation, Freetown, Sierra Leone
- 17. Borghero Angela, Doctors with Africa Cuamm
- 18. Bortolani Arianna, Doctors with Africa Cuamm
- 19. Boscardin Chiara, Department of Woman and Child Health, University of Padua, Italy
- 20. Bourdel-Marchasson Isabelle, CNRS, University of Bordeaux, France
- 21. Bregani Enrico Rino, Medicina Generale, Emostasi e Trombosi, Fondazione IRCCS Ca' Granda Ospedale Maggiore Policlinico, Milano, Italy
- 22. Brindicci Gaetano, Clinic of Infectious Diseases, University of Bari "Aldo Moro," Bari, Italy
- 23. Byamugisha Josaphat, Department of Obstetrics and Gynaecology, Makerere University, Uganda
- 24. Calgaro Serena, Department of Woman and Child Health, Padova, Italy
- 25. Camara Bienvenu Salim, National Centre for Training and Research in Rural Health of Maferinyah, Guinea
- 26. Cavallin Francesco, Indipendent Statistician, Italy
- 27. Cebola Bonifácio Rodrigues, Beira Central Hospital, Mozambique
- 28. Chhaganlal Kajal, Faculty of Health Science, University of Beira, Mozambique
- 29. Cleide Jose Maria, Central Hospital of Beira, Mozambique

- Cola Edoardo, Department of Obstretics and Gynecology, Universita Cattolica del Sacro Cuore, Roma, Italy
- Colangelo Anna Claudia, Department of Surgery and Organ Transplantation, University of Padua, Italy
- Conti Matilde, Medicina di Emergenza e Urgenza, Università degli Studi di Milano-Bicocca
- Damazo T. Kadengye, African Population and Health Research Center (APHRC), Nairobi, Kenya
- 34. Deganello Davide, Department of Neurosciences, Ophthalmology Unit, University of Padova, Italy
- De Luca Giuseppe Massimiliano, Società Polispecialistica Italiana Giovani Chirurghi – SPIGC
- 36. de Susa Joseth Rita, Ministry of Health, Luanda, Angola
- 37. De Vivo Emanuela, Doctors with Africa Cuamm
- 38. Demurtas Jacopo, Azienda USL Toscana Sud Est, Grosseto, Italy
- 39. Di Gennaro Francesco, Infectious Diseases, University of Bari, Italy
- 40. Ersdal Hege, Faculty of Health Sciences, University of Stavanger, Norway
- 41. Facchin Paola, Department of Woman and Child Health, University of Padua, Italy.
- 42. Fagotti Anna, Catholic University of the Sacred Heart, Rome, Italy
- 43. Fantini Maria Pia, Department of Biomedical and Neuromotor Sciences, University of Bologna, Italy
- 44. Fattorini Mattia, Department of Molecular and Developmental Medicine, University of Siena, Italy
- 45. Fedeli Ugo, Epidemiological Department (SER), Azienda Zero, Padova, Italy
- 46. Finos Livio, Department of Developmental Psychology and Socialisation, University of Padua, Italy
- 47. Frasson Giuliana, Department of Neurosciences, University of Padova, Italy
- 48. Guaitoli Eleonora, Società Polispecialistica Italiana Giovani Chirurghi - SPIGC
- 49. Jacob Louis, Faculty of Medicine, University of Versailles Saint-Quentin-en-Yvelines, France
- 50. Jones Susan, Department of Nursing and Midwifery, School of Human and Health Sciences, University of Huddersfield, London, UK
- 51. Kapur Anil, World Diabetes Foundation, Bagsvaerd, Denmark
- 52. Kok John, Yirol Hospital, South Sudan
- 53. Koyanagi Ai, Research and Development Unit, Parc Sanitari Sant Joan de De'u, Universitat de Barcelona, Spain
- 54. Isaakidis Petros, Médicins Sans Frontières
- 55. Izudi Jonathan, Department of Community Health, Faculty of Medicine, Mbarara, Uganda

- 56. Lattanzio Rossana, Clinic of Infectious Diseases, University of Bari "Aldo Moro," Bari, Italy
- 57. Lazzerini Marzia, WHO Collaborating Centre, Institute for Maternal and Child Health IRCCS Burlo Garofolo, Trieste, Italy
- 58. Llapur Figueredo Ramon, Department of Legal Medicine, Beira Central Hospital, Mozambique
- 59. Lochoro Peter, Doctors with Africa Cuamm
- 60. Lubulwa Clare, Mulago National Referral Hospital, Uganda
- 61. Lunardi Marta, Doctors with Africa Cuamm
- 62. Macome Augusto Cesar, Quelimane Central Hospital, Mozambique
- 63. Maggi Stefania, National Research Council, Padova, Italy
- 64. Manenti Fabio, Doctors with Africa Cuamm
- 65. Marotta Claudia, Department of Sciences for Health Promotion and Mother to Child Care, University of Palermo, Italy
- 66. Maziku Donald, Doctors with Africa Cuamm
- 67. Mazive Samito Anselmo, Department of Legal Medicine, Beira Central Hospital, Mozambique Mazzucco Walter, Department of Sciences for Health Promotion and Mother to Child Care, University of Palermo, Italy
- 68. McCoy Sandra I., Centre for Effective Global Action, University of California, Berkeley, USA
- 69. Menegazzo Francesca, Department of Woman and Child Health, University of Padua, Italy
- Messina Gabriele, Department of Molecular and Developmental Medicine, University of Siena, Italy
- 71. Mkolomi Rosalia, Tosamaganga Hospital, Tanzania
- 72. Mosca Davide, Realizing Health SDGs for Migrants, Displaced, and Communities, Italy
- 73. Muyinda Richard, Doctors with Africa Cuamm
- 74. Myrnerts Höök Susanna, Sachs' Children and Youth Hospital, Sweden
- 75. Namburete Evangelina Inacio, Central Hospital of Beira, Mozambique
- 76. Nankunda Jolly, Department of Paediatrics and Child Health, College of Health Sciences, Nannini Maria, School of Economics and Development, University of Florence, Italy
- 77. Massavon William, Doctors with Africa Cuamm
- 78. Monno Laura, Infectious Diseases, University of Bari, Italy
- 79. Norbis Luca, Ospedale San Raffaele, Milano, Italy
- 80. Nsuka Joseph, DAT TB Dispensary, Luanda, Angola
- 81. Olliaro Piero, Centre for Tropical Medicine and Global Health, University of Oxford, UK

- 82. Orech John Bosco, District Health Office, Oyam District, Uganda
- 83. Otchirov Serguei, Department of Surgery, Central Hospital of Beira, Mozambique
- 84. Parente Paolo, Department of Public Health, Università Cattolica del Sacro Cuore di Roma, Italy
- 85. Pejovic Nicolas J., Centre for International Health, University of Bergen, Norway
- Petrovic Mirko, Department of Internal Medicine and Paediatrics, Ghent University, Belgium
- 87. Pisani Vincenzo, Department for Woman and Child Health, Pujehun Hospital, Sierra Leone
- Pizzol Damiano, Doctors with Africa Cuamm
 Putoto Giovanni. Doctors with Africa
- Cuamm
- 90. Quaglio Gianluca, European Parliamnetary Research Services, Brussels, Belgium
- 91. Quercioli Cecilia, Healthcare Management, Campostaggia Hospital, Siena, Italy
- 92. Raguzzoni Gloria, Department of Biomedical and Neuromotor Sciences, University of Bologna
- 93. Robbiati Claudia, Doctors with Africa Cuamm
- 94. Salmaso Laura, Department of Woman and Child Health, University of Padua, Italy

- 95. Saracino Annalisa, Infectious Diseases, University of Bari, Italy
- 96. Schiavone Marcella, Department of Emergency and Organ Transplantation, University of Bari, Italy.
- 97. Segafredo Giulia, Doctors with Africa Cuamm
- 98. Sesay Santigie, Ministry of Health and Sanitation, Freetown, Sierra Leone
- 99. Sieber Cornel, Institute for Biomedicine of Ageing (IBA), Friedrich-Alexander-Universität Erlangen-Nürnberg, Germany
- 100. Sinclair Alan, Diabetes Frail Ltd and King's College, London, UK
- 101. Smith Lee, The Cambridge Centre for Sport and Exercise Sciences, Anglia Ruskin University, Cambridge, UK
- 102. Starforth Lenny, Department of Urology, Central Hospital of Maputo, Mozambique
- 103. Stubbs Brendon, Department of Psychological Medicine, Institute of Psychiatry, Psychology and Neuroscience, King's College London, United Kingdom
- 104. Torelli Giovanni F., Doctors with Africa Cuamm
- 105. Trevisanuto Daniele, Department of Woman and Child Health, Padova, Italy
- 106. Tylleskär Thorkild, Centre for Intervention

Science in Maternal and Child Health, University of Bergen, Norway

- 107. Valcarenghi Caterina, Anestesia, Rianimazione, Terapia Intensiva e del Dolore, Università degli Studi di Milano, Italy
- 108. Vaz Igor, Department of Urology, Central Hospital of Maputo, Mozambique
- 109. Veronese Nicola, National Research Council, Padova, Italy
- Wamani Henry, Department of Community Health and Behavioural Sciences, School of Public Health, Makerere University, Uganda
- 111. Wanzira Humphrey, WHO Collaborating Centre, Institute for Maternal and Child Health IRCCS Burlo Garofolo, Trieste, Italy
- 112. Wilunda Calistus, Maternal and Child Wellbeing Unit, African Population and Health Research Center, Nairobi, Kenya
- 113. Zainab Bangura, Department for Woman and Child Health, Pujehun Hospital, Sierra Leone
- 114. Zambon Mattia, Department of Surgery and Organ Transplantation, University of. Padua, Italy
- 115. Zangrando Mario, Doctors with Africa Cuamm

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