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OTTO KRANENDONK
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“Otto the Great”

A little support can mean a lot. This is what Prof. Otto Kranendonk (professor in tropical health sciences at the University of Amsterdam, and director of the Department of Tropical Hygiene at the Royal Tropical Institute) intended in 1994 when he established a fund to help researchers to conduct small-scale studies in the area of global health. Initially the fund did not carry his name, as he was too modest for that. Years after his death, the original name “Stichting Erefonds” was renamed the Otto Kranendonk Fund (OKF) to honour its first and only benefactor. Over the past 30 years, a variable number of initiatives could be funded each year, usually only a few, sometimes none, and last year even a handful, all depending on the investment returns of that year. Three decades of OKF-funded scientific studies are reason enough to devote a special edition of *MTb* to the research and researchers funded by an OKF grant.

Any member of the Dutch Society for Tropical Medicine and International Health (NVTG) is eligible to apply for an OKF grant, but usually the fund is approached by relatively young new researchers full of ambitions to dive into a new area of research in some tropical country that has stolen their heart. Four personal stories in this edition perfectly illustrate the typical four pillars of OKF-funded projects: field explorations, add-ons to ongoing studies, pilots, and emergency situations.

In a lively account of a day of fieldwork, Jacob van der Ende describes the challenges of assessing the presence of malaria and other infectious diseases in a rarely explored and difficult to access area of the Amazon: “I’m still shaky because of the boat trip.” Marlous Grijzen used OKF funding to add an important component to a large leprosy trial in Eastern Indonesia, namely the perspective of those suffering from leprosy. Jonathan Vas Nunes provides an excellent example of an OKF-funded pilot study that became a stepping stone towards a much larger study about wound care in Sierra

Leone. Finally, Marieke Lagro describes how she worked in Zambia as a tropical doctor and was able to use OKF funding to investigate, together with local nurses the sudden large influx of women with postpartum health problems.

The other contributions to this special edition have all been submitted by researchers who received OKF support at some time during their career, usually in the early stages. These accounts provide just a snippet of the plethora of subjects linked to OKF. Over the past 30 years, OKF has supported research initiatives involving various communicable and noncommunicable diseases in nearly every low- and middle-income country. The overarching ambition of so many researchers supported by OKF has been to improve the conditions of those that need it most. However small each individual step may have been, together, they make it a movement of significance.

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“It started as a small implementation research....” The Otto Kranendonk Fund in perspective

Thirty years of financial support from the OKF resulted in 37 studies, with a number of them still ongoing. Over the years, the study objects diversified. In the early years, a majority related to health challenges in the domain of infectious diseases (tuberculosis, malaria) and sexual and reproductive health and rights (SRHR). In recent years, the scope has widened to include health systems research and studies in the areas of child health, mental health, non-communicable diseases and surgery, among others. The study designs varied from small implementation and pilot studies to larger scale prospective cohort studies, as well as studies testing or validating protocols or diagnostic tools – depending on the academic / professional profile of the researcher, the local context, or specifics of the research questions.

Table 1 gives an overview of the studies support by the Fund. In addition, we asked researchers who received financial support from OKF:

1. What the Fund had meant to them personally;
2. What the impact or result of their research was at the local level for the target population and or field of global health / tropical medicine;
3. Whether in hindsight there was anything they would have done differently (also in light of the current debate on decolonising global health).

In quite a number of studies, the ‘OKF research’ was the actual starting point for or became part of an already ongoing PhD research trajectory. Six researchers obtained a PhD in the years following the grant, and seven researchers are

currently engaged in a PhD trajectory. One respondent underlined the pivotal role of the OKF support in the start-up of a PhD research as follows: *“The possibility to have some support of the research which enabled me to form a PhD out of it. It meant also feeling worth funding, with little other funding opportunities. Coming from a low income in a low resource setting, this meant the world for me.”*

Often curiosity drove the researchers to further investigate or systematise their observations in the health facility where they worked. In some cases, an actual lack of data inspired the research, as was the case for the researcher in the Amazon region: *“Tierra incognita, that is the best way to describe the area where*

we are implementing a study financed by OKF. Putumayo is a desolate region in the Amazon rainforest which is almost completely undescribed in any scientific paper. Malaria, dengue, and a host of other tropical infectious diseases are endemic. But how prevalent exactly, and which species, nobody knows. The only way to find out and to spread the truth is through a decent scientific study.”

Often the research project opened doors to strengthen partnerships and offer opportunities to engage national colleagues in doing research, as is described in the following statement: *“I received the grant together with a dear colleague of mine in a LMIC. For her, it was a chance to start a very nice project. For*



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us together, it was a great opportunity to continue our collaboration. For my part, I believe we will get data and information from this research that will have an impact on healthcare in Indonesia.”

The study in Senegal was set up to test an intervention at the facility level that may have nation-wide consequences. *“The study aims to identify health facility opportunities to implement the MAMI Care Pathway in Senegal. We use a primary health facility cross-sectional survey to assess current detection and care for nutrition and growth in infants from 0 to 6 months in Senegal. We also use interviews and focus group discussions with stakeholders to assess feasibility of the MAMI Care Pathway in the context of Senegal. We expect that results of this study will inform health workers and policy makers of opportunities for better care for growth infant failure in Senegal and beyond.”*

We asked OKF recipients about the impact of their research, be it at the local level for the target population, or for the wider field of global health and tropical medicine. One of the research projects led to a series of further studies on wound care, to a better and cleaner wound clinic, and also provided an excellent introduction to medical research for most of the staff at the facility. In another case, the research helped to get rid of misconceptions regarding specific health practices: *“The impact was that more vacuum extractions were done instead of second stage caesarean sections. With a follow up of 6 months, we were able to show that vacuum extraction is safe for mother and baby in the setting where the research was done. This was important because one of the reasons for not doing vacuum extraction was the misconception that vacuum extraction was not safe”.*

In another case, the results were shared at the policy level with the Ministry of Health, and may have a wider outreach as well, as it is anticipated that the results of the study support the implementation of the new WHO guideline for malnutrition in the country. In another project, the researcher saw that during the participatory research *“collaboration and care in maternity care was enhanced. The number of births with a skilled attendant increased.”*

Whether in hindsight they would do things differently – looking at the current debate on decolonising global health for example – one of the respondents indicated that local involvement could have been enhanced, more specifically in involving local health care workers in the development of the articles, even though they were very busy. Another researcher also mentioned missed opportunities to engage colleagues, though the researcher attributes this to limited funding. One of the respondents describes the partnership as a Dutch/Ugandan co-creation: *“The research was performed by a team consisting of a few Dutch professionals and more Ugandan professionals. Publications had at least 50% of Ugandan authors, including the last author. The co-supervisor of the PhD was Ugandan.”*

Another respondent would be happy to see things evolving into more equal partnerships: *“Research in a low-resource setting is sometimes challenging. In hindsight, I would have done many things differently. Our project was part of the launch of the Masanga Medical Research Unit (MMRU). The MMRU aims to allow Sierra Leonean (SL) medical professionals to perform medical research. We worked with many SL lab technicians, wound dressers and nurses, but I wasn’t able to find an SL doctor as research buddy. Luckily, this is slowly changing, as the MMRU now has its first SL PhD-student!”*

Relatively small investments can go a long way, considering the output of the OKF over the past decades. Besides strengthening the research skills of young health professionals and, in some instances, also of their colleagues in the field, the opportunities provided by the Fund helped in searching for solutions to many of the health problems people in low-resource settings are facing on a daily basis.



**Esther Jurgens
Klaas Binnendijk**

The Otto Kranendonk Fund

In 1994, the NVTG established the ‘Honorary Fund Tropical Medicine’ (also called the ‘Stimulation Fund’) to provide small-scale funds to global health practitioners with an interest in global health, including tropical medicine. In 2011, the Fund was renamed to its current name in honour of its sole benefactor, Prof. dr. Otto Kranendonk, an extraordinary professor in tropical health sciences at the University of Amsterdam, and director of the Department of Tropical Hygiene at the Royal Tropical Institute. He left behind a legacy that was invested in shares on the stock market, with the idea that the annual profit from this investment (the dividend) would be used to support small-scale research projects in LMIC countries. Over the past 40 years, quite a number of research projects have been funded, in some years more than others, depending on fluctuations in the stock market.

The purpose of the OKF was, and still is, to stimulate scientific research and knowledge transfer in the area of global health (including tropical medicine) by members of the Netherlands Society for Tropical Medicine and International Health (NVTG). The fund provides grants to studies in line with sustainable development goal 3 (“ensuring healthy lives and promoting well-being for all at all ages”), with a specific focus on low- and middle-income countries (LMICs) or low-resource settings.

For more information see: <https://www.nvtg.org/wat-we-doen/otto-kranendonkfonds>



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Table 1. Overview of OKF researches 1998 – 2022

OKF call	Name applicant (+ year PhD)	Research title
1998	Patrick van Rheenen (PhD in 2007)	The use of paediatric tuberculosis scorecard in an HIV-endemic area in Zambia
2001	Marjan Hoexum	Maternal mortality, Nicaragua
2001	Marieke Lagro	Postnatal follow-up and problems in the postpartum period, Zambia See the article in this edition of <i>MTb</i> .
2002	Peter Petit and Patricia Buijtel	Tuberculosis research in Zambia
2003	Marita Nijenhuis	Chloroquine efficacy in pregnant women in a rural area in Zambia where HIV prevalence is high
2003	Jeroen van Dillen (PhD in 2009)	Therapeutic efficacy of chloroquine and sulfadoxine-pyrimethamine in Onandjokwe Hospital, Northern Namibia & Malaria diagnosis using automated detection of malaria pigment in Northern Namibia
2003	Patrick van Rheenen (PhD in 2007)	Delayed cord clamping as an intervention to reduce infant anaemia in a malarious area in Zambia
2004	Eveline Geubbels (PhD in 2002)	Epidemiology of common diseases in Malawi (research on epidemiology of HIV/AIDS in adults and maternal mortality in Malawi)
2008	Heleen van Beekhuizen (PhD in 2012)	Treatment of retained placenta with misoprostol: a double blind randomised placebo-controlled study
2010	Ed Zijlstra (PhD in 1995)	Survey of the management and complications of diabetes mellitus in Malawi
2011	Yadira Roggeveen (PhD in 2021)	Innovative partnerships for safe motherhood: participation and trans-disciplinary collaboration as tools towards increasing skilled birth attendance
2011	Remco Peters (PhD in 2007)	Epidemiology of chlamydia and gonorrhoea in women in Mopani District, South Africa
2013	Reinou Groen (PhD in 2013)	Traumatic injuries in Sierra Leone See also the article in this edition of <i>MTb</i> .
2013	Sybrich Tiemersma	Delayed cord clamping in South Africa
2014	Floris Braat	Maternity Waiting Home to improve maternal and neonatal outcome in the Gurage Zone, Southern Ethiopia (Butajira General Hospital)
2014	Barbara Nolens (PhD in 2019)	Outcomes of vacuum extraction at Mulago Hospital, Uganda. See the article in this edition of <i>MTb</i> .
2016	Jonathan Vas Nunes (PhD candidate)	Wounds in Sierra Leone; a knowledge, attitude and practice study See the article in this edition of <i>MTb</i> .
2016	Hanna Mathéron (PhD candidate)	Prevalence and pathogen identification of peripartum infections in Sierra Leone
2017	Thom Hendriks (PhD in 2021)	Evaluation of a quality assured in-service training in surgical treatments for burns At Haydom Lutheran Hospital
2017	Natasha Housseine (PhD in 2020)	The development of a simple decision-making tool for optimal allocation of intra-partum care in low-income countries
2017	Alinda Vos (PhD in 2019)	Unmasking a silent killer: diabetes care in HIV-patients in a rural medical clinic in South Africa
2018	Elena Ambrosino (PhD in 2007)	Urogenital infections and pregnancy in Pemba Island (Zanzibar, Tanzania)
2018	Benjamin Visser (PhD in 2017)	A pragmatic approach to treat podoconiosis in Ethiopia
2019	Dickens Onyango (PhD in 2023)	Validity of urine dipstick for routine assessment of adherence to isoniazid preventive therapy among children living with HIV in western Kenya See the article in this edition of <i>MTb</i> .

Table 1. Overview of OKF researches 1998 – 2022

OKF call	Name applicant (+ year PhD)	Research title
2019	Anneloes Eleveld (PhD candidate)	Evaluation of access to care, incidence and outcome of treatment of patients with fractures of the lower extremities in Haydom Lutheran Hospital, Tanzania
2021	Tabitha van Immerzeel (PhD candidate)	Improving the case definition of small and nutritionally at-risk infants under six months of age and their mothers in Senegal See the article in this edition of <i>MTb</i> .
2021	Jacob van der Ende (PhD candidate)	Prevalence and attributable malaria case proportion of <i>P. vivax</i> in the Amazon basin in the border area between Ecuador, Colombia and Peru See the article in this edition of <i>MTb</i> .
2021	Fleur Gooren (PhD candidate)	Improving intrapartum foetal monitoring and clinical decision-making in Sengerema Hospital, Tanzania
2022	Juliette Severin (PhD in 2009)	Improving care for uncomplicated URinary tract infection-associated symptoms in primary health care settings in INDOnesia (URINDO project)
2022	Jim Determeijer (PhD candidate)	Family participation to enhance care and tackle health worker shortages in resource-limited hospitals
2022	Bente van der Meijden (PhD candidate)	Measuring quality of life for children with Cerebral Palsy and their caregivers
2022	Joost Binnerts	Building Bridges for Broken Bones: Providing adequate treatment for extremity fracture patients in Shirati, rural Tanzania. A study on the safety, efficacy and acceptability of a collaborative triage & treatment model for extremity fracture patients, involving traditional bone setters
2022	Janine de Zeeuw (PhD in 2015)	The Suriname Indigenous Mental Health (SIMH) study See the article in this edition of <i>MTb</i> .
2022	Kevin van 't Kruys	TRAIL, IP-10, and CRP as point-of-care biomarker combination test to distinguish bacterial from non-bacterial infections: a prospective cohort study in febrile children presenting to the emergency department in a resource-limited setting
2022	Marlous Grijsen (PhD in 2013)	Knowledge, attitudes and perceptions of leprosy among leprosy-endemic communities in South Sulawesi See the article in this edition of <i>MTb</i> .
2022	Rian Jager (PhD candidate)	Building an international learning network for point-of-care ultrasound in Mwanza region, Tanzania

The Suriname Indigenous Mental Health study

GLOBAL MENTAL HEALTH BURDEN
Mental health and substance use disorders account for 14% of the total burden of disease^[1], and about 80% of people with severe mental disorders live in low- and middle-income countries.^[2] In 2019, globally an estimated 970 million people were living with a mental disorder, which is a leading cause of disabilities.^[3] In many countries, mental health is not prioritised nor included in national policies and budget. In addition, there is low accessibility to prevention and care, a scarcity of resources for mental health systems, and a lack of understanding of how to best provide care for people with mental health problems.^[1,4,5,6] In 2013, the World Health Organisation's Comprehensive Mental Health Action Plan 2013-2020 was adopted in the 66th World Health Assembly, recognising the key role mental health plays in ensuring health for everyone.^[6]

TREATMENT GAP IN SURINAME

Recently, Suriname included mental health as a priority area in its non-communicable diseases plan. One recent large population survey investigated the prevalence of depression, general anxiety and substance use in two districts in Suriname. The rate of depression was estimated at 16% in suburban Nickerie and 18% in the capital Paramaribo, while the prevalence of general anxiety was 3% and 4% respectively^[7]; alcohol abuse was 5.8% and 6.4% for men and women combined in Nickerie and Paramaribo respectively.^[8]

In Suriname, less than 25% of people with mental health problems receive psychiatric treatment^[7], and there are only 1.7 psychiatrists per 100,000 inhabitants to provide mental care.^[9] Apart from the formal healthcare system, a traditional health care system is serving as first-line care for many patients, including those having a history of psychosis.^[10] Suriname has a highly centralised mental health care system in place, with one

psychiatric centre (PCS) in Paramaribo, and an outpatient unit in Nickerie.

In the rural areas, the Medical Mission Primary Health Care Suriname (MMPHCS) serves the population's health needs by providing primary healthcare in approximately 85% of the Surinamese territory. In these hinterlands, formal mental healthcare is currently unavailable; primary healthcare workers are not well trained in dealing with mental health issues in general, and there are no psychologists or psychiatrists working in these areas. Both PCS and MMPHCS stressed the urgent need for evidence on - and better understanding of - mental health problems among indigenous people living in the hinterlands in Suriname. Indigenous people, some 3.7% of the total population, are descendants of the original inhabitants of Suriname mainly living in the interior of the country. They face a lot of social and economic adversity, and the rates and severity of mental health problems are suspected to be higher than in other population groups. As a first step, more insight into their mental health problems is needed, and therefore a qualitative study was initiated. The aim was to understand idioms of distress, local concepts and expressions of mental health problems, and risk and resilience factors, as well as to gain insight into pathways to formal and informal care.

APPROACH

First, free and prior informed consent was obtained from the Association of Indigenous Village Leaders in Suriname (Vereniging van Inheemse Dorpshoofden, VIDS) and local traditional authorities in Suriname. During the preparatory and the data collection phases, a participatory approach was applied to ensure engagement and ownership by stakeholders. Authorities were involved and participated in discussions on the aims of the study, and commented on the interview guide that was developed by the research team.

Second, interviews with more than seventy key stakeholders and community members were conducted between 11 and 27 March 2023. The Indigenous villages

Apoera (700 inhabitants, a village in Western Suriname that can be reached by car), Kwamalasamutu (1100 inhabitants, a village in the South of interior Suriname, which can only be reached by aeroplane), and Pikin Saron (500 inhabitants, a village close to Paramaribo) were selected as study areas. Relevant stakeholders in the three villages, including the local traditional authorities (i.e., "Kapiteins" and "Basha's"), Shamans, Church leaders, primary healthcare workers, members of women's organisations and community members were interviewed, by the research team, either with personal interviews or in focus group discussions. The Sondeo method was adopted to reach a high level of community appraisal in a short period of time, and to stimulate reflection throughout the data collection process.^[11]

PRELIMINARY FINDINGS

Thematic analysis of the data is still ongoing, but the preliminary results of this study showed that stress, emotional problems, and suicide were common in the local communities, according to the participants. These problems were attributed to poverty, entrapment, domestic violence, alcohol and drug abuse, and supernatural causes. The threshold for talking about problems was considerable because of mistrust and shame in the local communities according to the participants. If there was any support, it was mainly provided by social organisations, such as traditional leaders, churches, women groups, or soccer clubs. In addition, participants mentioned that traditional healers are visited for mental health problems and people did not seek help at the primary healthcare centres in the communities. Community health workers were not trained to deliver any form of treatment and there was no collaboration with psychiatric specialists. The study participants expressed an urgent need for ways to address their social and social economic circumstances that seemed to be related to their mental health conditions. Key stakeholders and community members are being informed and consulted on the preliminary findings.



Photo by Wim Veling

THE WAY FORWARD

These results demonstrate that there is work needed at different levels to improve mental health among Indigenous communities. Solutions would need to address social, cultural, and spiritual determinants of mental health problems, and would need to consider the limited available financial and human resources. The Lancet Commission on Global Mental Health and Sustainable Development has proposed that the involvement of non-specialists in delivering mental health interventions offers an opportunity to address global mental health challenges in a context of remaining treatment gaps.^[1,2] We propose a stepped care approach, which is an evidence-based, staged approach whereby mental healthcare is tailored to population needs and health system abilities, offering the possibility to step down or up to a different care level. Building upon the qualitative needs assessment, the next steps we see as necessary include building community-based support systems, as well as strengthening the primary healthcare system and integrating structural consultation services with specialist psychiatric care providers.



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Leprosy research in Eastern Indonesia

INDONESIA

In December 2017, after completing my dermatology residency training in the Netherlands, our family started an exciting new adventure in Indonesia. As a global health dermatologist and research fellow, I am currently based at the Oxford University Clinical Research Unit Indonesia (OUCRU ID) located in Jakarta. The institute works closely with the medical faculties of Universitas Indonesia in Jakarta, Universitas Gadjah Mada (UGM) in Yogyakarta, and many other key partners across the country.

Indonesia is the largest archipelago in the world with more than 17,000 islands spread over 5,000 km. With 278 million inhabitants, Indonesia is the fourth most populous country in the world. There are stark socio-economic differences and health inequalities across the nation. Eastern Indonesia is the least developed, with limited access to health care services and high burdens of neglected tropical diseases (NTDs).^[1]

SKIN-NTDS

It is estimated that one billion people are infected with one or more NTDs with another one billion at risk, disproportionately affecting impoverished communities in (sub)tropical regions.^[2] More than half of the 20 NTDs that are recognised by the World Health Organisation are skin-related. Skin-NTDs are common in Indonesia and include leprosy, lymphatic filariasis, scabies, head lice, deep fungal infections, snake bites and yaws.^[3,4] The illnesses typically cause disability and disfigurement, which may lead to stigma, discrimination, and mental health problems. Poverty, crowding, malnutrition, and lack of access to clean water are important drivers.

LEPROSY AND STIGMA

Leprosy is a skin-NTD that affects more than 200,000 people around the world each year. It is caused by *Mycobacterium*



A 13 year old girl affected by leprosy is examined by a medical doctor. Photo by Yoppy Pieter.

leprae and *M. lepromatosis*, primarily affecting skin and peripheral nerves. After India and Brazil, Indonesia has the third highest number of newly diagnosed cases in the world.^[5] In 2019, 17,439 newly diagnosed patients were reported: 11% were children, indicating ongoing community transmission, and 6.4% had a visible disability, suggesting considerable diagnostic delays.^[6] People affected by leprosy and their family members are often heavily stigmatised, as misconceptions surround the disease and fuel the deep-rooted fears that still exist.^[7,8] Leprosy-related stigma is a barrier to implementing effective health care programmes and has a negative impact on health-seeking behaviour, prolonging the risk of transmission, undermining treatment, and thereby increasing the risk of developing disabilities, in turn increasing stigmatisation.^[9,10]

METLEP TRIAL

One of the main challenges in the clinical management of leprosy consists of adverse reactions, which are acute immune-mediated episodes that may occur before, during or after multi-drug therapy.^[11] Reactions affect 30% to 50% of people with multibacillary leprosy and are the primary

cause of irreversible nerve damage, causing disabilities and deformities that are often associated with stigma.^[12] Reactions are often chronic and recurrent requiring long-term use of steroids, which create dependency and have many side effects. We therefore designed the MetLep Trial (NCT05243654), a randomised controlled trial evaluating the safety and efficacy of adjunctive metformin in mitigating leprosy reactions in patients with multibacillary leprosy.^[13] Metformin, a safe, inexpensive and widely available anti-diabetic treatment, is a promising drug considered for repurposed use as host-directed therapy in tuberculosis (TB) and other communicable and noncommunicable diseases.^[14-17] In TB-studies, metformin has been shown to control intracellular mycobacterial growth by increasing host cell viability and reprogramming CD8-T-cells.^[18-20] Metformin may positively modify auto-immune cascades that are triggered by the host immune response towards an infection.^[20] The MetLep trial has been ongoing since October 2022 at four sites located in leprosy endemic areas in Papua and Sulawesi. To date, 114 participants have been screened of whom 50 have been enrolled in the trial.

In order to optimise the acceptability of the trial and gain a better understanding of the local communities and their contexts, we received additional funding from the Otto Kranendonk Foundation to engage with leprosy endemic communities and perform a community-based knowledge-attitudes-practices (KAP) survey, combined with in-depth interviews and focus group discussions, among persons affected by leprosy, their close contacts, community members and healthcare workers. The study is currently ongoing, and final results are expected in 2026. These activities will improve our understanding of the experiences and perceived barriers for aforementioned groups in terms of illness perception, health-seeking behaviours, access to health care, clinical management, social support and stigma, which may differ across the MetLep trial sites. Study outcomes will guide tailored interventions and engagement activities aimed at improving leprosy literacy in the wider community, reducing stigma, and optimising trial acceptance.

PHOTO EXHIBITION

Read more about leprosy in eastern Indonesia, and visit our online photo exhibition 'Letter from the Hills: The Invisible Burden of Leprosy in Sumba' by Yoppy Pieter, an award-winning Indonesian photographer, at www.invisibleburdenofleprosy.com. This work documents the lives of seven people affected by leprosy from Sumba, revealing their dreams and daily challenges. This exhibition was recently launched during World Leprosy Day 2023 and has also been published in *The Lancet*.^[1] The project was part of a public engagement campaign to raise awareness and highlight the burden of skin diseases in eastern Indonesia.



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The healthcare worker is obtaining a slit skin smear from a lesion on the skin. Photo by Yoppy Pieter.

LETTER FROM ED ZIJLSTRA

Dear readership,

After 13 years as editor (and in recent years interim editor-in-chief jointly with Esther Jurgens), I have decided to leave the editorial board of Medicus Tropicus bulletin, be it with mixed feelings.

I joined in 2010 when Hans Borgstein was editor-in-chief, who was followed by Hans Wendte, and later by Leon Bijlmakers. During that time, we decided on a more structured approach, selecting a theme for each issue. This proved to be efficient and productive, with guest editors often taking the lead and approaching potential authors from their network of colleagues. For the editorial board, these were extremely useful learning exercises, and this thematic approach continues to date. We have been careful to preserve a mix of public health and clinical topics, which we think reflects the activities and interests of the readership of the journal, in the Netherlands or abroad. In this respect, Esther and I managed to keep a perfect balance, given our background in public health and clinical medicine, respectively.

With more than 40 issues published in the last ten years that are available on the web (MTb, Bulletin of the NVTG - NVTG), a respectable (open access) library is available that reflects current trends and topics in Global Health and Tropical Medicine. Hopefully, the older (paper) issues will be scanned and added to the database.

Having a full complement of editors on the board proved challenging over the years. While we had many young and enthusiastic people joining, their availability was often for a relatively short period, as they, quite understandably, moved on with their career, not uncommonly a posting abroad. Yet, I believe that being an editor on a journal like MTb provides an excellent opportunity to experience what it takes to publish a journal, along the entire editorial process, from conception to proof reading of the final manuscript. It is also a learning experience, as it provides intensive insight into the various contributions along the spectrum of public health and clinical medicine. This includes reviewing the first draft of a submitted manuscript, contacting the author for clarifications, and providing suggestions for improvement. Lastly, it is an opportunity to acquire writing skills by attempting to contribute a piece under supervision of the (senior) editorial board.

I believe that the Netherlands Society of Tropical Medicine and International Health must continue to have its own journal. While the MTb is primarily available in an electronic format, modern times undoubtedly require a rethinking of which way the journal should go, with wider distribution in social media. Fortunately, the younger generation among the editorial board members is helping the senior board members in this respect.

I have thoroughly enjoyed the editorship and have likewise enjoyed contributing papers and editorials; you may have guessed already that I take pleasure in writing.

Lastly, a vote of thanks to all members of the editorial board over the years, and a special word of thanks to Esther Jurgens without whom all this would not have been possible.



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A Day of Fieldwork in the Amazon Research project on the prevalence of malaria

The old '86 LandCruiser is hesitating. The thick layer of dust on top testifies that the previous trip with so called 'Victor' has been a while ago. Finally, it starts and the garage of the hospital is filled with black smoke. It is 7 a.m. Ecuadorian time in Puerto el Carmen, the sun is already quite high, and since we're right on the equator, you can already feel it burning on your skin.

Outside we expect to meet Carlos, the head of the boat park of the local municipality. He will be our boat driver today to go to Tres Fronteras, a little village downstream where the borders of Peru, Colombia and Ecuador meet. However, when he arrives, he informs me that the boat we reserved a week ago is unavailable today. Normally, the mayor is willing to lend one of his boats since our aim is to improve health in his communities. You do have to ask him formally though, and in duplicate. And not on normal paper, but on paper they sell at a desk hidden downstairs in the municipality. But even after jumping through these hoops, a guarantee you will never get.

The good news is that today we will go with the 'limousine', a fast boat that normally only the mayor and his people use. With its two hundred horsepower, the outlook for the day is suddenly looking much more attractive. A four-hour drive one way is now reduced to one and a half hour one way, meaning more time available to attend to the people in Tres Fronteras. The only way to reach Tres Fronteras is over the Putumayo River



Arriving at Puerto el Carmen, where the pier has been destroyed due to recent floods.
Photo by Jacob van der Ende.

which forms the natural border between Colombia and Ecuador. It is a red zone in which armed groups have been active for many decades. They do not allow traffic on the Putumayo River after sunset. Leaving before 6 a.m. and coming back after 6 p.m. is out of the question. Due to these hazards, the Ecuadorian marine, which like the army has a large base in Puerto el Carmen, wants to know who is leaving with which boat and where to: another permit that had to be arranged.

The disadvantage of a faster boat is that it uses a lot more gasoline. And since the outboard motors of the limo are outdated, you have to mix the gasoline with engine oil yourself. Carlos climbs into the passenger seat of old Victor and first we go to the workshop of the municipality to get empty jerrycans. The only gas station in town opens at 7 a.m. and when we arrive around 7:30 a.m. there is already a long line of people with small jerry cans who came on foot or by boat. They are all lined up to one pump; the other one is for cars, luckily. To prevent a lot of gasoline ending up on the Colombian side of the border, where gasoline is much more expensive, you need a permit to buy large amounts of diesel or gasoline on the Ecuadorian side of the border. Permit checked and

approved, the hose goes into the first jerrycan to start pumping the three hundred litres of gasoline. Meanwhile there is time to buy the engine oil. “5 1/4’s” were the instructions of Carlos, deciphered as five times a quarter of a gallon, meaning five litres. We need to stop by two shops, as the owner of the first shop pretends not to have this type of oil - perhaps not willing to sell to this bearded ‘gringo’?

In a mix of gasoline fumes coming from Victor’s carburetor in the front and the filled jerry cans in the back, we drive back to the shore of the river just beside the hospital. The low water level exposes the destruction of the riverbanks during last rainy season. The old boarding school which is now housing Hospital San Miguel is built right on the riverbank where the San Miguel River and Putumayo River merge and bend. The result of this bending is that the flow of water is always pushing against the river banks, day and night. The wall that was built to protect the village is sinking slowly but surely back into the river. Stairs, structures on top of this wall, everything is going down. Massive amounts of concrete reinforced with impressive rebar just cracks as if made from glaze, testifying that nature, in the end, always wins.

The jerrycans with gasoline are dragged down to the boat, together with the crates and coolers from the hospital containing medicines and supplies, printed informed consents, laptops and, of course, lunch. The main reason for the visit today is a research project funded by the Otto Kranendonk Fund (OKF), which aims to demonstrate the prevalence of malaria within the Ecuadorian Putumayo. Putumayo is a local district within the Sucumbios province, inside the Ecuadorian Amazon basin. With respect to infectious disease, this is tierra incognita. No data is available on prevalence of disease or presentation of symptoms nor data on convalescence. For this research project, at three different moments throughout the year to include seasonal influences, three different communities throughout Putumayo are visited: one far upriver, one far downriver, and the third in Puerto el Carmen itself. Today will be the second visit downriver, after having visited these sites earlier in May this year.

That we’re facing a reduced travel time becomes evident when Carlos opens the throttle. Due to its speed, the boat lifts itself out of the water, further reducing resistance. At a speed of 50-60 km/h you feel like flying. The scenery that rushes by is just amazing: on the riverbank, lush green jungle with now and then a large ceibo tree towering above the canopy. Little wooden houses looming between the trees. The intense sunlight seems to bleach out the poverty of the circumstances in which people are living here. You almost start thinking that it is not the worst place on this planet to wake up every day,

This thought evaporates instantly once you put a foot on the community ground of Tres Fronteras. Though we announced our visit beforehand through a contact of a contact of a contact, people only arrive at community house - where we’re holding office for the day - once they’ve heard through another contact of a contact that the announcement was true. The difference between Puerto el Carmen and Tres Fronteras is stunning. Most people are in rags and often without shoes. Children look malnourished and unhealthy. Contact with the inhabitants is much more rigid than we’re used to. They clearly don’t trust us, most likely because

OKF CALL 2021

they think we're North Americans and suspect we may have other intentions. It wouldn't be the first time someone thinks we're spying for the DEA. We start unpacking and set up our 'laboratory' and 'sampling area'. Today we're offering both a rapid diagnostic test for malaria and for dengue, for which we have to draw one tube of full blood from each participant. Adult women are also offered sampling with a vaginal brush for a molecular assay of human papilloma virus (HPV), analysed upon arrival in our laboratory.

While we unpack, somebody asks if we can take a look at Don Augusto. It appears that he has been sick already for eleven days and is confined to his bed. We follow them to the 'house' of Augusto, a small wooden shed on poles just on the side of the river where we got out of the boat. Getting closer to the shed we hear groaning. The only way up is by climbing on a tree trunk with carved out steps. In ten years working abroad in low- and middle-income countries, I've seen quite some misery, but finding Augusto there, on top of a worn-out mattress, surrounded by garbage, damaged tools and some burnt out candles, did truly hurt: conditions so inhuman that I would have preferred to pick him up, carry him to our boat, and take him straight to our hospital. Unfortunately, things are managed differently here.

Agusto was burning up from fever and having the diagnostics available, we did a bedside malaria and dengue rapid test: both negative. Without having properly eaten for more than a week and living on coca cola, we knew there was not much time. Without permission of the president of Tres Fronteras there was no way of taking Augusto back to Hospital San Miguel. We just got to know the president when we arrived, a very reasonable man with, as a first impression, good intentions for his people. But he can't decide on his own. Augusto's sister appears not to be in favour of the evacuation of her brother. Even after promising her that they won't need to pay anything, they can leave whenever they want, she still refuses.

We decide to continue with what we came for: sampling for the combined malaria/dengue study and HPV. After an extensive

explanation of the objective of our visit and a short introduction of everyone on our staff, I take a seat on a very small primary school chair behind an even smaller primary school desk. One by one the people come and sit in front of me, and I explain, again, what our objective is and ask if they are willing to participate. If so, they sign with a signature or, more often, with their fingerprint. Then they move to the 'sampling area', which is just the chair next to them, and from there the blood goes to the 'laboratory' - all within 10 square metres. As time passes, the atmosphere changes a bit. We bring stickers and little crocheted octopuses as toy dolls for the kids, and share our homemade bread with the elderly. Little by little, the people start talking, ask us questions, and start to make jokes (most likely about us).

Close to 3 p.m. it's already time to go back to Puerto el Carmen. The decision regarding Don Augusto unfortunately has not changed, but at least they reveal the real reason for refusing to come with us: they first want to take Augusto to the shaman, a local traditional healer. If that doesn't make him better, they promise to bring him to Hospital San Miguel for further treatment. We get into our boat, happy with the forty samples we were able to take but sad for leaving Augusto behind, and head back to Puerto el Carmen.

A few days later, our receptionist calls me: the family of Don Augusto is standing in front of her, asking if we can lend them our stretcher to carry Augusto from the river to the hospital.



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Local laboratory. After a venipuncture, a rapid diagnostic test for malaria and dengue is performed. Participants wait for their results and, if indicated, medication is prescribed. Photo by Jacob van der Ende.



Signing informed consent. Everyone who wants to participate in one of the studies must sign an informed consent. Photo by Jacob van der Ende.

Postpartum care in a rural district in Zambia

From 1998 until 2002, I worked as a medical officer at Mpongwe Mission Hospital in Zambia. I worked closely together with Agnes, Ruth, and Theresa (registered midwives), and they were immediately interested in participating in a local research project about postpartum health. Our research was prompted by an influx of women with serious postpartum infections combined with the low number of routine postpartum care visits at the clinic.

We decided on two topics of interest: postpartum care attendance rate and postpartum health problems. We developed a semi-structured questionnaire with six questions about place and type of delivery, reason for visiting the hospital, complaints after delivery, and treatment of these complaints. Women underwent a physical examination, and a genital swab was taken for wet mount and gram stain. The team adjusted the questionnaire after a pilot of two months. The study ran from March until December 2001, the last month of my stay at the hospital. The three midwives were responsible for including the women in the study: they interviewed them and performed the physical examination. The midwives received an allowance as an incentive to include as many women as possible in the study and to compensate them for the extra work.

This allowance was made possible by a grant I received from the Dutch Society of Tropical Medicine & International Health (NVTG) from the so-called 'Erefonds', as the OKF was called in the early days. The grant also paid for processing the genital swabs. It was around 1000 guilders, and without this financial support we could not have conducted this study.

Agnes, Ruth, Theresa and I enjoyed conducting this study together. After my return to the Netherlands in 2002, it took some time to analyse and write up the results. In 2003 and 2006, we published two papers. The first was about postpartum care attendance: only 42% of



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women returned for care within 6 weeks of delivery, and we concluded that more awareness and an integrated way of health care delivery could be beneficial for postpartum women. In the second paper, we reported that 84% of women experienced at least one health problem in the postpartum period and most of them took action. What made this study interesting was the type of complaints women experienced and the type of action taken. We suggested further research on the impact of these complaints on women's daily lives.



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Multi-country stakeholder consultation on malnutrition in infants less than six months of age: a summary of published research

The 2023 WHO (World Health Organisation) guideline on acute malnutrition sheds new light on infants less than six months of age.^[1] The 2013 version focussed on outpatient, community-based treatment for children from 6 to 59 months^[2], leaving many infants less than six months old undetected and untreated.^[3] There is growing evidence that malnutrition can start as early as in utero or shortly after birth, so young infants should be included in global efforts to reduce maternal and child malnutrition.^[4] A recent Lancet series revealed that more than a quarter of babies worldwide are born preterm or at low birth weight.^[5] Besides, episodes of being underweight or wasted are frequent between birth and six months of age.^[6] Early malnutrition increases risk of mortality^[7] and impairment of growth and

development^[8] as well as chronic diseases later in life.^[9] In this paper, we present perspectives of stakeholders from various parts of the world on care for malnutrition in infants less than six months of age.

RADICAL CHANGE FOR INFANTS LESS THAN SIX MONTHS

Defined as “infants less than six months of age at risk of poor growth and development”, the new WHO guideline broadens the term “malnutrition”, proposing a set of criteria from infants with low birth weight to poor growth in the first six months, that should be adapted to the local context.^[1] Also, the treatment recommendations are rather generic, formulated as guiding principles for care. The most radical change in the guideline is the focus on primary level, outpatient care, with referral to hospitals only for complications. The emphasis is on early detection and proper assessment, in order

to provide timely support. Breastfeeding assessment and counselling, maternal mental support, and management of basic health problems are key elements of care. Milk supplements should be prescribed cautiously to not interfere with breastfeeding, respecting hygiene standards.

THE MAMI APPROACH

In anticipation of this guideline, a global network of researchers and policy makers developed a care pathway for the management of small and nutritionally at-risk infants under six months and their mothers (MAMI)^[10] (Figure 1). MAMI uses similar case definition and care principles as the WHO guideline, and a package of guides and counselling cards has been developed and updated in 2021.^[11] Pilot testing in Ethiopia and Bangladesh showed early recovery of infants, prevention of severe malnutrition, and satisfaction by health workers and programme managers.^[12] Earlier qualitative research revealed health workers’ and

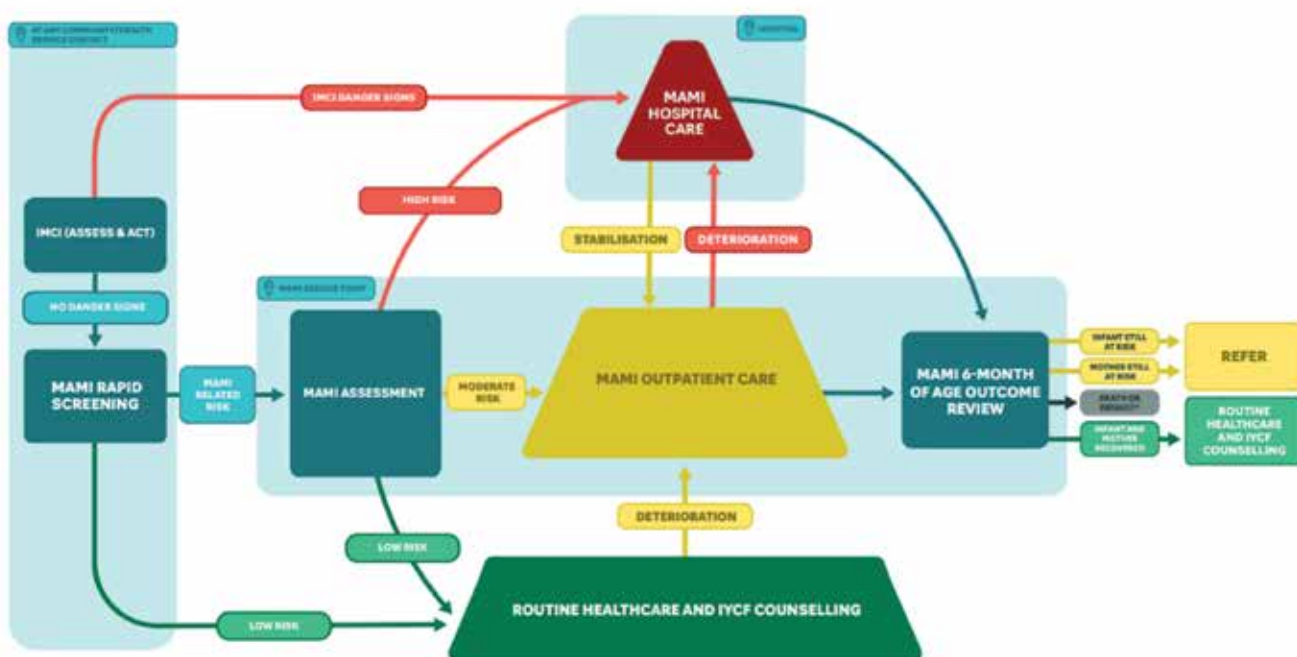


Figure 1. MAMI Care Pathway flow diagram^[11].

Table 1. Participant characteristics of survey and interviews

	Surveys N (%)	Interviews N
WHO geographical regions (no countries)		
Region of the Americas (6)	14 (7)	2
African region- West (11)	49 (26)	4
African region- East/ central (12)	48 (25)	3
South-East Asia region (5)	35 (19)	4
Western Pacific region (3)	10 (5)	1
Eastern Mediteranian Region (5)	20 (11)	0
Global	13 (7)	0
Sex		
Male	84 (44)	8
Female	105 (56)	6
Age		
< 30 years	19 (10)	1
31-40 years	62 (33)	3
41-50 years	65 (34)	5
51-60 years	28 (15)	2
>60 years	15 (8)	3
Educational level		
Undergraduate	32 (17)	1
Masters	111 (59)	6
Post-master	46 (24)	7
Type of organisation		
NGO	88 (47)	4
Government	58 (31)	2
University	33 (17)	3
UN agency	26 (14)	4
Private	18 (10)	1
Type of stakeholder		
Program manager	112 (59)	7
Clinician/ academic	63 (33)	4
Policy maker	14 (7)	3
Years of experience		
<2 years	25 (13)	0
2-5 years	53 (28)	0
5-10 years	47 (25)	10
>10 years	64 (33)	4

caregivers' preference for outpatient care for this age group.^[13] MAMI operational research and learnings have directly fed into the new WHO guideline.^[14]

STAKEHOLDER CONSULTATION

We conducted an early-stage formative implementation study aiming to investigate stakeholders' views on the feasibility of implementing the MAMI approach (for full report see ^[15]), which is relevant for the new WHO guideline. We used an online survey and semi-structured interviews with country-level stakeholders in nutrition and child health. The Promoting Action on Research Implementation in Health Services (PARiHS) theoretical framework for implementation science was used to group barriers and enablers for implementation, in line with its three aspects ^[16]:

- "Evidence" refers to scientific research, data sources and evidence underpinning the guideline;

- "Context" refers to the socio-cultural setting and the health system in which implementation takes place;
- "Facilitation" is defined as the dynamics or actors supporting implementation.

Country-level stakeholders in nutrition and child health were invited to participate in an online survey of 12 multiple choice closed questions based on the three PARiHS elements. The invitation was spread through the MAMI Global Network newsletter and other nutrition and child health online platforms. Semi-structured interviews were conducted with a purposely selected subset of survey respondents, together with more in-depth discussions of the perceived barriers and enablers.

RESULTS

189 stakeholders participated in the online survey and 14 remote interviews

were conducted. See Table 1 for characteristics of the participants. Figure 2 shows barriers and enablers grouped in line with the three PARiHS dimensions.

EVIDENCE

The MAMI approach was largely unknown in most countries, but 142 (75%) of stakeholders considered it feasible and 166 (88%) relevant.

"So they (at-risk infants) fall through the cracks of the system; they are missed most of the time." ^[12]

Participants emphasised that more evidence is needed on anthropometric screening methods for infants less than six months old. This method should be simple for usage at community level.

"..but we are not able to identify at the correct time. So, because of that, also we are losing many children that we could have saved." ^[18]

CONTEXT

Contextual barriers were expected on access to care, with strong health care seeking in the informal sector mentioned by 163 (86%) of respondents and a lack of means and transport by 149 (79%). The strong community influence on care for young infants was seen as a barrier and potential enabler for implementation.

"It needs a whole tribe to raise a child..." ^[13]

Many stakeholders mentioned primary care workers' lack of time (91, 48%) and competence (106, 56%) to provide MAMI care, especially breastfeeding counselling, although they would likely have a positive attitude towards the approach.

"It's not just how well trained they are, but also how passionate they are about it...., I feel that it requires a passion." ^[17]

Community health workers could play a key role in delivering care tailored to local community needs.

"... and they (community health workers) are actually the change maker at community level." ^[10]

FACILITATION

There were mainly enablers in the PARiHS facilitation dimension with 166 (88%) of survey respondents seeing MAMI as contributing to country goals and 155 (82%) who would wish a pilot project. Integration of the MAMI approach within already existing maternal and child health programmes, was brought up as an enabler to the implementation process by most interview respondents.

“We have plenty of opportunities... Almost all children come for their vaccination, during which time the child can be validly screened.” [13]

NGOs were ranked first as actors enabling the implementation, notably by piloting MAMI

“some NGOs in community health are strong in malnutrition,...some of them are able to inflame the governmental to accept (the change).” [14]

LESSONS LEARNED FOR WHO GUIDELINE IMPLEMENTATION:

In this formative study, stakeholders

in nutrition and child health from 42 countries expressed an urgent need for a shift in nutritional care for infants less than six months of age. The following insights can inform implementation of the newly published WHO guideline.

EVIDENCE

Within the PARiHS dimension of “evidence”, stakeholders highlighted the need for more scientific data on the anthropometric method for use in the assessment of infants less than six months. The new WHO guideline proposes weight for age Z-score (WAZ) and/or mid-upper arm circumference (MUAC), which have been shown to be more reliable than weight for length z-score in detecting infants at risk.^[17] WAZ is already widely used for growth monitoring, which could enable implementation. Generally, WHO recommendations for detection and treatment of at-risk or malnourished infants less than six months are based on weak evidence. Operational and implementation research is needed to strengthen the evidence. The MAMI package and its tools can support these efforts.

CONTEXT

Most implementation barriers in our study were placed in the “context” dimension of PARiHS, concerning social-cultural as well as health provision factors. Socio-cultural factors, such as knowledge and beliefs around childhood and new-born illnesses, as well as care costs and means of transport are known to highly determine the implementation fidelity or sustainability of nutrition interventions.^[18] The new WHO guideline aims to overcome these barriers in two ways. First, shifting the level of care to primary or community care will bring care closer and reduce access barriers. Second, the infant with the mother/care-giver are treated as a pair and “grounded in a family-centred and context-adapted approach”, which will encourage community engagement in health care seeking.

Our survey respondents were concerned about the increased workload for primary and community health care workers. With these new elements in the WHO guideline, there is a pressing need for training and capacity building. Earlier research from Ethiopia showed that by

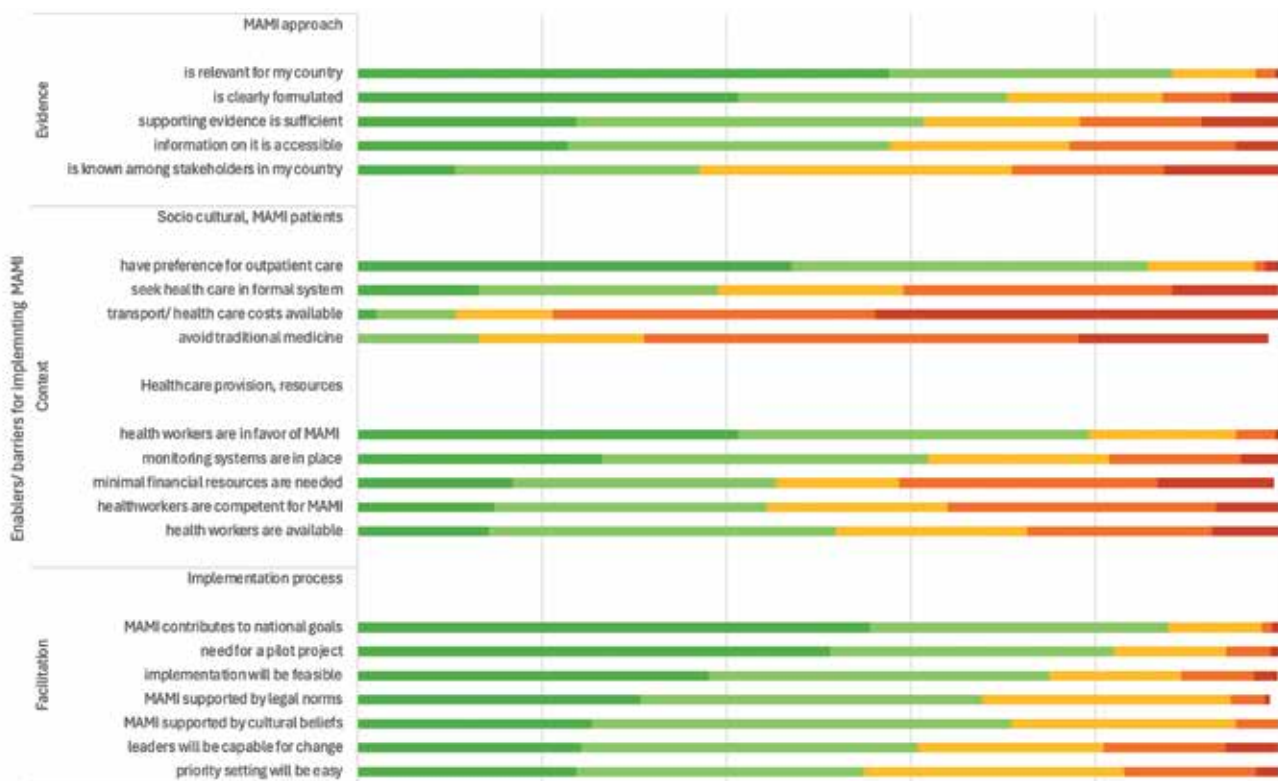


Figure 2. Enablers (green) and barriers (orange/ red) for implementing the MAMI approach

training primary care staff and involving community stakeholders, service availability was improved and patient trust was increased.^[19] An important aspect in training is reinforcing health workers' role in breastfeeding counselling, which is highly underestimated in many countries.^[20]

FACILITATION

Finally, within the “facilitation” dimension, our study emphasised the importance of integrating the MAMI approach into existing structures and making use of local resources. A review assessing the integration of nutrition related programmes showed improved outcomes of the primary programme when well-integrated.^[21] The WHO guideline states that a strong focus on continuity of care and inter-linkages with existing services is essential for the effectiveness and feasibility of the approach. This means active communication between services like antenatal/postnatal care, sexual and reproductive care, and other services for infants less than six months, such as vaccination or growth monitoring.

CONCLUSION

The new WHO guideline for infants less than six months at risk for poor growth and development, can potentially bridge gaps in detection and care for this vulnerable group. The approach, which is similar to MAMI, is not a one-size-fits-all guideline, and stakeholders will need to continuously be involved in local evidence generation and its adaptation to the context.



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Health workers' perspectives on vacuum extraction in Mulago Hospital, Uganda

INTRODUCTION BY THE RESEARCHER:

From 2012 to 2015, I had the privilege of working as an obstetrician in Mulago Hospital, a large hospital (>80 births per day) in Kampala, Uganda. Vacuum extraction was hardly used. Women with prolonged second stage of labour or foetal distress were sent to theatre for caesarean section, an operation with a high risk of maternal morbidity and mortality. Would use of vacuum extraction result in better outcomes? Would it be accepted by health workers and by women?

After assessing health workers' perspectives on vacuum extraction and with funding from OKF, a programme was implemented with the aim of (re)introducing vacuum extractions. Health workers were trained in the use of vacuum extraction, and maternal and perinatal outcomes as well as women's perspectives were investigated. This resulted in my PhD. More importantly, it resulted in regular use of vacuum extraction instead of caesarean section and better maternal outcomes with similar or better (depending on study) perinatal outcomes.

Below we publish parts of Chapter 3 of the thesis: the study on vacuum extraction.

Abstract

Objective

To explore perceptions of health workers regarding the use of vacuum extraction.

Methods

A cross-sectional survey among midwives, residents and

consultant obstetricians in Mulago Hospital, Uganda, was performed. It was composed of questions pertaining to vacuum extraction, addressing reasons for low use, recommendations to increase use, preferred mode of birth in case of prolonged second stage for oneself or one's relative, views about who is suited to perform the procedure, and contraindications.

Results

Eighty-three of 134 (61.9%) participants returned the survey. The most frequent reasons for low use of vacuum extraction were lack of training (60/83, 72.3%) and equipment (59/83, 71.1%). Skills training and improved supply of equipment were recommended. Most participants (57/83, 68.8%) chose vacuum extraction over caesarean section as hypothetical mode of birth for themselves or a relative in case of prolonged second stage of labour. Opinions about contraindications varied. There was a tendency to cite contraindications not identified as such in international guidelines (big baby, caput succedaneum, moulding). Midwives, residents, interns and consultant obstetricians with appropriate training were generally all considered suited to perform vacuum extraction.

Conclusions

Health workers generally expressed a positive attitude towards vacuum extraction, despite some perceived barriers, often unsupported by evidence. Organisation of skills training, supply of equipment, and focus on knowledge of indications are essential to increase its use.

INTRODUCTION

Vacuum extraction is a procedure assisting a woman to give birth vaginally when the second stage of labour is prolonged or needs to be shortened because of suspected foetal or maternal distress.^[1] It can be life-saving and improve maternal and foetal outcomes.^[2,3] It also has significant advantages over caesarean section, including the reduction of complications associated with surgery, reduced delay between decision for intervention and



A dedicated team of midwives is in charge of the vacuum extraction equipment. Photo by Barbara Nolens.

birth, faster recovery, lower health care costs, and avoiding complications related to uterine scars in subsequent pregnancies – an important aspect, particularly in low resource areas with high fertility rates.^[2,4,5]

Despite these advantages, vacuum extraction has been under-utilized in low-and-middle-income countries (LMIC) in recent years, as compared to many high-income countries.^[6,7] Furthermore, rising caesarean section rates and increasing proportions of caesarean sections unsupported by medical indications are

also present in LMIC.^[7,8] These unwarranted caesarean sections are part of the growing concern for excessive or inappropriate use of obstetric interventions.^[9]

As one of the interventions to counteract this trend, a programme aiming to increase use of vacuum extraction in Mulago Hospital, Uganda was introduced in November 2012. Part of this programme was to assess health workers' perspectives on the intervention.

Common reasons cited in the literature for low vacuum extraction use in LMIC are lack of appropriate equipment, lack of skilled staff and training, low detection rate of indications for vacuum extraction, and concerns held by health care providers as well as national health institutions regarding potential harm to the neonate and increases in mother-to-child transmission of HIV.^[5,7,8,10]

In this paper, we report outcomes of a survey distributed to health workers in the obstetric department of Mulago Hospital in Uganda. The aim was to obtain a better understanding of the underlying reasons for low use of vacuum extraction by assessing personal opinions, recommendations and preferences.

Follow the link on this QR code for the full thesis:



Reintroduction of vacuum extraction in a tertiary referral hospital in Uganda (Barbara Nolens). Nr. 33 in the Safe Motherhood series, supervisors: Jos van Roosmalen, Thomas van den Akker, Josaphat Byamugisha.

DISCUSSION

MAIN FINDINGS

The most frequently reported reasons for previous low use of vacuum extraction are lack of skills among health workers, lack of available equipment, and insufficient opportunities for training and practice. Concerns related to neonatal trauma and HIV transmission were also reported. Recommendations to increase use of vacuum extraction included providing additional training and a guaranteed supply of equipment. Most participants chose vacuum extraction over caesarean section when asked about their personal preferred mode of birth. The majority of health workers agreed that consultant obstetricians, residents and midwives should be entitled to perform vacuum extraction.

INTERPRETATION

Results from other studies, including the ones performed in the context of the implementation programme in Mulago Hospital, revealed that frequent periodic training sessions and an adequate supply of equipment can reverse the trend of low vacuum extraction use and lead to improvement of neonatal and maternal outcomes.^[2,3,12,17,18] As a matter of fact, before the start of the programme, trainings were limited and vacuum extractors scarce.

Despite a generally open attitude, a substantial part of participants expressed concerns regarding vacuum extraction as a mode of birth. Apparent concerns regarding trauma to the neonate were mentioned. However, outcomes of severe neonatal trauma and brain damage were investigated in the same hospital and revealed that neonatal trauma was infrequent and not more frequent after vacuum extraction compared to second-stage caesarean section.^[3] This is consistent with other studies from high-income and low-income countries that show reassuring outcomes after vacuum extraction, especially when compared to caesarean section.^[19,27]

Another concern was vertical HIV-transmission. A meta-analysis conducted in the era before antiretroviral treatment was introduced revealed that there is no significant difference in transmission risk between a second-stage caesarean

section and assisted vaginal birth.^[28]

A more recent study stated that vertical transmission risk was very low in women on ART with suppressed viral load.^[29] Furthermore, it is unlikely that second-stage caesarean section provides a better protection for HIV transmission compared to vacuum extraction, especially considering the delay between the decision to perform a caesarean section and actual birth.^[28,29] Decision on mode of birth in HIV-positive women should be based on risks and benefits, depending on the underlying risks associated with disease stage, antiretroviral treatment, and local capacity to manage potential complications.^[30]

There were also suggestions for raising awareness about benefits of vacuum extraction by presenting local outcomes in order to better inform not only health workers but also women. Since September 2013, outcomes from studies performed in Mulago Hospital have been presented in the hospital itself as well as during various conferences. Studying interventions in a local context can indeed help health workers understand benefits and inform them about safety. In this way, beliefs about potential harm can be addressed, discussed and adjusted.

Big baby, moulding and caput succedaneum were perceived as relative and absolute contra-indications by an important number of participants, whilst in international guidelines these are not described as such.^[1,31] Non-recognition of indications or wrongly assumed contra-indications may be an additional reason for low use of vacuum extraction.^[7]

In Uganda, obstructed labour is not a rare event and is sometimes diagnosed at a late stage with severe caput succedaneum and moulding.^[32] This might have contributed to the misconception that caput and moulding are pathological findings indicative of cephalo-pelvic disproportion and that caesarean section is the only possible intervention in case these are present. Concerns about cephalo-pelvic disproportion is hence probably the reason that "big baby" is seen as a contraindication. However, estimating foetal weight by abdominal palpation is unreliable. The best way to find out if vaginal birth



Skills training of vacuum extraction is incorporated in the curriculum of the obstetrics/ gynaecology specialisation. Photo by Barbara Nolens.

is possible is trial of labour with adequate contractions. When cephalo-pelvic disproportion is present, descent of the foetal head does not take place. In the event of prolonged labour or foetal distress in the second stage of labour, vacuum extraction could be tried, provided the bony part of the foetal head has engaged to the level of the ischial spines (station 0) and if per abdominal palpation not more than 1/5th of the foetal head is palpable above the pubic bone, irrespective whether caput succedaneum or moulding are present. When a difficult vacuum extraction is expected (severe caput succedaneum and/ or moulding, foetal head not reaching beyond station 0), trial of vacuum extraction with the operation theatre available and ready could be considered.

Furthermore, scarred uterus, occipito-posterior position, an HIV-positive woman on antiretroviral therapy, or intra-uterine foetal death are not considered contraindications for vacuum extraction in international guidelines, contrary to the opinion of a substantial part of the participants.^[1,31] The diverse answers to these questions reveal that there is a lack of clarity of guidelines and a reluctance to use vacuum extraction. In May 2013, a local guideline on vacuum extraction was designed by Ugandan obstetricians and international members of the research group, based on the RCOG guideline and adapted to the local context. This protocol was presented to the department (midwives, residents and consultant obstetricians) in May and July 2013 and

approved by the department in July 2013. The guideline was distributed to all staff and posters were placed in the labour ward. The survey, however, revealed that not all participants agreed or were aware of the protocol. Together with reporting local outcomes, continuous training and supervision may help to improve adherence to the guideline. Finally, the majority of participants was of the opinion that a wide range of trained health workers can perform vacuum extraction, including interns and midwives. This reflects an open approach towards the expansion of skills among all health workers.

STRENGTHS AND LIMITATIONS

In the dynamic process of re-introducing vacuum extraction, a survey obviously only represents a snapshot of opinions at a certain point in time. However, we believe that this survey provides a fair representation of the stance of health workers on vacuum extraction at the time, which is important in the context of implementing an intervention programme. Furthermore, to our knowledge, health workers' opinion on this obstetric intervention has not been studied before.

The response rate was relatively low and could indicate that there is a chance of selection bias, with participants more acquainted with the procedure being perhaps more likely to return the survey. Furthermore, there is a chance of recall bias considering that some of the questions referred to the period before the start of the re-introduction programme.

Nevertheless, the outcomes of this study complement outcomes of previous publications on this topic and may encourage further implementation of training programmes on vacuum extraction in Mulago Hospital as well as other hospitals in LMIC.^[7,8,10]

CONCLUSION

Health workers' perspectives on vacuum extraction demonstrate their willingness to learn more about maternal and neonatal outcomes of vacuum extraction and translate them into practice with the support of skills training, supervision and feedback.

Most participants would prefer the use of vacuum extraction over caesarean section for themselves or family members. Outcomes suggest that there is room to expand the knowledge of medical indications, which could promote the use of vacuum extraction.



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Wound Care in Sierra Leone & the Otto Kranendonk Fund

Below is a summary of how the kind support of the Otto Kranendonk Fund enabled us - a team including nurses, wound dressers, laboratory technicians and doctors including the authors - to start our project on researching and improving wound care in Sierra Leone.

Having suffered from a civil war in the nineties and a more than two-year-long Ebola virus disease outbreak until 2016, the country's health system is fragile. Wounds are a common problem and often arise due to infection or secondary to trauma, but there is a lack of data on prevalence, aetiology and antimicrobial resistance patterns. Prevention, diagnosis and (surgical) treatment of wounds is often difficult or unavailable. Until 2023, there was no clinical microbiology lab for wound swabs in Sierra Leone. Empirically, many of the wound patients present at a late stage at a health clinic, often delayed by an initial visit to a traditional healer and/or use of topical treatment or antibiotics from a local drug store.

In 2019, our local research team started our first project to collect prospective data on new wound patients in Masanga Hospital. This former leprosy clinic has evolved into a larger district hospital and has become a national referral centre for wound patients. With the help of a full-time research nurse, several wound dressers, lab technicians, clinical officers, medical doctors – and, most importantly, the patients who all gave their informed consent – a database of roughly 300 patients was built in 1.5 years. Forms for history taking, clinical examination, diagnostics, and follow-up were designed by our team, cleared by the Masanga Medical Research Unit's Scientific Review Board (MMRU-SRC) and subsequently approved by the Ministry of Health and Sanitation (MOHS) and Ethics Board of Sierra Leone. Due to several challenges, such as loss of equipment and data and an infectious disease outbreak at the hospital, roughly only half of our wound care population could be included in our subsequent studies. The first two studies have been published, and analysis for



45 year old female presented at Masanga Hospital with a wound for 3 months. She is a farmer, the wound started after a minor trauma to the leg. She visited a traditional healer for one month and received 'hot rub' treatment and ampicillin, doxycycline and metronidazole prior to arriving at Masanga Hospital (photo on the left). There the wound was treated with povidone and honey and, when the wound was clean enough with granulation tissue (middle photo), a split skin graft was performed (photo on the right). Photos by Jonathan Vas Nunes.

the third is currently being conducted.

- Study 1^[1] and study 2^[2]. Wounds swabs were taken from all wound patients and sent for culturing in the Munster University Hospital with the help of Prof. Schaumburg.^[3] We found a common colonisation with *Pseudomonas* spp., *Klebsiella* spp., *Proteus mirabilis* and *Staphylococcus aureus* related complex. These pathogens commonly co-occur and are often resistant against common antibiotics. We therefore concluded that for patients with chronic wounds who are not systemically ill, emphasis should lie on topical wound care.
- Study 3. We further aim to describe the demography, clinical examination and outcomes of treatment of our wound patients at Masanga Hospital. The relatively young and predominantly male population is often treated with honey (for which local beekeepers were trained)^[4] or povidone dressings and surgical debridement, skin grafting or amputation. We took clinical data including photos during their treatment at the hospital and followed up on most of the patients after six months.

A second part of the same project funded by the OKF grant was a knowledge, attitude, and practice study. With the help of focus groups and interviews among health care providers, traditional healers, patients in need of wound care and the general population, we designed a questionnaire on wounds and wound care. Roughly 400 people, including several traditional healers, among the 11 chiefdoms in Tonkolili district, were included. We asked for their knowledge on the origin and (availability) of treatment of wounds and their attitude and subsequent practice regarding health care seeking behaviour. The data show interesting findings on the common practices (e.g. use of salt and papaya and traditional healthcare) and the willingness of traditional healers to work together with health clinics. We aim to analyse and publish our findings soon.

Over the past years, several improvements, including the rehabilitation of the wound clinic, were undertaken to improve wound care at Masanga Hospital. Some of these improvements were made possible (in)directly by conducting the

OKF project, e.g. by having a full-time research nurse available for patients and training our staff. More attention on wound care at Masanga Hospital has further increased the influx of patients in need of wound care. This was also enabled by increased referrals from other hospital, a group working on 3D printing of limb prosthesis in Masanga^[5], and the founding of the Masanga Medical Research Unit in 2018 by prof. Grobusch from the Amsterdam University Medical Center and partners, including the Masanga Hospital Rehabilitation Project, CapaCare, University of Amsterdam, University of Munster, Statistics Sierra Leone and the Ministry of Health and Sanitation of Sierra Leone.^[6] Many research questions remain to be answered, and there is still a high unmet need for high(er) quality wound care in Sierra Leone. We are looking forward to the work of several other groups of researchers currently conducting further wound research in Sierra Leone. These include microbiological studies in the new lab at Masanga Hospital and a clinical trial on the addition of Clindamycin for wound treatment. Future plans are also being drafted to implement several improvements to the Masanga Hospital wound clinic together with an observational study, and to compare data on treatment and outcomes to ours from 2019-2020 (e.g. case controlled).



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Local beekeeper at Masanga. Photo by Jonathan Vas Nunes.



Wound dresser Tamba at the wound clinic in Masanga Hospital. Photo by Jonathan Vas Nunes.

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Validating urine biomarkers for improving the assessment of adherence to tuberculosis preventive therapy in Western Kenya

Tuberculosis (TB) remains a significant global health challenge, with an estimated 10 million cases and 1.4 million deaths in 2021.^[1] TB preventive therapy (TPT) targeting individuals at highest risk is one of the main interventions aimed at reducing TB burden, particularly in high-burden countries, such as Kenya. TPT reduces the risk of TB among vulnerable individuals by at least 60%, if consistently adhered to.^[2] The main TPT regimens include six months of daily isoniazid (6H), three months of weekly isoniazid with rifapentine (3HP), three months of daily isoniazid with rifampicin (3RH) and four months of daily rifampicin (4R). 6H has been used for the longest period, especially among children living with human immunodeficiency virus [HIV] (CLHIV), among whom it remains the preferred regimen according to the Kenya Ministry of Health.^[3] However, one of the biggest challenges with TPT has been suboptimal adherence.

Adherence to medication has traditionally been assessed through approaches that estimate the proportion of prescribed pills ingested. However, such approaches have been found by numerous studies to be unreliable.^[4,5] Biomarkers that detect isoniazid metabolites in urine are now being used for more objective assessment of adherence to TPT. The scalability of commercially available biomarkers of isoniazid has been limited by their high cost. Less expensive biomarkers, such as a urine dipstick test developed by the University of Washington bioengineering department, are a promising opportunity for more objective assessment of adherence to TPT.^[6] A small study that enrolled HIV-exposed infants on TPT suggested that the urine dipstick test performed relatively well compared to the commercially available test.^[6] In an article in

the journal AIDS, we share the results of a larger (100 participants) longitudinal study that assessed adherence to TB preventive therapy, using a commercially available biomarker that was used as the gold standard for validating the in-house urine dipstick test developed by the University of Washington.^[7] Our prospective cohort enrolled CLHIV aged less than 15 years who were currently on the six-month isoniazid preventive therapy (IPT). Adherence to IPT was assessed longitudinally during routine clinic visits by asking caregivers about missed pills and confirmed through testing urine with two biomarkers.

Our longitudinal study was conducted from November 2019 through November 2020. This period coincided with the COVID-19 pandemic, during which non-pharmaceutical interventions (NPIs) were instituted among the general population. The NPIs included travel restrictions, restriction on the number of passengers allowed in public transport vehicles, mask mandates, and advice to the public to avoid crowding, including in health facilities. In response to the COVID-19 pandemic, study sites rescheduled patients on chronic care, giving them longer appointment times. Whereas we had planned to assess adherence at monthly intervals, some of our participants were now scheduled for TPT refills at two-month intervals. We had initially planned to assess adherence using the relatively inexpensive dipstick test at all visits and the more expensive commercially available test at alternate visits. We successfully mitigated the impact of COVID-19 response measures by using two tests concurrently at all visits for patients with two-month appointment intervals, resulting in a median of 3 (interquartile range 3-5) adherence assessments per participant.

This type of study needed consent from parents or caregivers in addition to assent from the children. In general, most

caregivers were co-operative, resulting in high consent rates. In a few instances, adolescent children came to the clinic without adult caregivers, complicating the consent process. Nevertheless, we were able to meet our target sample size of 100 children. However, 3 children never returned to the clinic for adherence assessment. Thus, adherence was assessed for 97 children whose results are presented in our peer-reviewed publication.^[7]

During routine TPT refill visits, we assessed adherence in two ways. We estimated the proportion of prescribed pills that were ingested by asking caregivers and adolescent children about missed pills. We also conducted urine biomarker testing with the in-house dipstick and the commercially available test at multiple time points longitudinally. Our assessments demonstrated suboptimal long-term adherence to TPT. Only 39% of assessed children had biomarker evidence of TPT ingestion at all



A research assistant performs a urine biomarker test as the study participant and their primary caregiver look on. Photo by Dickens Onyango.

time-points, with biomarker-confirmed adherence levels declining over time. This finding was very informative for TB control programmes as it revealed that although TPT uptake among people with HIV remains high, adherence remains modest, thereby limiting its efficacy. Furthermore, a comparison of caregiver reported adherence to biomarker results supported previous reports that caregiver/self-reports significantly overestimate adherence. Twenty six percent of the assessments in which children reportedly ingested their medication had negative biomarker results. These findings further emphasized the need for more objective methods of assessing adherence, such as urine biomarkers, during clinical care.

The causes of suboptimal adherence to TPT among people living with HIV are complex and are categorized into individual, social and structural factors. Individual factors include limited knowledge, mental health, substance use, and physical limitations. Adherence may also be affected by social factors, such as stigma and structural barriers, including complex healthcare systems, medication regimens, and inadequate education.⁽⁸⁾ Addressing these factors through targeted interventions and support systems can enhance adherence and improve health outcomes.⁽⁸⁾ To maximize the effectiveness of adherence support interventions, it is necessary to accurately identify people who are not adhering to their TPT regimen. The in-house urine dipstick test that we validated in this study is a promising tool for improving the accuracy of adherence assessments in routine clinical settings. It costs less than \$1 per test compared to the commercially available option, which commands a price tag of \$7 per test. The remarkable performance of the in-house dipstick test (98% sensitivity and 95% specificity) therefore offers a glimmer of hope. The dipstick could be used in combination with other adherence support interventions, such as managed problem solving, to increase adherence to TPT and thereby reduce TB related morbidity and mortality among people living with HIV.⁽⁹⁾

The preliminary findings of this study were shared as an oral presentation during the 51st Union World Conference on

Lung Health, 20 to 24 October 2020. The need for daily dosing and the long duration of prophylactic therapy (six months) contribute to inadequate adherence to 6H. Data from this study and others showing suboptimal adherence to 6H has informed current programmatic efforts to improve adherence by introducing short-course TPT regimens. In 2021, Kenya revised the national TPT guidelines to recommend 3HP for all adults regardless of HIV status and 3RH for HIV-uninfected children aged less than 15 years. However, 6H remains the regimen of choice in CLHIV aged less than 15 years. The Ministry of Health in Kenya is also piloting other measures to strengthen adherence to TPT, including digital adherence technology (DAT). DAT entails patients using a unique code printed on their personalized medication packaging to send daily SMS reports of their intake to a dedicated toll-free number, making adherence monitoring more convenient and efficient.

Although several studies, including clinical trials, have suggested that short-course TPT regimens are expected to improve adherence, there is no evidence from real-world settings to support this claim. Following the introduction of the newer short-course TPT regimens, there is a need for more studies to estimate adherence to these TPT regimens. We are planning to conduct a retrospective study to evaluate the performance of the short-course TPT regimens in routine settings compared to 6H. It is currently uncertain if the urine biomarkers can be used to assess adherence to some of these newer short-course regimens with weekly dosing. Urine biomarkers typically detect isoniazid metabolites within 48 hours of ingestion. Although 3HP contains isoniazid, the weekly dosing schedule may make urine biomarkers less useful for assessing adherence to this regimen. In the planned study, we are planning to evaluate the feasibility of monitoring adherence to 3HP using the in-house urine biomarker that we recently validated.

In conclusion, our study demonstrated suboptimal adherence to TPT despite high uptake, with poor concordance between reported adherence and biomarker-confirmed adherence. The in-house urine dipstick test that we validated performed



Comparison of urine dipstick results to the commercially available assay for selected study participants. Photo by Dickens Onyango.

well compared to a commercially available assay, proving to be a promising alternative to relatively more expensive commercially available tests. The dipstick test, in conjunction with other interventions like managed problem solving, could play a key role in enhancing TPT adherence by offering more accurate assessment and facilitating targeted support strategies.



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What is successful research?

Recently, I gave a lecture about all my misfortunes in research, or dare I say research not successful for the progress of science but rather for my own progress (after all, any project you start is something worth the effort). I've done literature reviews no medical journal cared about, I've computed teamwork efficacies scales for postpartum haemorrhage management that were not given value by reviewers, and I have noted that the precision in your statistical analysis needs to have more power if you are addressing sensitive topics like abortion care. In short, I've learned quite well how a publication bias may steer research and funding now and in the future.

One of the topics which was not well addressed in the literature, when I was doing my Masters in International Health (MIH) at the Royal Tropical Institute, was surgery in low- or middle-income countries. At the time, 2008, the MIH programme was for the most part based on research into malaria, tuberculosis and human immunodeficiency virus (HIV). Surgery was not considered public health, and this needed much reconsideration! This led to a discussion on how surgical care: 1) is needed to address a large part of the global burden of diseases, 2) can be delivered in a cost-effective manner, and 3) as in other previously designed public health projects, a long-term commitment is indicated for success.^[1] As a surgically minded person, doing my MIH got me started on the search for the denominator of surgical treatable diseases, or if you'd like: surgical epidemiology.

This search for a surgical needs-denominator went from developing the Surgeons OverSeas Assessment of Surgical need (SOSAS), with a pilot study in Sierra Leone, to two full-country surveys in Sierra Leone and Rwanda and beyond.^[2,3] It is incredibly satisfying to open up PubMed and see that SOSAS was used in India or Lebanon^[4,5] with no involvement from me at all. These researchers at times have contacted me via email or have found the survey via the link

on the Surgeons OverSeas website, and then went ahead to use the tool for their needs.^[6] Furthermore, besides me earning a PhD through this research, Dr. Varela, surgeon in Malawi, was also able to use the SOSAS tool for his PhD^[7] as will others currently working on the redo from SOSAS in Sierra Leone.^[8]

So one might consider this a successful project; but as is true in many scientific fields as well as medicine, a precise number of surgeries per unit of population and a precise number of surgeons or surgical skills that need to be taught to cover the surgical needs have yet to be found. And with both the evolution of medicine, as well as the evolution of the world at large, that number will never be found. However, in any case, surgery is no longer being omitted from the discussion of public health or health care development and planning.

Lately, I have not been involved in the so-called 'Global Surgery' discussion or progression, but after completion of my OB-GYN residency at Johns Hopkins in Baltimore USA, I've taken a position at the Alaska Native Medical Centre. I can truly say that I have the best job in the world. The position of full scope OB-GYN is in Anchorage, a fairly large city with about 9 months of winter, with consultations from all over the state and regular visits to more remote places for either non-urgent GYN clinics or teaching emergency Obstetrics to a variety of Tribal Health Corporations.

My research and epidemiologic enthusiasm is being channelled in the Quality Assurance programme for our department as well as in research on postpartum haemorrhage, which has a 10% occurrence rate in our population with no good understanding of the origin.^[9] Besides the practical knowledge we try to gain from our research, we also try to elevate indigenous research and researchers and hopefully encourage other doctors working in non-academic centres to get their data and reality acknowledged and addressed.



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Turmeric



Figure 1. Turmeric is readily available in spice shops in Asia. Photo Shutterstock

The next time you are preparing a curry and add turmeric (*Curcuma longa*) for flavour, aroma, and bright yellow colour, think of this remarkable story. It was published recently in the Economist newspaper and showed how population-based research led to a high-level public health intervention that was decisive, effective and relatively cheap.^[1,2]

Turmeric (Bengali for “yellow”) is a herbal medicine that is thought to have antioxidant, anti-inflammatory, antiviral, and antifungal properties; its healing properties target, among others, respiratory and gastro-intestinal illnesses as well as cancer.^[3,4] For millennia it has been widely used in India, Bangladesh,

Myanmar, China, and Nigeria. It is known for its brilliant yellow colour (“the golden spice” or “Indian saffron”) and used as a natural colouring agent for macaroni, cheese, and yoghurt, among others; its use has been promoted to avoid the use of artificial colouring agents.^[5] (Figure 1).

The Economist (4 November 2023) wrote on the issue of adulteration of turmeric with lead

chromate (PbCrO_4) to brighten its yellow colour, thus making it more attractive for the common – unsuspecting – buyer. Lead chromate is neurotoxic and may cause brain and heart damage. In Asian countries, exposure occurs daily, and children are particularly vulnerable; it is assumed that chronic exposure to lead causes neurological toxicity, in particular disrupted cognitive development leading to a lower IQ, and it is assumed to be so severe as to explain 20% of the learning gaps compared to high-income countries for example.^[1,3]

The toxicity of lead exposure was the reason for a global phase-out of leaded petrol, but considerable exposure is thought to remain in low-and middle-income countries (LMICs). In a systemic review, more than 600 million children were estimated to have blood lead levels exceeding the CDC reference value.^[6] Exposure occurs in lead acid battery recycling and manufacture, metal mining (e.g. to extract gold), electronic waste, and food adulteration.^[6] Another study showed that 72% of 100 turmeric samples from Bangladesh, India, Nepal, Pakistan, and Morocco contained elevated lead levels.^[7] In Bangladesh, investigation of the turmeric supply chain indicated that lead chromate pigments were being added by turmeric processing mills since the 1980s despite being prohibited by law.^[8] The pigment was widely available with unrestricted use, and there were no safe food-grade lead-free alternative colourants available in Bangladesh.^[8]

A team of researchers from Stanford University and the International Centre for Diarrhoeal Diseases Research, Bangladesh (ICDDR, B) started a public health campaign in Bangladesh in collaboration with food safety authorities and politicians to eliminate the use of lead-chromate pigment in processing turmeric. The issue was brought to the public’s attention in a mass-media campaign, including graphic warnings, and posters in markets and public areas; the public was addressed by prime minister Sheikh Hasina on national television. Turmeric adulteration was declared a crime and wholesalers were convicted.^[2] (Figure 2)

A subsequent nationwide survey showed that the proportion of market turmeric samples containing detectable lead decreased from 47% pre intervention in 2019 to 0% in 2021. Similarly, the proportion of mills with direct evidence of lead chromate adulteration decreased from 30% to 0%. Blood lead levels among workers at turmeric mills dropped by 30% on average.^[7] Preliminary data suggested that an additional year of healthy life had been added for 1 USD.^[1] The next challenge will be to do the same in India, where the

problem is presumed to be even larger and not restricted to turmeric. For example, heavy metals such as lead, arsenic, zinc, and mercury have been detected in Ayurvedic traditional medicines, that may be used by 1.1 billion of India’s population.^[9] While these medicines can be herbal-only, others are rasa shastra, in which herbs are deliberately combined with these heavy metals as well as minerals (e.g. mica) and gems (e.g. pearl).^[9,10]

Nevertheless, these research-driven, population-based efforts provided evidence that successful public health interventions were possible with a clear and measurable result. The challenge is now to sustain these results and to extend them to other countries as well as for exposure to other toxic substances.



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Figure 2. Bangladesh Food Safety Authority flyer of which more than 50,000 copies were distributed (from: Forsyth JE et al. *Environmental Research* 2023)

A case report of acute intestinal obstruction in third trimester of pregnancy – a diagnostic challenge

SETTING

This case is from Haydom Lutheran Hospital, located in the village Haydom, Manyara region, Tanzania. The hospital is a regional referral center, and serves people from a catchment area of 2 million people. It has approximately 400 beds with capacity to conduct basic laboratory tests, cultures, X-rays, CT scans and ultrasounds. However, patients often do not have insurance and/or the financial means to pay for all required diagnostics and treatment, and choices need to be made. Several specialists in the hospital are available for consultations, including a urologist, gynaecologist, radiologist, paediatrician, internal medicine physician and three surgeons.

CASE

A 35-year-old pregnant woman, gravida 5 para 4 living 4, presented in our setting with sudden onset of lower abdominal pain for one day. The pain was located in the periumbilical region and non-radiating. She also complained of hard stools since three days. The pain was not associated with other complaints and there was no history of trauma. She reported normal foetal movement, no per vaginal blood loss or leaking. She did not remember her last menstrual period and did not bring her antenatal clinic card. She had no previous medical or surgical history.

On examination, she was pale and her vital signs were normal (BP 129/74, PR 88, RR 26, SpO₂ 96%, RBG 8.4). Abdominal examination showed a fundal height of approximately 30 weeks gestational age, a soft uterus with tenderness around the umbilicus. The remaining systems were normal. Obstetric ultrasound showed a viable singleton pregnancy of 32 weeks gestational age in breech presentation with normal amniotic fluid and placenta. Laboratory findings showed a

haemoglobin of 7.6 gr/dL, and elevated white blood cell count of 14.2×10^9 while urinalysis was normal. The other laboratory results were unremarkable.

The patient was admitted in the obstetric department with clinical diagnosis of partial intestinal obstruction and conservative management was started. Corticosteroids injections were started for foetal lung maturation.

Two days after admission, the patient's condition worsened due to increasing abdominal pain and vomiting of bilious materials with no passing of stools. On examination, she had normal vitals and foetal heart rate, but the abdomen was distended with tenderness around the umbilicus and epigastrium and exaggerated bowel sounds. Per vaginal examination showed a closed cervix and digital rectal examination an empty rectum. Additional laboratory findings showed negative MRDT and normal electrolytes, RBG, renal function and liver enzymes. Abdominal ultrasound showed multiple bowel loop dilatation suggestive of intestinal obstruction. There was no free fluid or other abnormalities detected. An abdominal X-ray was performed and showed multiple air fluid levels with bowel distention and no free air (Figure 1). Our provisional diagnosis was intestinal obstruction secondary to a sigmoid volvulus or adhesions, and conservative ileus management was started with nil per mouth, high volume iv fluids, nasogastric tube (NGT), catheter, serial enema, pain medication and broad spectrum antibiotics (iv ceftriaxone and iv metronidazole). Two blood units were prepared for transfusion.

After a short period of improving condition, four days after admission, the patient deteriorated despite conservative management, with increasing abdominal pain, generalised tenderness, distention and NGT draining faecal material. Following a discussion involving general surgeons and the obstetrician, the decision was

reached for emergency exploratory laparotomy with caesarean section.

An extended midline incision was done and clear ascites was found. A caesarean section was performed. The neonate, weighing 1860 grams with Apgar scores of 4 in the 1st minute and 6 in the 5th minute, was resuscitated and transferred to NICU for further management. Furthermore, distended small bowels were found with an ileo-ileal intussusception (Figure 2) at 20 cm proximal from the ileocecal junction. An intraluminal white-ish non mobile firm tumour of approximately 2 cm, 40 cm proximal from the ileocecal junction, was found as the lead point (a lesion or variation in the intestine that is trapped by peristalsis and dragged into a distal segment of the intestine). There were no signs of intra-abdominal metastases. Then the ileo-ileal intussusception was reduced (Figure 3) and a resection of approximately 45 cm of ileum was done. This was followed by an end to side primary anastomosis of ileum with transverse colon (Figure 4). The ileum stump at the ileocecal junction was closed in two layers and the window between the ileo-loop and transverse colon was closed to prevent internal herniation. The abdominal cavity was washed and a drain was placed before closing the abdominal wall. Postoperatively her clinical condition improved quickly, and she was discharged the 4th postoperative day. The neonate was discharged ten days post-partum in good clinical condition.

FOLLOW-UP

One week after discharge, the patient came back to the OPD for follow-up and suture removal. She was in improving clinical condition, and repeated abdominal ultrasound was normal. The histopathology result of the biopsy revealed benign gastrointestinal stromal tumour (GIST).

BACKGROUND

Intestinal intussusception is rare in adults and accounts for 1 to 5 percent of

CASE REPORT

mechanical bowel obstructions. In pregnancy this condition is less common and only described in case reports.^[1-7] Most cases occur during the third trimester. It is typically caused by a pathological lead point (lesion or variation) within the bowel, which is pulled forward by normal peristalsis, telescoping the affected segment of bowel into the lumen of the distal bowel segment. Patients with disorders associated with higher occurrence of infections and neoplastic conditions, e.g. HIV, have an increased incidence of intussusception, secondary to conditions such as lymphoid hyperplasia, Kaposi sarcoma and non-Hodgkin lymphoma that can serve as lead points.^[8] The intussusception leads to venous and lymphatic congestion, causing oedema and eventually intestinal ischemia.^[6] Complications can be life-threatening in the case of intestinal necrosis and perforation, thus requiring early diagnosis.

Intestinal obstruction in pregnancy is a surgical emergency which requires acute intervention.^[9] It is associated with high incidence of foetal and maternal morbidity and mortality, with maternal and perinatal mortality of 6% and 26%, respectively.^[2,3]

CLASSIFICATION

Intussusception in adults can be classified by aetiology^[4,8]:

- Benign lesion (e.g. polyps, lymph nodes, lipoma, Meckel's diverticulum, inflammatory bowel disease, adhesions or trauma)
- Malignant lesion (25%; Metastatic disease or primary small bowel tumour such as lymphoma, leiomyosarcoma, neuroendocrine tumour)
- Idiopathic (8-20%)

It can also be classified by location:

- Entero-enteric, which is limited to the small bowel
- Ileo-colic with prolapse of the terminal ileum into the ascending colon
- Colo-colic, which is limited to the large bowel. [4,8]

In this case, intestinal obstruction was caused by a benign gastrointestinal stromal tumour (GIST) in the ileum leading to ileo-ileal intussusception. GISTs are rare, typically benign,

mesenchymal neoplasms of the gastrointestinal tract.^[10] About 10 to 30% of GISTs progress to malignancy.^[10] The dynamic of growth is exophytic, having the potential to invade the adjacent organs, and in some cases causing perforation into the peritoneal cavity. GISTs rarely cause intussusception or obstruction.^[11]

DIAGNOSIS

Adults often present with intermittent abdominal pain and symptoms of (partial) bowel obstruction such as nausea, bloating, vomiting, constipation and weight loss. These symptoms can be subtle and are non-specific and are encountered frequently during a normal pregnancy, making diagnosis potentially difficult. Moreover, the displacement of the bowel by the gravid uterus impedes the physical examination.^[3] In the diagnostic and therapeutic process, the risks and benefits for both mother and foetus must be considered.^[4] However, a delay in diagnosis of surgical abdomen in pregnant women leads to higher complication rates.^[9] This is significantly more risky to the foetus than the radiation exposure, since ionising radiation exposures up to 0.05 Gy are usually safe in pregnancy.^[12]

Plain abdominal and chest radiography in supine position could show the typical features of distal small bowel obstruction, like distended bowel loops.^[3] Air under the diaphragm in erect position indicates visceral perforation. However, an abdominal CT scan is the most sensitive imaging modality in the diagnosis of adult intussusceptions, showing the location, cause and potential complications of bowel obstruction, like ischaemia or perforation. The distended loop of bowel appears thickened because it represents two layers of bowel. A "target sign" may be seen on the sagittal view of the abdominal CT, while on axial or coronal view, the intussusception will appear as a sausage-shaped soft tissue mass.^[3,8] The lead point can be identified as well.

Abdominal ultrasonography may be useful for the diagnosis of small bowel obstruction in pregnant patients, since it is fast and avoids radiation, and in settings with limited resources. Ultrasound is limited by obesity and by poor visualisation of gas-filled structures, but it

is more sensitive and specific than plain films for the diagnosis of small bowel obstruction. The sonographic findings of intussusception are similar to CT scan, showing a 'target' or 'doughnut sign' on transverse section, which consists of single or double anechoic rings surrounded by a central echogenic focus^[2,5,6], and the pseudokidney or sandwich sign in the longitudinal view.^[11]

If available, abdominal magnetic resonance imaging (MRI) is also an option for the assessment of small bowel obstruction in pregnant women and in children. However, more time is required for high-quality image acquisition and for repeated breath-holds, which limits the general applicability of MRI in patients with acute small bowel obstruction.^[8]

In low-resource settings with limited access to imaging modalities, clinical history and physical exams with frequent re-evaluation should be the basis of early diagnosis and surgical management.^[11,13]

DIFFERENTIAL DIAGNOSIS INTESTINAL OBSTRUCTION IN PREGNANCY

Intestinal obstruction in pregnancy has an incidence of between 1:2500 and 1:3500 deliveries, mostly during third trimester. It is most commonly caused by adhesions.^[3,14] Other causes of intestinal obstruction in pregnancy include volvulus, intussusception, carcinoma, herniation, and acute appendicitis.^[1,2] While adhesions may be the most common cause of intestinal obstruction in patients that have had previous abdominal surgeries, the possibility of other causes of intestinal obstruction must always be considered.

TREATMENT

In intussusception in pregnancy, timely diagnosis can prevent bowel ischaemia and reduce maternal morbidity and mortality. The combined expertise of the obstetrician, radiologist, and surgeon are needed to manage the pregnant patient.^[2] In contrast to adhesional obstruction, where patients may be managed conservatively initially, for other causes of intestinal obstruction, including intussusception, surgery remains the definite management and an exact diagnosis can be made during the operation.^[3,11,14] Surgical resection of the lead

point and necrotic bowel is almost always required in intestinal obstruction during pregnancy.^[2] Intra operative reduction can be attempted in small bowel intussusceptions provided that the segment involved is viable and a malignancy is not suspected. If intestinal obstruction occurs during the third trimester of pregnancy, a concomitant caesarean section should be considered to increase the chance of foetal survival and also because of the fundal height necessitating a caesarean section before bowel exploration.^[9,12,15] Providing corticosteroids for foetal lung maturation can be considered if the gestational age is below 34 weeks, but should not cause a delay in surgical intervention. If no caesarean section is performed during laparotomy, the overall risks of premature labour are significant.^[14]

CONCLUSION

Intussusception in pregnancy is a rare condition and can be a diagnostic challenge. Patients often present with very non-specific symptoms and unreliable physical exam findings. High index of suspicion and systematic re-evaluation of the pregnant patient with intestinal obstruction are essential for timely diagnosis and treatment, which is key for preventing complications and poor outcomes for mother and foetus. Surgery remains the definite management in adult intussusception, and an exact diagnosis can be made during the operation.



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Figure 1: Abdominal X-ray showing multiple air fluid levels with bowel distention, no free air.



Figure 2: Distended small bowels with an ileo-ileal intussusception.



Figure 3: The reduced ileo-ileal intussusception with necrotic patches.



Figure 4: End to side primary anastomosis of ileum with transverse colon.



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