ACCESS TO SEXUAL AND REPRODUCTIVE HEALTH MEDICINES AND SUPPLIES IN SUB-SAHARAN AFRICA

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ACCESS TO SEXUAL AND REPRODUCTIVE HEALTH MEDICINES AND SUPPLIES IN SUB-SAHARAN AFRICA

Toegang tot medicijnen en benodigdheden voor seksuele en reproductieve gezondheid in Afrika bezuiden de Sahara
(met een samenvatting in het Nederlands)

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"The future belongs to those who believe in the beauty of their dreams."

Eleanor Roosevelt

TABLE OF CONTENTS

1

GENERAL INTRODUCTION

BACKGROUND

Sexual and reproductive health is the state of physical, mental, and social well-being in all matters related to the reproductive system. Sexual and reproductive health and rights (SRHR) encompass efforts to eliminate preventable maternal and neonatal mortality and morbidity, to ensure quality sexual and reproductive health services, including contraceptive services, and to address sexually transmitted infections (STI) and cervical cancer, violence against women and girls, and sexual and reproductive health needs of adolescents (1).

Sexual and reproductive ill health forms a major proportion of the global burden of disease (2). In 2016, 19.3% of global deaths were from communicable, maternal and neonatal problems (3). WHO has further estimated the proportion of disability-adjusted life years (DALYs) lost to sexual and reproductive health conditions at 17.8% in the general population, with the proportion rising to 31.8% in women aged 15-44 years (4).

The attainment of SRHR has not been realized as highlighted by an estimated annual death of more than 350,000 women and 5.6 million children worldwide from preventable complications related to pregnancy and childbirth (5). Developing countries are affected disproportionately having the highest maternal, newborn and under-5 mortality rates in the world (6). Maternal deaths in the world's least developed countries are estimated at 415 maternal deaths per 100,000 live births. Sub-Saharan Africa and Southern Asia accounted for approximately 86% (254,000) of the estimated global maternal deaths in 2017 with sub-Saharan Africa alone accounting for roughly 66% (196,000) (7). The lifetime risk of maternal death is as high as one-in- 37 for a 15-year old girl in sub-Saharan Africa, in contrast to a risk of just 1 in 7,800 for a girl living in Australia (7).

Sub-Saharan Africa is the region with the highest under-5 mortality rate in the world, with one child in 13 dying before his or her fifth birthday, 15 times higher than in high income countries (8). Two regions – Sub-Saharan Africa and Central and Southern Asia – account for more than 80% of the 5.3 million under-five deaths in 2018 (nearly half of them being newborn deaths), yet they only account for 52% of the global under-five population (8). Fig. 1 below shows the global burden of maternal mortality.
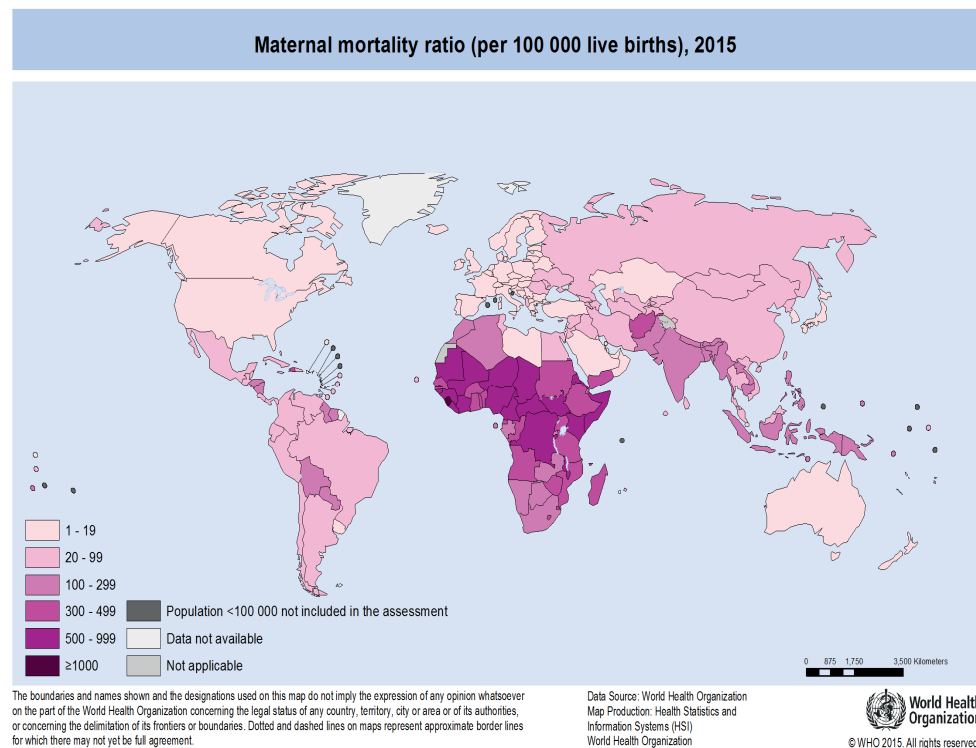
Maternal mortality ratio (per 100 000 live births), 2015

1 - 19
20 - 99
100 - 299
300 - 499
500 - 999
≥1000
Population <100 000 not included in the assessment
Data not available
Not applicable

0   875   1,750   3,500 Kilometers

The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement.

Data Source: World Health Organization
Map Production: Health Statistics and Information Systems (HSI)
World Health Organization

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World Health Organization

Figure 1. Total Fertility, Maternal Mortality Ratios by Country for 2015. Source: WHO Global Health Observatory (9)

SRHR challenges

The key SRHR challenges include lack of quality SRH services including contraceptive services, maternal and neonatal mortality, sexually transmitted infections (STI)- including human immunodeficiency virus (HIV)-and cervical cancer treatment, violence against women and girls, and addressing SRH needs of adolescents (10).

The use of modern contraception has risen slightly but continues to be low (26%) in sub-Saharan Africa (11). In sub-Saharan Africa, women who have an unmet need for modern contraception account for a disproportionate 93% of unintended pregnancies and abortions (12). If all unmet need for modern contraception were satisfied, unintended pregnancies would drop by 83%, from 18 million to three million per year; and unsafe abortions would decline by 84%, from 5.7 million to 0.9 million (12). While almost all abortions in developed countries were safe, an estimated 25.1 million (or 45%) of all abortions that

occurred every year worldwide between 2010 to 2014 were unsafe. The majority (97%) of the unsafe abortions occur in developing countries in Africa, Asia and Latin America – and the proportion of unsafe abortions is significantly higher in countries with highly restrictive abortion laws (13).

Five major complications that account for nearly 75% of all maternal deaths are haemorrhage/ severe bleeding (mostly bleeding after childbirth), infections (usually after childbirth), high blood pressure during pregnancy (pre-eclampsia and eclampsia), complications from delivery and unsafe abortion (14). Haemorrhage accounts for 27% of all maternal deaths (14). The remainder are caused by or associated with infections such as malaria or related to chronic conditions like cardiac diseases or diabetes (7, 15).

The leading causes of death in children under-5 years are preterm birth and neonatal complications, pneumonia and other respiratory infections, birth asphyxia, congenital anomalies, diarrhea, malaria, and HIV/AIDS (8, 16). More than half of these early child deaths are preventable or can be treated with simple, affordable interventions including immunization, adequate nutrition, safe water and food and appropriate care by a trained health provider when needed (8).

STIs are also a key challenge. In 2016, approximately one million pregnant women were estimated to have active syphilis globally, resulting in more than 350,000 adverse birth outcomes, with at least 200,000 of these adverse outcomes being stillbirths and neonatal deaths (17). An estimated 300 million women have an infection of human papilloma virus (HPV), the primary cause of cervical cancer; HPV infection causes 570,000 cases of cervical cancer and over 300,000 cervical cancer deaths each year (18). The WHO estimates that in 2016, chlamydia, gonorrhoea, syphilis and trichomoniasis – four of the most common curable STIs – accounted for 376.4 million new infections in 15-49-year old men and women globally (19). Left untreated, some STIs increase the risk of HIV transmission during unprotected sexual contact and lead to complications, such as pelvic inflammatory disease (PID), infertility, ectopic pregnancy, miscarriage, fetal death and congenital infections (20).

Despite gains in preventing new HIV infections, sub-Saharan Africa remains the region most severely affected, with nearly 1 in every 25 adults (4.4%) living with HIV, with women being affected more than men – women account for

58% of the total number of people living with HIV – while 80 percent of young women living with HIV live in sub-Saharan Africa (21).

The role of national governments and international community
For centuries women's health has been riddled with controversy. Socio-cultural expectations and values about women, marriage and child bearing including misconceptions and fears remain an impediment to SRH (22, 23). Information about contraception was understood as a way to challenge moral and social values (24, 25). There have also been disputes and legal restrictions on abortion due to societies' condemnation of extramarital pregnancies (26, 27).

There was a decade-long concern about the safety of depo-medroxyprogesterone acetate (DMPA) or Depo-Provera due to its adverse effects such as endometrial carcinoma, interference with carbohydrate metabolism, and suppression of immune responses in laboratory animals which delayed its approval by the US Food and Drugs Agency yet USAID allowed to distribute it for use in population programs in developing countries (28, 29). This caused controversy about how a medicine deemed unsuitable to the US population would be suitable for populations elsewhere. The controversy with Depo-Provera still abides even with studies showing that it is a satisfactory contraceptive with advantages and disadvantages no more than oral contraceptives and that women across the world have shown to be capable of making personal choices for themselves (30).

Most SRHR challenges are preventable or can be managed with known solutions. For example, in high and upper middle-income countries more than 90% of all births are attended by a trained midwife, doctor or nurse but less than half of all births in low and lower-middle-income countries are assisted by such skilled health personnel (31). The reasons why these SRH challenges persist are many, among them; limited access to services (lack of information, limited male involvement, inadequately skilled health professionals and inadequate health infrastructure including access to medicines, distance to facilities, poor quality services, limited choice of services) particularly for young people, poorer segments of populations and those in remote areas; cultural or religious practices; and gender-based barriers (11). Therefore, barriers must be identified and addressed at societal level, national health system level as well as at international level.

According to WHO, many of the SRH challenges could have been prevented with proper healthcare and services (32). The importance of increased access to and the appropriate use of essential medicines, medical devices and other commodities to save lives cannot be underestimated. For example, in 2010 the United Nations (UN) Secretary-General's Commission on Life-Saving Commodities (UNCOLSC) for Women and Children estimated that scaling up of just 13 commodities that had been around for a long time would save over 6 million lives including averting 230,000 maternal deaths through increased access to family planning over five years (32).

The UN *Global Strategy for Women's, Children's and Adolescents' Health* (2016-2030) is a road map scaled up from the 2010 Strategy to among others improve access to life-saving medicines and health supplies for women, children and adolescents around the world (33). Before that, SRH was one of the inequities that the Millennium Development Goals (MDGs) sought to address (32). SRH is also prominently highlighted in Sustainable Development Goals (SDGs) which were agreed upon by 193 world leaders in 2015 as follows: target 3.1. *By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live births*; target 3.2. *By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low*

Table 1. United Nation's list of life-saving commodities across the reproductive, maternal, newborn and child health (RMNCH) continuum

| Category	Commodity	Indication
Reproductive health commodities	Female condom	Barrier contraception
	Contraceptive implant	Hormonal contraception
	Emergency contraception	Hormonal contraception
Maternal health commodities	Oxytocin	Postpartum haemorrhage
	Misoprostol	Postpartum haemorrhage
	Magnesium sulphate	Preeclampsia/eclampsia
Newborn health commodities	Antenatal corticosteroids	Preterm birth enlargement of lungs
	Injectable antibiotics	Infections
	Chlorhexidine	Cord care
	Resuscitation devices	Resuscitation of newborns
Child health commodities	Amoxicillin	Pneumonia
	Oral Rehydration Salts/ Zinc	Diarrhoea
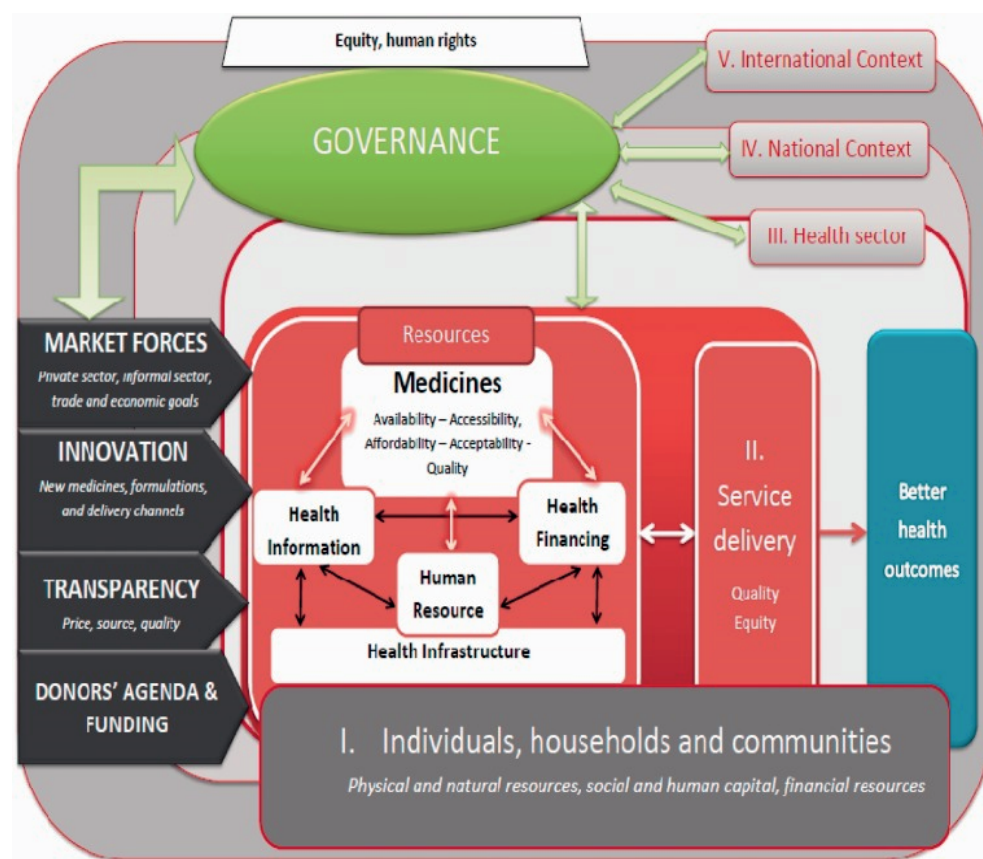
Figure 2. Access to medicines from a health system perspective: a conceptual framework. Source: Bigdeli et al (40)

as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births; target 3.7. By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes (34).

A number of global institutions and governments have made commitments to support access to health services and commodities in low- and middle-income countries (LMICs) (33). In 2006, WHO and the Interagency Working Group developed a list of 140 SRH commodities to guide countries in the selection of commodities to avail (35). Of the above commodities, the UN Commission on Life Saving Commodities (UNCoLSC) in 2012 identified and highlighted 13 underused, low-cost and high impact ones with the greatest potential to reduce

preventable deaths of women and children. Table 1 below provides an overview of these commodities.

To meet global SRHR targets, improvements are required in access to the above medicines and commodities and in research on health technologies that can help the under reached populations for example heat stable medicines carbetocin for low- and middle-income countries (36) and child friendly formulations of medicines (37, 38).

Previous research has shown that access to medicines is a complex interplay of many factors at different levels in the health care sector, involving many stakeholders. The access framework formulated by Hanson et al. in 2003 (39) and adapted by Bigdeli et al. in 2013 (40) into a five-level framework outlines this interplay and can support efforts at national and international level (see Fig 2). The five levels at which efforts need to be consolidated include: **Level I** - *Individuals, households, community- demand level;* **Level II**- *Health service delivery;* **Level III**- *Health sector level;* **Level IV** - *Public policies cutting across sectors; and* **Level V**- *International and regional level.*

In Bigdeli's framework, health system building blocks (namely medicines, health information, health financing, human resources, and health infrastructure) were reorganized to illustrate their interactions and relationships while placing a focus on governance at local, national, and international context.

RATIONALE FOR THIS THESIS

SRHR has been widely studied, from the measurement of progress of indicators, identification of key challenges, service provision, user perceptions and attitudes, human rights as well as policy and programme implementation (41-43). The UNCoLSC has underscored the key role that medicines play in healthcare delivery specially to avert many deaths (15). Progress is being made towards SDG targets but it is particularly slow in improving essential medicines as governments and donors continue to provide limited funding for medicines (44). However, access (availability, prices and affordability) to SRH commodities has not been adequately studied to inform policy makers.

To ensure that the place of access to essential medicines is upheld in the fulfilment of the right to the highest attainable standard of health, the World

Health Assembly in 2001 passed resolution 54.11 (45). The resolution requested the Director-General in collaboration with non-governmental organizations and other concerned partners to support Member States to set up systems for voluntary monitoring of medicine prices and reporting global medicine prices with a view to improving equity in access to essential medicines in health systems.

The WHO/HAI methodology was developed in 2003 to measure availability, prices and affordability of medicines and has been used across all regions of the world (46). The results have been used by governments and internationally to make decisions on improvement of access to medicines (47-49). Most of the studies using the WHO/HAI methodology have focused on a core basket of medicines for global comparisons and although there have been recent adaptations to the methodology, it has hardly been used for SRH medicines.

OBJECTIVE OF THE THESIS

This thesis assesses the current situation on access to selected SRH commodities in Sub-Saharan African countries. We focus on Level V and IV by Bidgeli et al by reviewing public policies at a national level and regional and international practices and regulations by studying how countries and donors responded to the needs. We also study Level III and II of the access to medicines framework by measuring availability and affordability for different SRH commodities at health facility and health sector level.

THESIS OUTLINE

This thesis consists of six studies structured in four chapters. After the introduction, **Chapter 2** consists of two sub-chapters on governmental and donor responses to SRH needs at the global and international levels. **Chapter 2.1** presents an assessment of donor commitments and disbursements for sexual and reproductive health aid in Kenya, Tanzania, Uganda and Zambia. **Chapter 2.2** assesses inter-country comparisons of SRH policies and priorities by presenting a comparative content analysis of policy approaches to adolescent contraception in Uganda and Kenya. Adolescents are particularly a vulnerable group regarding SRH as they face expounded access challenges.

Chapter 3 studies access to SRH commodities in sub-Saharan Africa with a focus on availability and affordability. **Chapter 3.1** shows the results of a pilot study on availability, prices and affordability of UN Commission's lifesaving medicines for reproductive and maternal health in Uganda. **Chapter 3.2** presents an analysis of access to sexual and reproductive health commodities in East and Southern Africa: a cross-country comparison of availability, affordability and stock-outs in Kenya, Tanzania, Uganda and Zambia. **Chapter 3.3** subsequently focuses on availability, prices and affordability of oxytocin and misoprostol -the two frontline medicines for management of postpartum haemorrhage- in Kenya, Uganda and Zambia. Finally, since pregnant women and children under five years of age are the most vulnerable population to malaria (50). **Chapter 3.4** shows trends in access to first line antimalarial treatment and diagnostics in the private sector in Uganda between 2007 and 2018.

To finalise, **Chapter 4** draws lessons from the different studies conducted in the thesis, it presents conclusions and policy recommendations from all the papers. The chapter highlights methodological challenges and areas of improvement as well as provides insight into future studies in the area.

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2

GOVERNMENT AND DONOR
RESPONSES TO SEXUAL AND
REPRODUCTIVE HEALTH NEEDS AT
GLOBAL AND INTERNATIONAL LEVELS

2.1

DONOR COMMITMENTS AND DISBURSEMENTS FOR SEXUAL AND REPRODUCTIVE HEALTH AID IN KENYA, TANZANIA, UGANDA AND ZAMBIA

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Hendrika A. van den Ham, Tim Reed,
Hubert G. Leufkens, Aukje K. Mantel-Teeuwisse

ABSTRACT

Background

Sexual and Reproductive Health and Rights (SRHR) investments are critical to people's wellbeing. However, despite the demonstrated returns on investments, underfunding of SRHR still persists. The objective of this study was to characterize donor commitments and disbursements to SRH aid in four sub-Saharan countries of Kenya, Tanzania, Uganda and Zambia and to compare trends in donor aids with SRH outcome and impact indicators for each of these countries.

Methods

The study is a secondary analysis of data from the Organization for Economic Co-operation and Development's Assistance creditor reporting system and SRH indicator data from the Global Health Observatory and country demographic health surveys for a 16-year period (2002-2017).

We downloaded and compared commitments to disbursements of all donors for population policies, programs and reproductive health for the four African countries. SRH indicators were stratified into health facility level process/outcome indicators (modern contraceptive prevalence rate, unmet need for family planning, antenatal care coverage and skilled birth attendance) and health impact level indicators (maternal mortality ratio, newborn mortality rate, infant mortality rate and under 5 mortality rate).

Results

Donor commitments for SRH aid grew on average by 20% while disbursements grew by 21% annually between 2002 and 2017. The overall disbursement rate was 93%. Development Assistance Cooperation (DAC) countries donated the largest proportion (79%) of aid. Kenya took 33% of total aid, followed by Tanzania 26%, Uganda 23% and then Zambia (18%). There was improvement in all SRH outcome and impact indicators, but not enough to meet targets.

Conclusion

Donor aid to SRH grew over time and in the same period indicators improved, but improvement remained slow. Unpredictability and insufficiency of aid may be disruptive to recipient country planning. Donors and low- and middle-income countries should increase funding in order to meet global SRHR targets.

BACKGROUND

Universal access to sexual and reproductive health and rights (SRHR) is necessary for the achievement of peoples' social, economic and environmental dimensions of sustainable development (1). The attainment of SRHR has not been realized as highlighted by an estimated annual death of more than 350,000 women and 5.6 million children worldwide from preventable complications related to pregnancy and childbirth (2).

Developing countries are affected disproportionately with 99% of the deaths from complications related to pregnancy and childbirth which could be mostly prevented by proper healthcare and services (3). Developing countries have the highest maternal, newborn and under-5 mortality rates in the world (4). About 80 per cent of under-five deaths occur in two regions, that is sub-Saharan Africa and Southern Asia (2). Table 1 shows SRH indicators for some of the most affected sub-Saharan countries namely Kenya, Tanzania, Uganda and Zambia.

SRHR is one of the inequities that the Millennium Development Goals (MDGs) sought to address (9). Building on the MDGs, the Sustainable Development Goals (SDGs), agreed by 193 world leaders in 2015, are a 17-point plan to end poverty, combat climate change and fight injustice and inequality. SDG 3 aims to ensure healthy lives and promote wellbeing for all at all ages (10).

SDG 3 sets targets by 2030 which include; reduce the global maternal mortality ratio to less than 70 per 100,000 live births; end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to as low as 12 per 1,000 live births and under-5 mortality to as low as 25 per 1,000 live births; ensure universal access to sexual and reproductive health-care services including family planning, information and education, and the integration of reproductive health into national strategies and programs.

To meet the above targets and improve health status, adequate health financing is essential (11). However, low- and middle-income countries (LMICs) in which resources are limited also have inadequate health expenditure by governments (12). For example, in financial year 2009/10, the Kenyan government allocated about US$12.20 per person (equivalent to 5.4 % of the domestic budget) to health, and in Uganda the domestic budget was about US$11.20 per person equivalent to 7.4 % of the budget (13). This is against a backdrop of US$ 34 per person recommended by the WHO Commission on Macroeconomics and Health

Table 1. Comparison of SRH indicators for Kenya, Tanzania, Uganda and Zambia (4-8)

Variable	Context Kenya	Tanzania	Uganda	Zambia	Sub-Saharan Africa	Global
2019 Population (in millions)	52.574	58.005	44.270	17.861	1,066.283	7,713.468
Total Fertility Rate	3.9	5.2	5.4	4.7	4.9	2.5
Modern Contraceptive Prevalence Rate	53%	32%	38%	48%	26%	55%
Unmet need for Family Planning	18%	23%	28%	20%	24%	12%
Teenage Pregnancy Rate	15%	27%	25%	29%	–	44%
Maternal Mortality Ratio (per 100,000 live births)	362	556	336	252	546	216
Infant Mortality Rate (per 1,000 live births)	39	43	43	42	56	30.5
Under five mortality Rate (per 1,000 live births)	52	67	53	61	79	41

for governments to spend per year to provide a set of essential interventions (14). The limited spending on health by LMIC governments has meant that outside support is required (15). The magnitude of external funding on health as a percentage of total health expenditure has been significant, varying from 11% to 60% in over 28 sub-Saharan countries (16).

The United Nations (UN) Secretary-General's *Global Strategy for Women's, Children's and Adolescents' Health, 2016-2030* aims to catalyze the SDGs by mobilising stakeholders including governments, donors/development partners, civil society, academia, healthcare providers and communities to scale up and prioritize high-impact interventions for strengthening health systems, integrating efforts across diseases and sectors as well as promoting human rights, gender equality and poverty reduction (9). In low-income countries, where much development assistance for health (DAH) is targeted, it made up 34.6% of total health spending in 2016 (17). DAH was estimated to total $37.6 billion in 2016, up 0.1% from 2015. However, after a decade of rapid growth from 2000 to 2010 (11.4% increase annually), DAH grew at only 1.8% annually between 2010 and 2016. SRHR is one of the priority areas financed by DAH from wealthier nations and international agencies (18).

In order to improve accountability for DAH, there has been increased efforts in resource tracking (19, 20). Studies have tracked trends and magnitude of donor funding to different areas of SRH that is reproductive, maternal, newborn, and child health (21), and sought to verify whether donor resources are better targeted to countries with the highest need (21). However, there is need to further explore what determines donor aid to recipient countries, priorities funded by donors within recipient countries, donor aid predictability (including whether donors disburse what they commit), how the donor aid is used by recipient countries, its effectiveness, and how donor aid influences funding of priorities by recipient countries (22).

This study sought to characterize donor predictability by examining their commitments and disbursements for SRH aid in four of the most affected countries in sub-Saharan Africa. The study therefore described the types of donors, the value and trends of their commitment and disbursement for SRH aid and matched the aid to changes in SRH indicators across the four countries in order to add to the body of knowledge on DAH accountability.

METHODS

Data sources and definitions

The study is a secondary analysis of data on donor aid commitments and disbursements for SRH from the Organization for Economic Co-operation and Development's Assistance creditor reporting system (OECD CRS) for a 16-year period (2002-2017).

The OECD CRS is a database to which donors of official development assistance (ODA), other official flows and private grants report their commitment and disbursement activities as described at http://www.oecd.org/dac/stats/methodology.html. The CRS is a publicly accessible web-based database on aid activities, developed and maintained by the Development Assistance Committee (DAC) of the OECD (18). OECD DAC commitments and disbursements are tracked at both the aggregate level and at the level of particular aid programmes (22).

ODA refers to grants or loans from members of the OECD DAC (a group of 30 nations including most of the West European and North American countries, the European Union, Australia, New Zeeland, Japan, and Korea), non-DAC bilateral donors (mostly Eastern European and Middle Eastern countries for example Croatia, Bulgaria, Turkey, Israel, United Arab Emirates, Kuwait),

multilateral institutions (for example International Monetary Fund, regional development banks), global health initiatives (for example Global Fund to Fight Tuberculosis, AIDS and Malaria, Global Alliance for Vaccines and Immunization) and private philanthropists (for example Bill and Melinda Gates Foundation, Metlife Foundation, United Postcode Lotteries) with promotion of economic development and welfare as the main objective (22). In addition to financial flows, technical co-operation is included in aid (22).

Commitments refer to a firm obligation, expressed in writing and backed by the necessary funds, undertaken by an official donor to provide specified assistance to a recipient country or a multilateral organisation (22). Recipients are defined by the CRS as all 'developing countries' eligible to receive ODA. These include all 'least developed countries' as defined by the United Nations and all LMICs defined by the World Bank, except any members of the G8, or members or agreed future members of the European Union (23).

Disbursements refer to the release of funds to or the purchase of goods or services for a recipient; by extension, the amount thus spent. Disbursements record the actual international transfer of financial resources, or of goods or services valued at the cost to the donor. In the case of activities carried out in donor countries, such as training, administration or public awareness programmes, disbursement is taken to have occurred when the funds have been transferred to the service provider or the recipient.

WHO and the United Nations Interagency Working Group set 17 population-based indicators to provide an overview of the global and national SRH situation (24). We divided these indicators into health facility level process/outcome indicators and health impact level indicators. Of the process/outcome indicators, we selected indicators that are routinely collected using country demographic health surveys conducted between 2002 and 2018. These include modern contraceptive prevalence rate (mCPR), unmet need for family planning (FP), antenatal care coverage (ANC) and percent of births attended by skilled health personnel. For impact we selected the mortality indicators, maternal mortality rate (MMR) and neonatal mortality rate (NMR), and added infant mortality rate (IMR) and under 5 mortality rate (U5MR).

Data collection
We downloaded ODA data on commitments and disbursements for all donors for population policies, programs and reproductive health for four sub-Sahara African countries; Kenya, Tanzania, Uganda and Zambia from the OECD CRS for a 16-year period (2002 to 2017) on 22nd September 2019.

OECD-CRS database has eight parameters: donors, sectors, ODA flow, channels, amount type, flow type, type of aid, and unit of aid in US million dollars. We selected data for all 110 donors reporting onto the system to the four recipient countries. Under sectors we selected code 130 with data on population policies/ programs and reproductive health and took into consideration all its subgroups which included population policy and administrative management, family planning, sexually transmitted diseases control and personnel development. We used total ODA and we considered all the different channels of fund flows including the public sector, non-government organisations (NGOs) and civil society, public-private partnerships, multilateral organizations, teaching institutions, research institutions or think tanks. On amount type, we chose constant prices in US dollars (USD) which is the amount that is adjusted for the effects of inflation. Under flow types, we considered both commitments and disbursements. We selected all types of aid including budget support, core contribution and pooled programmes, project-type interventions and technical assistance. The selected data was then exported into Microsoft Excel spreadsheet.

We collected data on the SRH indicators from the Global Health Observatory (GHO) and DHS surveys accessed from DHS StatCompiler on 22nd September 2019. The Global Health Observatory derives this data from the United Nations Inter Agency Group (UN IAG) for Child Mortality Estimates: Levels and Trends in Child Mortality, Report 2017 (Available from: http://www.childmortality.org). Data on the MMR was derived from the World Bank Database available at http://data.worldbank.org/indicators/sh.sta.mmrt. We selected the four countries (Kenya, Tanzania, Uganda and Zambia) and filtered available data which was for the period (2002-2017) that was then exported into Microsoft Excel.

Data analysis
We studied trends for donor commitments and disbursements of SRH aid for the period 2002-2017 to the four countries. We examined variations in: the commitments and disbursements over time by total value; the commitments and disbursements over time by different types of donors (we considered

DAC countries, multilateral organizations, UN agencies and the World Bank which contributed 83.4% of funding to the four countries); and examined the commitments and disbursements over time to each of the four countries and by type of donors to each of the countries. In a descriptive manner, we compared the time series data on donor aid disbursements to SRH indicators in each of the four countries.

RESULTS

Total donor commitments for SRH aid to the countries

Total donor commitments for SRH to the four countries (Kenya, Tanzania, Uganda and Zambia) grew annually by 20% on average between 2002 and 2017 from USD 319.14 million to 1,635.05 million. There was an increase in commitments between 2002 and 2008 but thereafter there were fluctuations. The total amount of commitments equalled USD 21,678 million over the 16-year period. Kenya received the largest donor commitments totalling USD 7,571.24 million (35%) over the sixteen-year period, followed by Tanzania at 24% amounting to USD 5,296.66 million, Uganda at 22% amounting to USD 4,837.67 million and then Zambia being the lowest at 18% amounting to USD 3,972.04 million. Despite the general growth in commitments, there were year on year fluctuations over the period with a general decline in 2010. Figure 1 shows trends in donor commitments to the four countries.

DAC countries committed the largest proportion (82%) equivalent to USD 18,444.25 million over the sixteen-year period (2002-2017) followed by multilateral institutions, UN agencies and then the World Bank as shown in Annex 1.

DAC countries committed the highest amount (36% of their commitments) to a tune of USD 5,989.29 million to Kenya. Tanzania took the largest commitment of funds (USD 960.69 million, 30%) from multilateral donors. Uganda received the largest commitment of funds (USD 106.10 million, 30%) from UN agencies whereas the World Bank also committed most of its funds (USD 139.95 million, 46%) to Kenya. In contrast, Tanzania, Uganda and Zambia did not receive any commitments for SRH funds from the World Bank between 2005 and 2014. See table in Annex 2 for details.
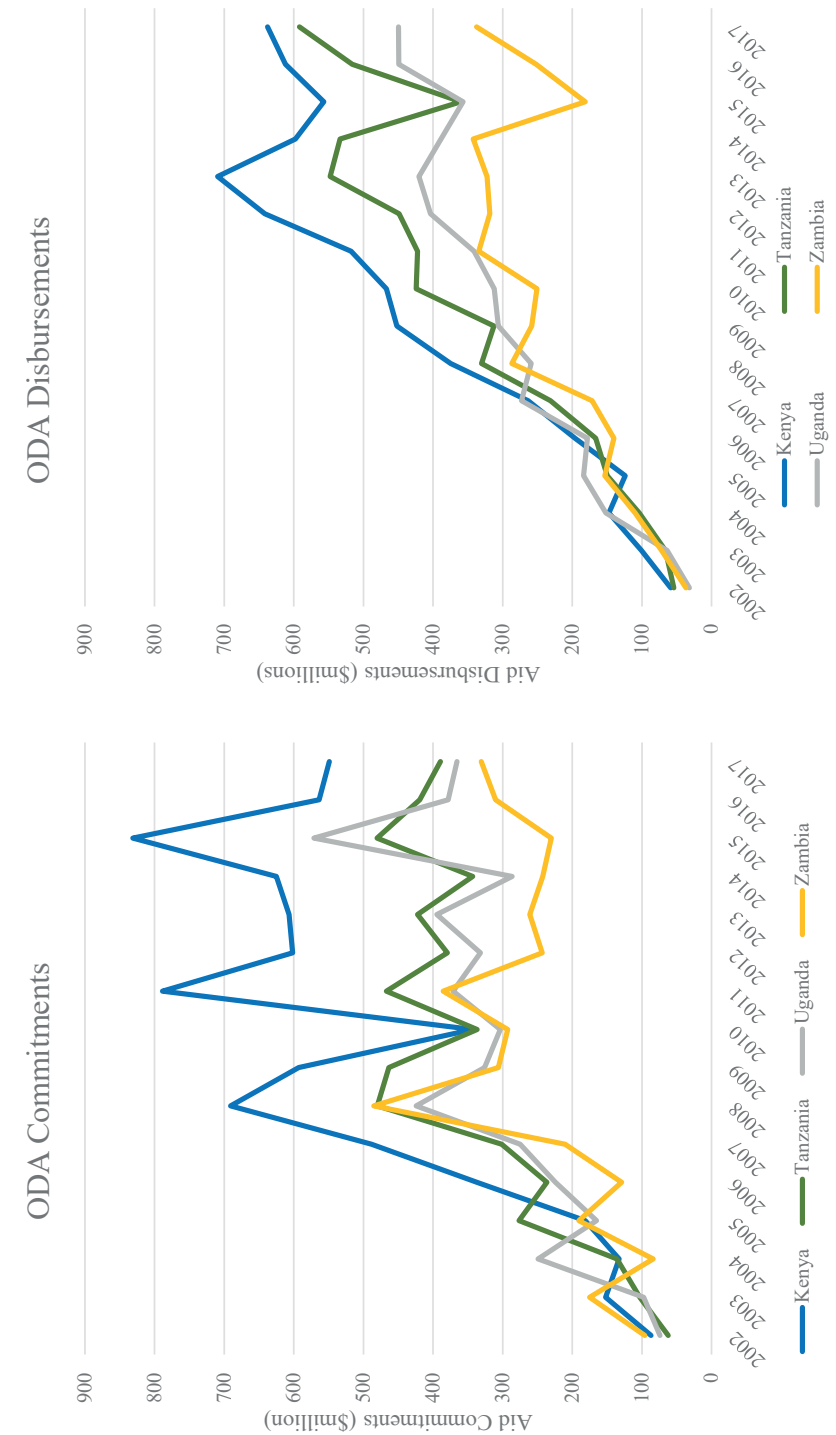

Figure 1. Trends in donor commitments and disbursements for SRH aid to countries 2002-2017 (in USD millions)

Total donor aid disbursements to countries

The total disbursements to the four countries over the 16-year period were USD 19,852.92 million. The overall disbursement rate over the sixteen-year period was 93%. Disbursements grew over time rising from USD 181.27 million in 2002 to 1,999.51 million in 2013, but thereafter reduced to 1,455.43 million in 2015 and rising to 2,016.85 million in 2017 at an average annual growth rate of 21%. In contrast with the commitments, there was a steady increase in disbursements until 2013 and 2014 for Zambia and a drop in 2015 from where disbursements then started to rise slowly. Kenya received the largest donor disbursements totalling USD 6,457.52 million (33%) over the sixteen-year period, followed by Tanzania at 26% amounting to USD 5,258.61 million, Uganda at 23% amounting to USD 4,568.79 million and then Zambia being the lowest at 18% amounting to USD 3,567.99 million. Despite the general growth in disbursements, there was a general decline between 2013 and 2015 before picking up in 2016. Trends in donor aid disbursements to the four countries are shown in figure 1.

The highest donor disbursement over the sixteen-year period (2002-2017) was from DAC countries comprising 79% of the total and rising from USD 138.36 million in 2002 to USD 1,686.01 million in 2017. Multilateral funders followed the DAC countries contributing 17% of disbursements. United Nation agencies and the World Bank contributed 2% each. Trends in donor aid disbursements for SRH by donor type in the four countries are shown in Annex 1.

Kenya was the biggest recipient from DAC countries getting 35% of funds worth USD 5,626.52 million over the period 2002-2017. Tanzania took the largest proportion (39%) of funds (USD 1,396.54 million) from multilateral donors; Uganda received the largest proportion 30% of funds worth USD 122.43 million from UN agencies whereas the World Bank also provided most (45%) of its funds (USD 146.05 million) to Kenya. This is detailed in table in Annex 2.

Country specific donor aid commitments and disbursements

Figure 2 highlights the trends in the donor aid commitments and disbursements to each of the four countries. The trends show that the commitments and disbursements grew mostly in line overtime but peaks in commitments were not reflected in the disbursements. While Kenya received most aid, it also had most fluctuations between amounts committed and disbursed. For Kenya 86% of commitments were disbursed compared to 100% of commitments for Tanzania, 95% for Uganda and 91% for Zambia over the total study period.

Comparison of trends in donor disbursements to SRH indicators

Figure 3 shows SRH health facility level process/outcome indicators which showed improvement over the 16-year period across the four countries. ANC improved and remained very high, mCPR increased with most pronounced increase observed in Kenya, and unmet need for FP reduced mostly in Kenya. Tanzania was much slower in improvement in the indicators. Skilled birth attendance increase was most pronounced in Uganda and Zambia. Improvement in SRH impact indicators (Figure 4) were most pronounced for Kenya. U5MR and IMR dropped markedly across the four countries but reduction in NMR was slow. MMR dropped across the four countries with Kenya having the most pronounced improvement. The rise in donor aid disbursements between 2005 and 2017 aligned with improved SRH outcome and impact indicators but not enough to meet SDG targets. Impact indicators reduced majorly between 2002 and 2005 and slowed thereafter especially for under-5-mortality.

DISCUSSION

Between 2002 and 2017, donor commitments for SRH aid to the four sub-Saharan countries of Kenya, Tanzania, Uganda and Zambia grew annually by 20% on average while disbursements grew at an average annual growth rate of 21%. DAC countries committed and disbursed the largest proportion (82% and 79% respectively) over the sixteen-year period. Kenya received the largest proportion of aid (33%) and was most favoured by DAC donors. Whereas overall 93% of committed aid to SRH was disbursed over the 16year period, there were year on year fluctuations in both commitments and disbursement. The study showed improvements in both SRH process/outcome indicators and impact indicators.

The trend of growth in donor aid observed in this study is in line with studies done at a global scale (18, 21, 25-29). There was an increase in both commitments and disbursements between 2002 and 2008. During 2009 to 2013 disbursements continued to grow although commitments declined. Towards the end of the Millennium Development Goals era between 2013 and 2015, a decline was observed in both commitments and disbursements for donor aid to the four countries. However, there was an increase in 2016 at the start of the SDGs era. These changes may point to some unpredictability of aid.

The peaks and dips in aid that are observed are not markedly erratic which may reinforce John Hudson's assertion that aid to health is one of the least volatile
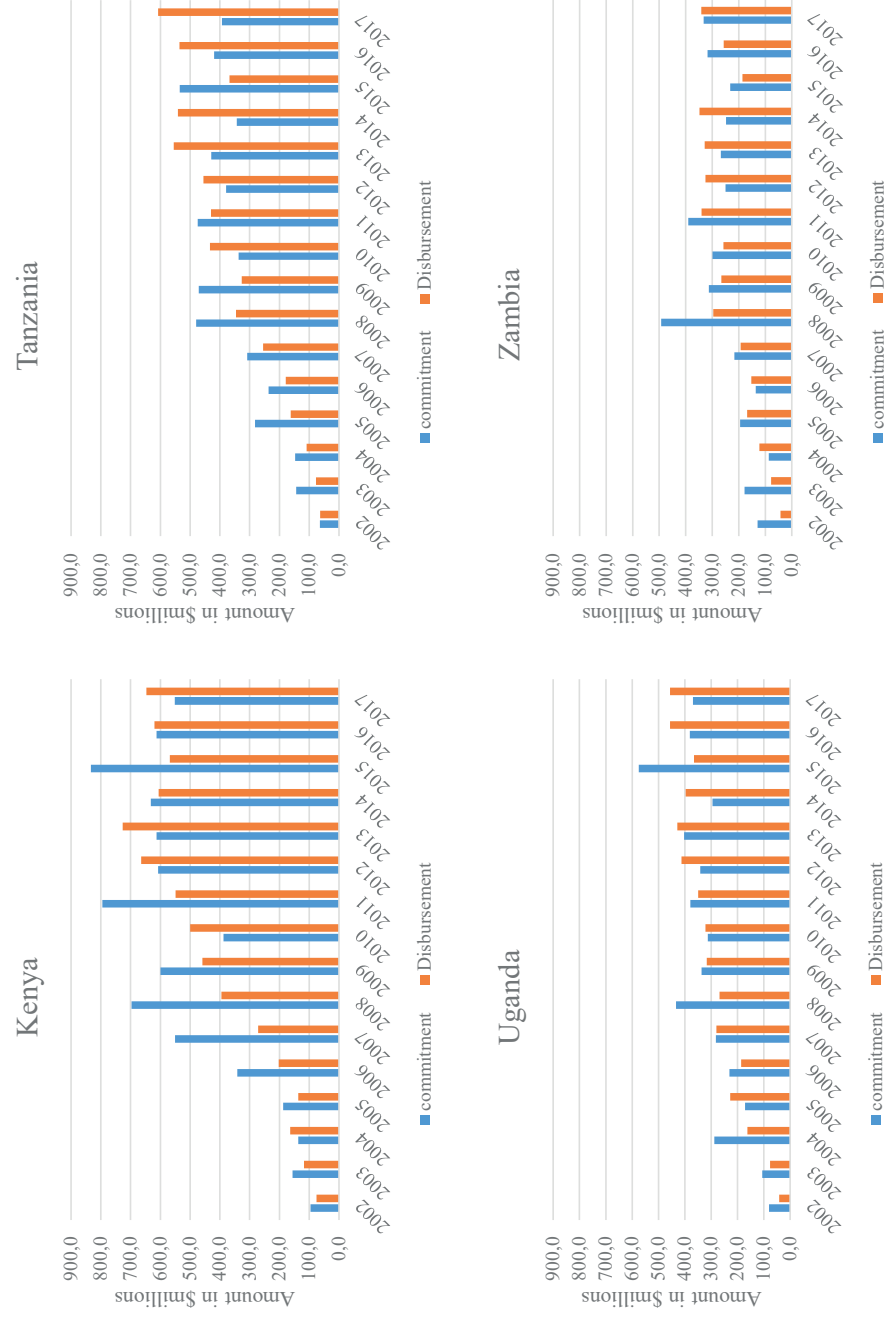
Figure 2. Country specific comparisons in donor aid commitments and disbursements, 2002-2017 (USD millions)

Legend: .... Aid disbursements ——— mCPR ——— unmet need for FP ——— ANC ——— Skilled birth attendance .... SRH health facility level process/outcome indicators

Figure 3. Comparison of disbursements with selected SRH health facility level process/outcome indicators
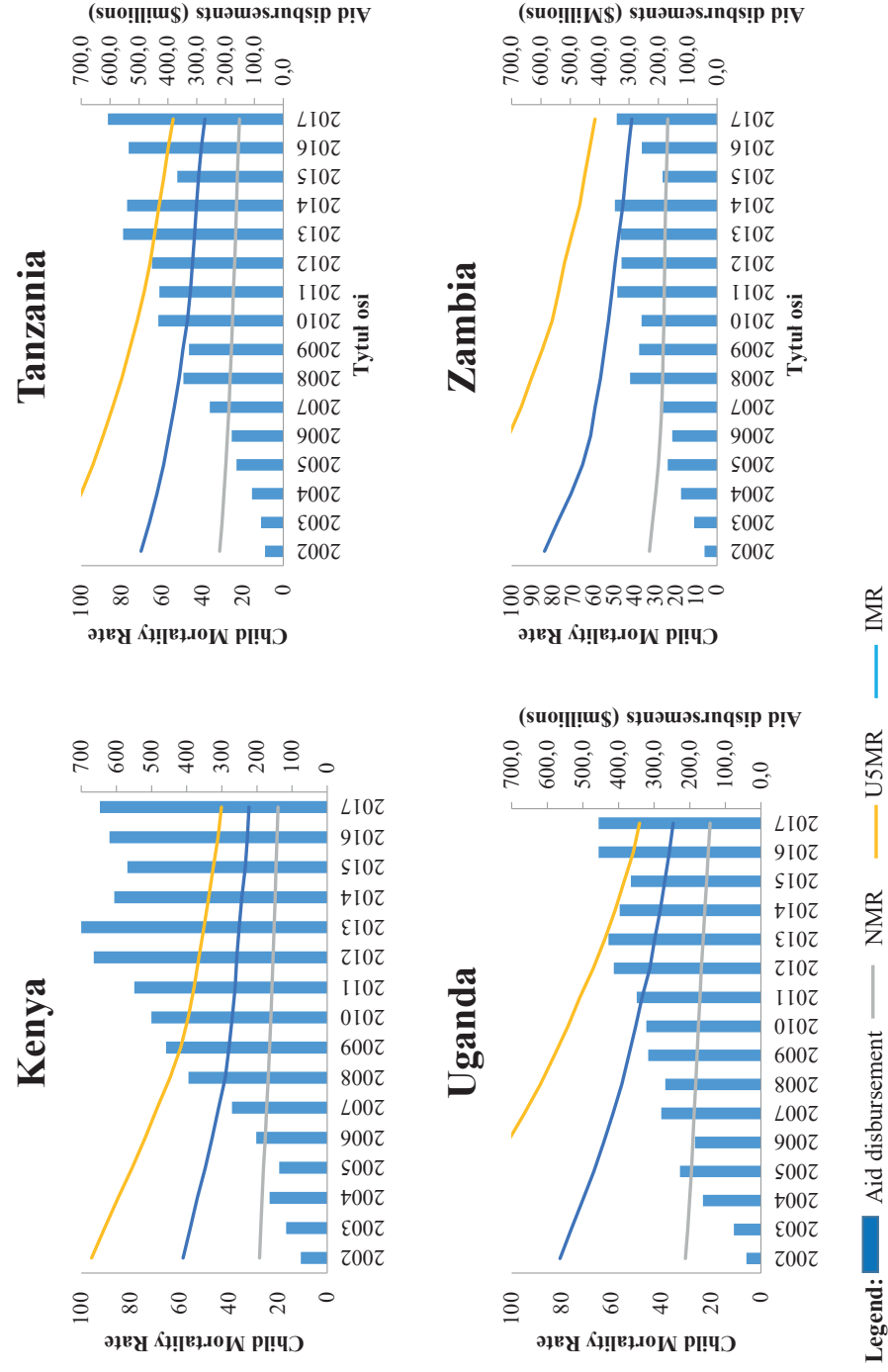
Figure 4a. Comparison of aid disbursements with neonatal, under 5 and child mortality rates

Legend: Aid disbursement — NMR — U5MR — IMR
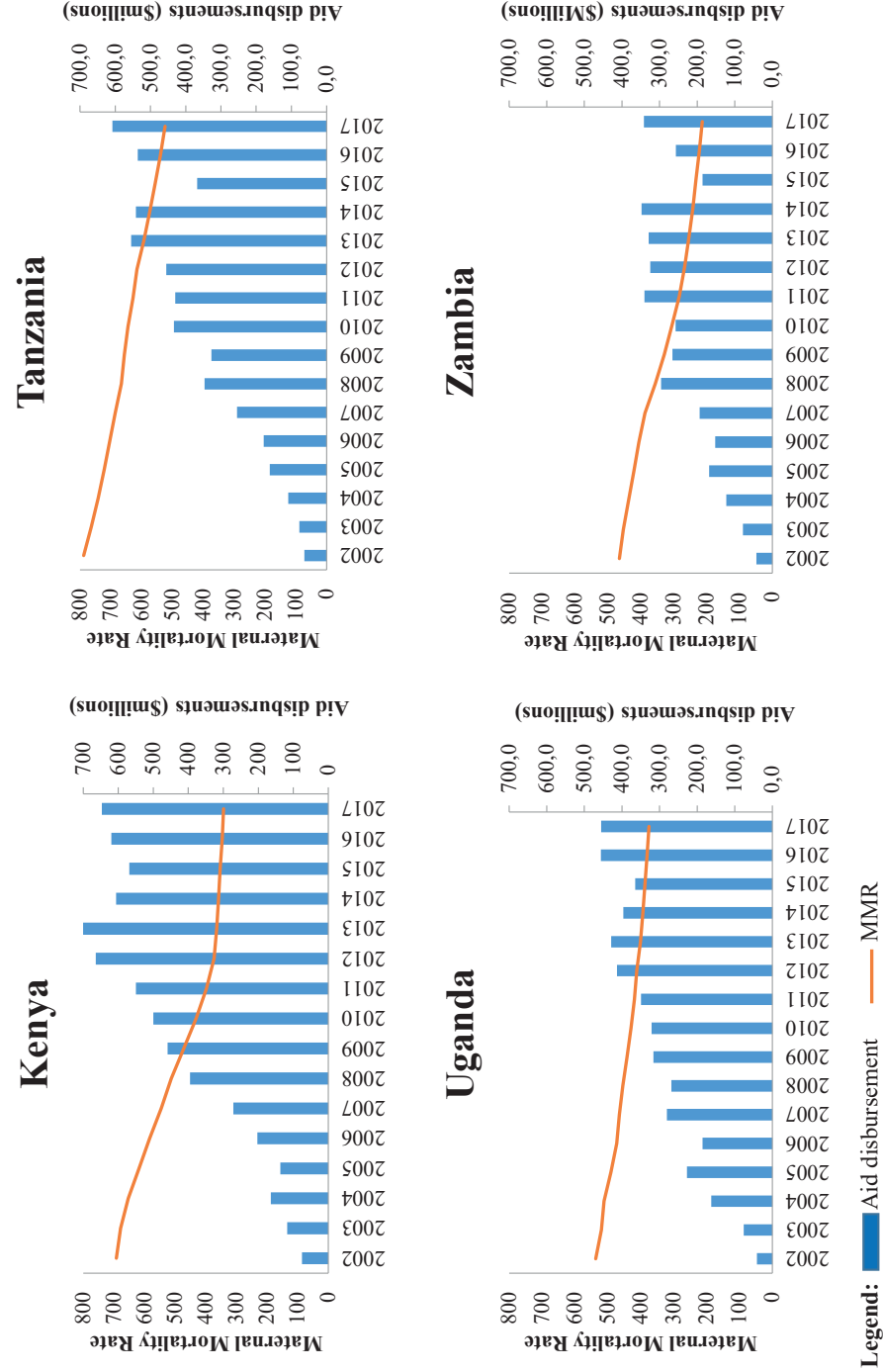
Figure 4b. Comparison of aid disbursements with maternal mortality rates

Legend: Aid disbursement — MMR

(30). However, Kenya had the largest fluctuation between funds committed and those disbursed. When donors do not disburse what they commit, it affects the recipient governments' ability to plan and therefore impacts on results as was noted by Arregoces et al (21). Recipient countries should therefore cautiously rely on aid and track volatility in aid provided.

While there was improvement in both SRH outcome and impact indicators alongside growth in donor aid over the 16-year period, the SRH impact indicators are not reducing fast enough to meet SDG targets (2, 4). Kenya, which received most funds, also had the most promising SRH indicators. Zambia on the other hand received the least SRH aid over the period and with its population that is less than half of any of the other three countries, is struggling with SRH indicators of a similar magnitude (4-8). LMICs will require more concerted efforts to avert future maternal and child mortality.

The disbursements by the different donors showed countries of preference. DAC countries and the World Bank provided most aid to Kenya; Tanzania received most funds from multilateral donors whereas Uganda was most preferred by UN agencies. Donors have preferred countries to provide aid based on strategic interests. The magnitude of aid may differ based on various reasons, for example; delays in project implementation, emergencies that call for immediate support interventions, sometimes donor countries have realized more or less than expected growth and therefore have more or less aid available, other times there are changes in donor political environment.

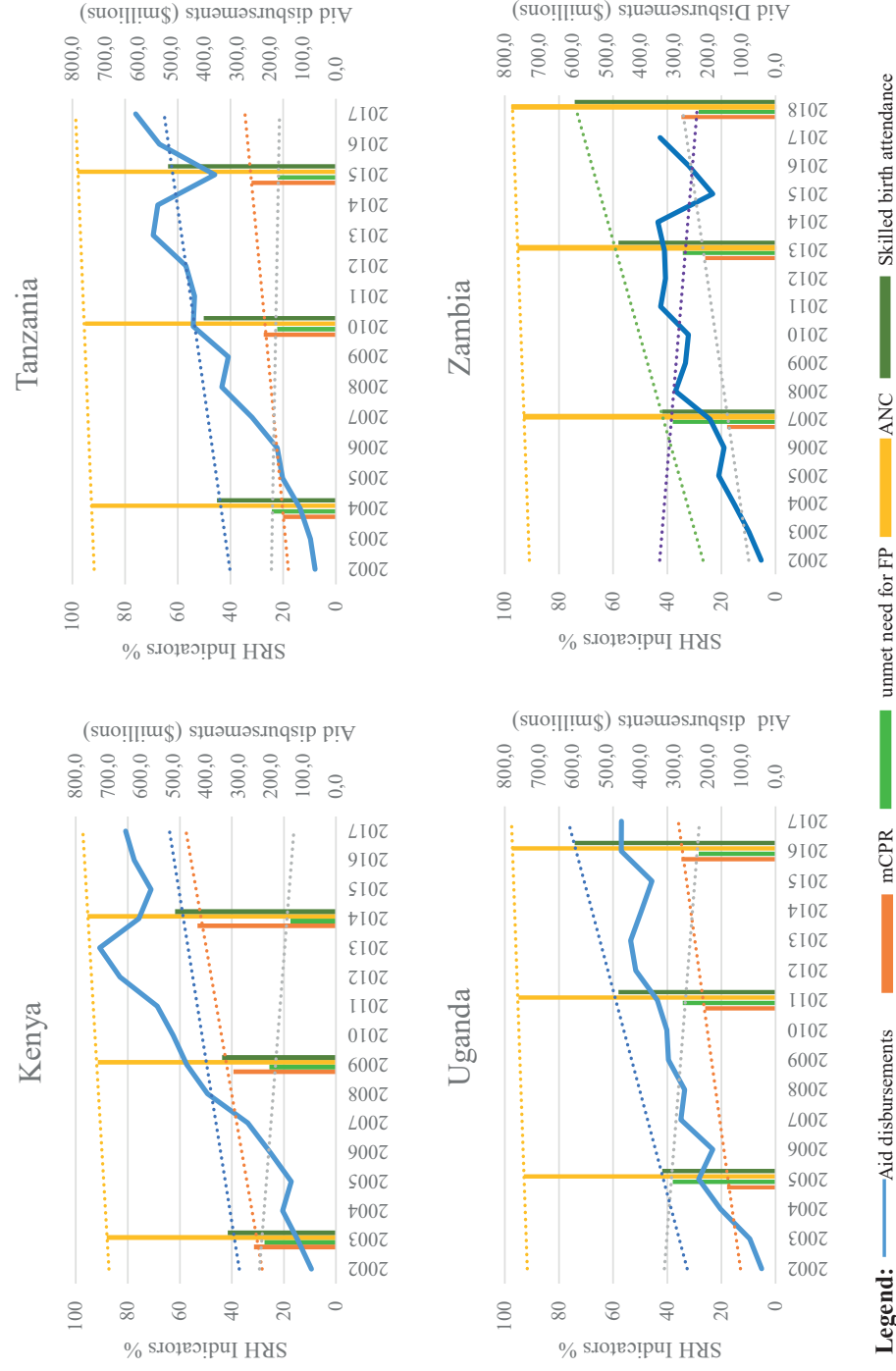The preference for some countries by donors may also not be targeted to recipient national priorities or countries with most need as noted by Grollman et al and other studies (26, 31). However, what is clear is the need for more funding to meet SDG3 targets (10) and therefore more deliberate targeting of funding to country needs and priority interventions is required (32-34). Countries have an obligation to the United Nations to spend a target of 0.7% of their gross national income (GNI) on international aid (35). Bilateral aid is a reflection of strategic interests of donors and is driven by variables that include: an obligation to protect human rights, dignity and solidarity; trade and economic relations with recipient countries; political interests including creating stability in poor countries to reduce migration; level of transparency and accountability within recipient governments (36, 37). However, politics is the ultimate determinant (38-40). As countries develop, donor countries prefer to transition from aid

to trade. LMICs therefore ought to progressively move away from reliance on donor support and increase country ownership of health needs by consistently improving domestic investments in SRH (41, 42), as reflected in the 2017 Tokyo declaration on Universal Health Coverage (43).

To meet the aspirations of the United Nations (UN) Secretary-General's *Global Strategy for Women's, Children's and Adolescents' Health, 2016-2030 (9)* and the Tokyo Declaration to Universal Health Coverage (43), more efforts will be required to mobilize governments, donors and other stakeholders to ensure sustained funding to SRH (42). This is especially important in the light of slower improvement in some of the SRH indicators in the latest years. Aid has been shown in other studies to have positive long-term effect on health and on development (44-46). Also, Dieleman et al note that in the near term, increased domestic spending on health alone is unlikely to cover the gaps to meet the ambitious health goals laid out in the SDGs (47). Therefore, increased funding to DAH is required and should be in accordance with principles of the Paris Declaration on Aid Effectiveness.

SRHR investments are critical to people's wellbeing, the prosperity and resilience of families, communities and nations (17). These investments are cost-effective and cost-saving, freeing resources for investment in other development priorities with high payoffs for equality and equity. Regardless of the demonstrated returns on investments, underfunding of SRHR still persists. This is a contributing factor to why the core goal of achieving universal access to sexual and reproductive services adopted by 179 governments at the International Conference on Population and Development (ICPD 1994) remains unfulfilled (17).

The Organization for Economic Co-operation and Development's Development Assistance Committee (OECD DAC) is one of the most comprehensive tracking platforms for resource flows. The OECD CRS information has been recorded, in one form or another, since 1967. It is relatively complete in terms of bilateral aid commitments since 1995. Even taking into account changes in definitions, the time series information is the most stringent and validated database on aid flows that currently exists (48). In addition, the database provides for accuracy of data as it ensures that accurate and comparable measurements of donor outflows can be derived (48).

As shown by other similar studies, donor reporting to the CRS has improved over time (49). The CRS is limited by the accuracy, completeness, consistency, and timeliness of donor reports to improve data in the system which also affect study is limited. It is important that more efforts are made to ensure improvement of data under the CRS. It is also important to note that the study only describes donor funding for SRH and how it compares with some of the most critical SRH indicators. Statistical assessment of the relation between disbursements and SRH indicators was not carried out since there are many factors which influence these indicators. The study does not presuppose that aid can be independent of both government (domestic) funding and out-of-pocket payments (49). As is noted in other studies, this study also does not explain variation or timeliness in donor aid to different countries and therefore further research is needed (50). However, the strength of this study is that it zooms in on some of the specific countries with most need, begins to assess predictability of aid by assessing commitments and disbursements to add to the body of knowledge on accountability of donor aid for SRH. Reporting on the time when both commitments and disbursements are made in CRS will help strengthen arguments around predictability of aid which is important for recipient country planning (41).

CONCLUSION

Donor commitments for SRH aid grew on average by 20% annually while disbursements grew by 21% annually between 2002 and 2017. There was improvement in SRH indicators alongside growth in donor aid, but the improvement is slow to meet SGD targets. There were year-on-year fluctuations in both commitments and disbursements. Unpredictability and insufficiency of donor aid may be disruptive to country planning and may lead to missing of global targets on SRH. Donors and LMICs should increase domestic investments in order to meet global SRHR targets.

ACKNOWLEDGEMENTS

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ANNEX 1
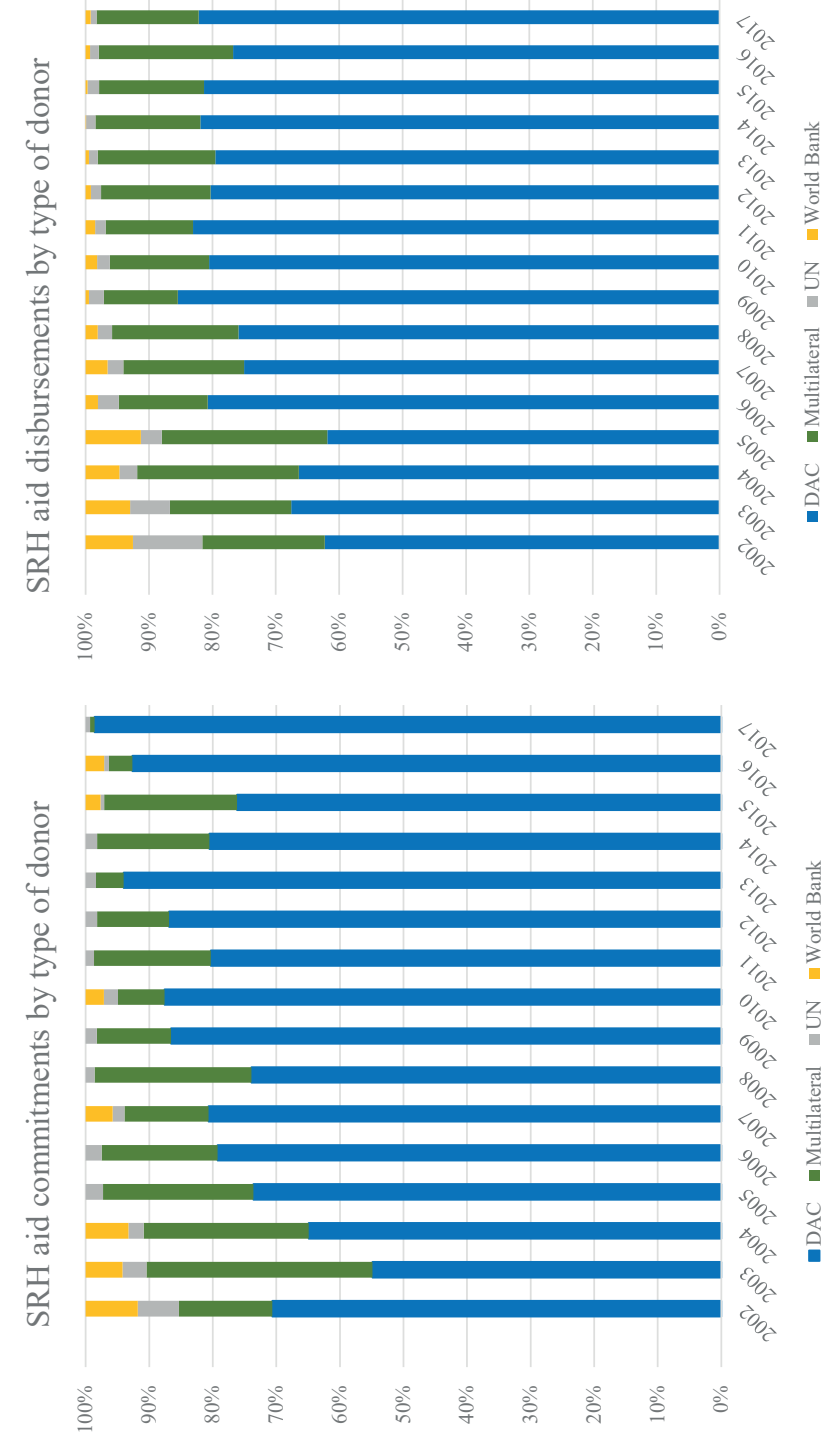
Annex 1 Figure. Trends in proportion of commitments and disbursements of SRH aid by type of donor, 2002-2017

ANNEX 2

Annex 2 Table. SRH aid donor commitments and disbursements by donor type (2002-2017), amounts are expressed in million US dollars

Commitments

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	TOTAL
DAC																	
Kenya	78.553	99.658	125.05	175.536	252.222	426.107	640.742	586.829	298.035	675.744	595.509	600.713	402.017	622.324	514.439	546.697	6640.175
Tanzania	54.354	54.638	94.037	155.153	160.298	217.03	319.881	339.207	328.858	383.507	302.409	368.666	310.246	425.458	414.982	385.601	4314.325
Uganda	68.137	45.426	128.998	159.22	217.973	267.499	338.028	315.62	294.022	350.071	276.549	386.085	278.672	382.17	374.85	362.284	4245.604
Zambia	63.155	120.596	81.331	125.684	122.639	184.706	260.846	246.388	256.685	227.943	202.837	254.779	236.784	227.983	302.879	328.914	3244.149
Total	**264.199**	**320.318**	**429.416**	**615.593**	**753.132**	**1095.342**	**1559.497**	**1488.044**	**1177.6**	**1637.265**	**1377.304**	**1610.243**	**1227.719**	**1657.935**	**1607.15**	**1623.496**	
Multilaterals																	
Kenya	8.374	52.359	7.539	5.894	84.669	62.300	50.019	6.263886	45.101221	112.72033	6.186066	5.990998	223.14406	208.90446	49.119027	2.476	931.063
Tanzania	7.858	48.412	41.935	121.148	76.179	84.234	160.242	124.30244	7.868091	83.56549	76.996327	53.665792	32.820869	54.93998	4.191553	3.810	982.173
Uganda	5.898	52.208	120.021	6.155	6.078	7.408	86.305	10.239727	9.384738	21.034499	55.47317	8.428447	7.872573	188.95425	3.232976	3.368	592.066
Zambia	32.810	54.664	2.495	64.837	6.389	25.629	224.243	59.610526	36.159785	157.35712	40.471814	6.370723	5.474929	2.0751	7.403347	1.898	727.891
Total	**54.941**	**207.645**	**171.993**	**198.035**	**173.317**	**179.572**	**520.810**	**200.416**	**98.513**	**374.677**	**179.127**	**74.455**	**269.312**	**454.873**	**63.946**	**11.554**	
UN																	
Kenya	8.374	4.35	4.1	5.895	5.038	4.4	6.458	6.264	6.173	6.119	6.186	5.991	6.486	2.49	3.301	2.476	84.101
Tanzania	6.074	6.56	4.006	5.97	6.389	7.015	6.877	7.332	7.868	7.464	6.643	7.152	7.511	4.305	4.192	3.811	99.169
Uganda	5.899	8.175	5.079	6.155	6.078	7.408	9.285	10.24	9.385	8.005	9.247	8.309	7.873	3.653	3.233	3.369	111.393
Zambia	3.992	2.758	2.495	4.793	6.39	6.391	7.46	6.445	6.394	5.454	6.607	6.371	5.475	2.075	2.822	1.898	77.82
Total	**24.339**	**21.843**	**15.680**	**22.813**	**23.895**	**25.214**	**30.080**	**30.281**	**29.820**	**27.042**	**28.683**	**27.823**	**27.345**	**12.523**	**13.548**	**11.554**	
World Bank																	
Kenya	..	..	..	..	..	57.900	..	..	38.927	..	..	..	..	..	45.817	..	142.646
Tanzania	1.784	33.951	11.171	..	..	..	..	..	..	..	..	..	..	50.634	..	..	97.542
Uganda	..	..	33.515	..	..	..	..	..	..	..	..	..	..	..	..	..	33.515
Zambia	28.818	..	..	..	..	..	..	..	..	..	..	..	..	..	4.581	..	33.400
Total	**30.603**	**33.952**	**44.687**	**0.000**	**0.000**	**57.900**	**0.000**	**0.000**	**38.928**	**0.000**	**0.000**	**0.000**	**0.000**	**50.635**	**50.400**	**0.000**	

Disbursements

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	TOTAL
DAC																	
Kenya	41.864	73.485	103.113	108.543	188.013	231.201	334.214	428.222	405.305	478.938	562.696	625.659	533.152	445.266	523.018	543.830	5626.526
Tanzania	44.696	51.298	90.207	86.502	111.964	160.574	213.178	243.162	325.650	340.390	342.201	371.138	396.040	323.0263	346.625	415.252	3861.909
Uganda	20.978	49.379	109.961	130.106	170.654	226.643	246.705	291.195	278.517	317.901	343.652	378.290	346.411	264.3558	336.094	400.685	3911.535
Zambia	30.824	61.773	67.213	104.188	109.668	131.055	196.729	206.357	207.678	248.153	243.417	246.251	273.766	176.9099	227.847	326.241	2858.076
Total	**138.364**	**235.935**	**370.495**	**429.341**	**580.301**	**749.474**	**990.827**	**1168.937**	**1217.152**	**1385.384**	**1491.968**	**1621.340**	**1549.370**	**1209.558**	**1433.585**	**1686.01**	
Multilaterals																	
Kenya	16.768	27.301	44.336	15.280	8.251	32.406	40.386	23.681	61.785	38.921	79.041	83.738	64.511	111.624	89.1062	93.855	830.998
Tanzania	9.438	14.947	13.552	63.094	54.215	70.908	117.075	69.308	98.581	81.662	106.502	176.519	137.384	37.167	169.560	176.624	1,396.544

Annex 2 Table. (continued)

Commitments

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	TOTAL
Uganda	10.796	14.570	41.874	53.788	7.637	46.177	12.242	14.847	33.591	23.167	60.116	41.810	42.307	92.46	112.938	48.926	657.262
Zambia	5.904	9.988	42.4543	49.238	30.526	40.504	90.173	51.818	43.251	86.356	75.061	76.099	68.535	4.619	23.948	11.437	709.917
Total	**42.907**	**66.808**	**142.218**	**181.402**	**100.630**	**189.998**	**259.878**	**159.655**	**237.211**	**230.108**	**320.722**	**378.168**	**312.739**	**245.881**	**395.554**	**330.843**	
UN																	
Kenya	8.374	4.350	4.100	5.894	5.038	4.399	6.457	6.691	6.578	6.599	7.143	6.285	6.486	7.470	7.781	5.145	98.798
Tanzania	6.074204	6.559978	4.006439	5.969597	6.388663	7.014642	6.876169	7.550227	7.926127	7.464311	6.642515	7.152426	7.510546	7.328398	6.930842	4.784	106.180
Uganda	5.898	8.175	5.079	6.155	6.078	7.408	9.285	10.239	9.384	8.004	9.246	8.309	7.872	8.276	6.896	6.126	122.437
Zambia	3.99	2.758	2.495	4.730	6.389	6.389	7.459	7.623	6.394	5.453	6.607	6.370	5.474	4.287	4.827	3.087	84.343
Total	**24.339**	**21.844**	**15.681**	**22.750**	**23.895**	**25.212**	**30.079**	**32.105**	**30.283**	**27.522**	**29.640**	**28.118**	**27.345**	**27.364**	**26.436**	**19.143**	
World Bank																	
Kenya	8.271	12.059	12.676	7.257	0.992	3.215	13.729	0.359	26.427	24.885	15.327	10.664	1.862	4.233	0	4.088	146.051
Tanzania	3.066	4.552	0.915	6.160	5.775	16.061	9.113	6.756	0.896	0	0	0	0	0	12.843	11.168	77.311
Uganda	3.455	4.163	5.796	37.420	1.332	-0.049	0	0	0	0	0	0	0	0	0	0	52.120
Zambia	1.771	3.741	10.341	9.726	5.761	15.227	1.721	0.0173	0	0	0	0	0	0	0	0.647	48.957
Total	**16.566**	**24.517**	**29.730**	**60.566**	**13.862**	**34.455**	**24.565**	**7.134**	**27.324**	**24.885**	**15.327**	**10.665**	**1.863**	**4.233**	**12.844**	**15.904**	

2.2

A COMPARATIVE HUMAN RIGHTS ANALYSIS OF LAWS AND POLICIES FOR ADOLESCENT CONTRACEPTION IN UGANDA AND KENYA

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ABSTRACT

Background

Improving access to adolescent contraception information and services is essential to reduce unplanned adolescent pregnancies and maternal mortality in Uganda and Kenya, and attain the Sustainable Development Goals on health and gender equality. This research studies to what degree national laws and policies for adolescent contraception in Uganda and Kenya are consistent with WHO standards and human rights law.

Methods

This is a comparative content analysis of law and policy documents in force between 2010-2018 governing adolescent (age 10-19 years) contraception. Between and within country differences were analysed using WHO's guidelines "Ensuring human rights in the provision of contraceptive information and services".

Results

Of the 93 laws and policies screened, 26 documents were included (13 policies in Uganda, 13 policies in Kenya). Ugandan policies include a median of 1 WHO recommendation for adolescent contraception per policy (range 0-4) that most frequently concerns contraception accessibility. Ugandan policies have 6/9 WHO recommendations (14/24 sub-recommendations) and miss entirely WHO's recommendations for adolescent contraception availability, quality, and accountability. On the other hand, most Kenyan policies consistently address multiple WHO recommendations (median 2 recommendations/policy, range 0-6), most frequently for contraception availability and accessibility for adolescents. Kenyan policies cover 8/9 WHO recommendations (16/24 sub-recommendations) except for accountability.

Conclusions

The current policy landscapes for adolescent contraception in Uganda and Kenya include important references to human rights and evidence-based practice (in WHO's recommendations); however, there is still room for improvement. Aligning national laws and policies with WHO's recommendations on contraceptive information and services for adolescents may support interventions to improve health outcomes, provided these frameworks are effectively implemented.

BACKGROUND

The 2030 Agenda for Sustainable Development seeks to improve gender equality (Sustainable Development Goal (SDG 5) and reduce maternal mortality (SDG 3), which claims the lives of 289,000 women annually (1). Worldwide, pregnancy-related causes are the leading cause of death among women aged 15-24 and this is mostly in low- and middle-income countries (2). Improving access to contraceptive information and services is essential to reduce maternal mortality (3, 4).

Achieving the SDG goals requires adopting supportive national sexual and reproductive health (SRH) laws and policies and repealing regressive legal rules, for example restrictions on contraception and abortion services. Recent changes in global and national SRH policies illustrate that the policy making process is dynamic and complex, sometimes leading to scientifically irrational public health decisions by governments (5). In the case of access to contraception for adolescents, one school of thought favours restricting access based on the notion of traditional morals, values, and culture; while another school of thought promotes contraceptive access based on the best medical evidence and human rights law (6). In this paper we refer to adolescents as people aged 10-19 years as defined by the World Health Organisation (WHO).

Both Uganda and Kenya have a high maternal mortality rate (336 and 362 per 100,000 live births, respectively), a low prevalence of modern contraceptive use among adolescents aged 15-19 years in union (7% and 20% respectively,) and high fertility rates among adolescents aged 15- 19 years ((132/1000 and 96/1000 women, respectively), respectively) (7, 8). During the tenure of the Millennium Development Goals (MDGs), both governments modestly improved contraceptive uptake with the use of modern contraceptives among married women increasing in Uganda from 18% (2001) to 35% (2016) and in Kenya from 31.5% (2003) to 58% (2014) and adopted laws and policies promoting adolescent contraception (9, 10). These achievements were realised against the backdrop of restrictive gender norms, some political opposition often from religious communities, and negative media messages about contraception (11). The Ugandan government's decision to endorse the 2018 National Sexuality Education Framework made significant headlines by effectively abolishing comprehensive sexuality education for adolescents including contraception in favour of a values-based approach that favours abstinence promotion (12, 13).

National law and policy are important tools that shape legal obligations, government programmes, social norms, and the potential to hold governments accountable for fulfilling girls' and women's health rights (1). The East African Community (EAC), a regional intergovernmental organisation including Kenya and Uganda, adopted the HIV & AIDS Prevention and Management Act in 2012 that requires EAC States to ensure adolescents have access to SRH information and education, including about contraception (14).

It is unclear to what extent the national laws and policies in Kenya and Uganda uphold contraceptive availability, accessibility, acceptability, quality, freedom from discrimination, and other standards in the WHO's guidance document called "Ensuring human rights in the provision of contraceptive information and services" (15). WHO's guidelines offer a global standard of evidence-informed and human rights-based recommendations for adolescent contraception; they have been used to analyse domestic law and policy in South Africa, the Philippines, and Paraguay, as well as to guide country-level action (16-20). Failing to address the norms underlying law, policy, and public health practice may be why some micro-level interventions and programmes are unable to deliver improved adolescent SRH outcomes (21). Laws and policies that protect and promote adolescents' access to safe and affordable contraception of assured quality in a non-discriminatory manner can create a supportive environment for the enjoyment of their rights, poverty reduction, and sustainable development.

METHODS

This article aims to assess to what degree national laws and policies for adolescent contraception (2010-2018) in Uganda and Kenya are consistent with the global standards in the WHO's guidance. This study is a comparative content analysis of legislation and policy documents governing any aspect of adolescent contraception at the national level in Uganda and Kenya. As has been described in previous studies, we defined policy as principles or strategies for a plan of action designed to achieve a particular set of goals (22). We selected the period 2010-2018 due to the accelerated global efforts to improve girls' and women's health during the period. In 2010 the United Nations (UN) Secretary-General's Commission on Life-Saving Commodities (UNCOLSC) for Women and Children was set up (23) and in 2015, the UN *Global Strategy for Women's and Children's and Adolescents' Health* (2016-2030) was published (24).

Data collection

An online search (conducted in May 2019 and repeated in March 2021) identified relevant laws and policies that were in force between 2010 to 2018 through national government websites and legal databases (i.e. Uganda Legal Information Institute https://ulii.org/consol_leglist/consolidated_legislation, Kenya Law http://kenyalaw.org/kl/index.php?id=400, Kenyan Health Guidelines, Standards & Policies Portal http://guidelines.health.go.ke, Ugandan Ministry of Health Knowledge Management Portal http://library.health.go.ug, International Labour Organisation NATLEX), reference lists in relevant academic commentary and publications, a Google search using the search syntax "((adolescent OR sexual OR Reproductive) health) AND (law or policy OR policies) AND Uganda/ Kenya", and through crowdsourcing documents from our network.

Documents were selected for inclusion in three stages (See flow diagram in Figure 1). First, legal, strategic, and policy documents addressing subjects related to adolescent health, SRH, and/or contraception were collected for further screening (See Annex 1 for a complete list of these documents). Second, we applied the following two inclusion criteria: (1) document is legal, strategic, or policy-related; and (2) the document was in force between 2010-2018. We determined whether the document was in force by the term stated explicitly in the document or in a superseding document, the status of the document on a government website, or, in the absence of other available information, by assuming that policy documents have a lifespan of 10 years. Documents were excluded if they did not meet the inclusion criteria or if no full text was available. Third, we scanned the full text to identify any explicit content related to the recommendations in WHO's guidance document called "Ensuring human rights in the provision of contraceptive information and services" ('WHO recommendations'). This resulted in a short list of documents that underwent content analysis (see Table 1) (15). Finally, local policy experts (DK, DKA, JO, TSG) verified whether the shortlist of documents was accurate, complete, and up-to-date, and suggested other documents for consideration. Experts were co-authors (DK, Executive Director of a Ugandan health policy NGO; JO, Kenyan academic expert in gender policy) and project advisors (DKA, TSG – both are health lawyers with track records representing Ugandan and Kenyan NGOs (respectively) with a strong focus on SRH and rights) who have extensively engaged with SRH policies in their respective countries.
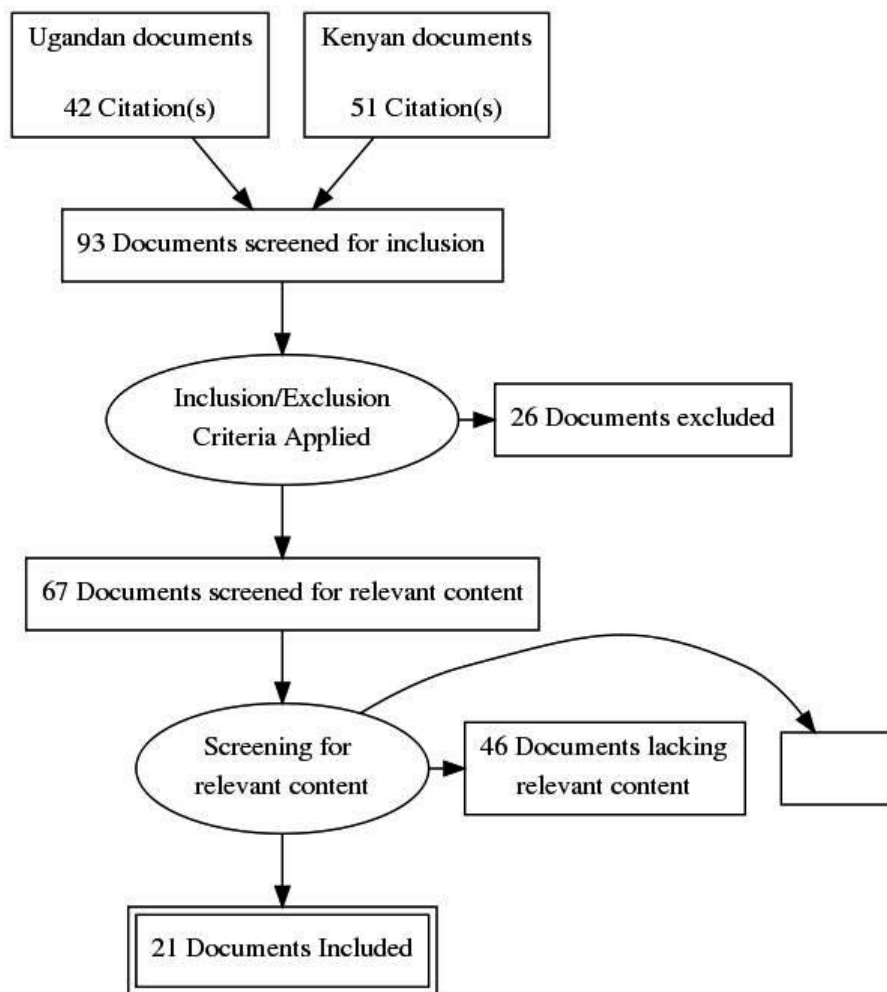
Figure 1. Document selection process flow diagram

Table 1. Ugandan and Kenyan laws and policies (in force between 2010-2018) included in content analysis.

Document title	Date of publication	Status*	Acronym in Figure 1
Legal and policy documents from Uganda			
Uganda Family Planning Cost Implementation Plan 2015-2020 (Ministry of Health)	2015	Current	UFPCIP
Reducing Morbidity and Mortality from Unsafe Abortions Standards and Guidelines (Ministry of Health)	2015		RMMUA

Table 1. (continued)

Document title	Date of publication	Status*	Acronym in Figure 1
National HIV/AIDS Strategic Plan 2015-2020 and Priority Action Plan (Uganda AIDS Commission/Republic of Uganda)	2015	Current	NASP
National Condom Programming Strategy 2013-2015 (Ministry of Health)	2013		UNCPS
Adolescent Health Policy Guidelines and Service Standards (Ministry of Health)	2012	Current	AHPGSS
National HIV Prevention Strategy for Uganda 2011-2015	2011		NHPS
National HIV Testing Services Policy and Implementation Guidelines Uganda (Ministry of Health)	2010		NHTSPIG
Reproductive Health Commodity Security Strategic Plan, 2009/10– 2013/14 (Ministry of Public Health and Sanitation, Ministry of Medical Services)	2009		RHCSSP
Roadmap for Accelerating the Reduction of Maternal and Neonatal Mortality and Morbidity in Uganda (Republic of Uganda)	2007		RMNMM
National Policy Guidelines and Service Standards for SRH and Rights (Ministry of Health)	2006		NPGSS
National Adolescent Health Policy (Ministry of Health)	2004		NAHP
Legal and policy documents from Kenya			
National Family Planning Costed Implementation Plan 2017-2020 (Ministry of Health)	2017	Current	KFPCIP
National Guidelines for Provision of Adolescent and Youth Friendly (AYF) Services in Kenya (Ministry of Health)	2016	*Current^*	NGPAYS
National Adolescent Sexual and Reproductive Health (SRH) Policy 2015 (Ministry of Health)	2015	*Current^*	ASRHP
Towards the Elimination of Mother to Child Transmission (eMTCT) of HIV and Keeping Mothers Alive- Strategic Framework 2012-2015 (Ministry of Health)	2012	*Current**	MTCTSF
Population Policy for National Development 2012–2030 (Ministry of State Planning, National Development, and Vision 2030)	2012–2030	*Current*	PPND
National Communication Strategy for Community Health Services 2012–2017 (Ministry of Public Health & Sanitation)	2012	*Current**	NCSCHS
National Road Map for Accelerating the Attainment of the MDGs Related to Maternal Health and Newborn Health in Kenya (Ministry of Public Health & Sanitation)	2010	*Current**	NRMMNH
National Family Planning Guidelines for Service Providers (Ministry of Public Health & Sanitation)	2010		NFPGSP

Table 1. (continued)

Document title	Date of publication	Status*	Acronym in Figure 1
National Reproductive Health Strategy 2009 – 2015 (Ministry of Public Health & Sanitation, and Ministry of Medical Services)	2009	*Current**	NRHS
Strategy for Improving the Uptake of Long-acting and Permanent Methods of Contraception in the Family Planning Program 2008-2010 (Ministry of Public Health & Sanitation)	2008		SULAR
Adolescent Reproductive Health and Development Policy 2005-2015 Plan of Action (Ministry of Planning & Ministry of Health)	2005	*Current**	

Legend: AIDS= Acquired Immunodeficiency Syndrome; AYF=adolescent- and youth-friendly; HIV=Human Immunodeficiency Virus; SRH=sexual and reproductive health. *In these cases, the policy's explicit timeframe had lapsed yet the Ministry of Health still listed the document as 'current'; ^When not explicitly stated in the policy, we assume policies have a 10-year lifespan.

Data analysis

Three researchers (EW, CP, KP) were responsible for coding the documents and the data extraction. A pre-defined coding strategy and data extraction sheet was used, which was pre-tested by these researchers on legal and policy documents from South Africa.

During analysis the included documents were screened for content relating to adolescents, and excerpts were classified by two independent researchers (a medical doctor (CP) and, a health scientist (EW) both trained in health policy, and a health scientist trained in law (KP)) using WHO's nine recommendations and 24 sub-recommendations, which served as a coding matrix. See Table 2 for an overview of these recommendations.

Researchers used the coding matrix that scored the content based on references to: (1) adolescent contraception, or (2) contraception in general (not specifically related to adolescents). Discrepancies were deliberated until consensus was reached. The coding results were reviewed by two experts (DK, JO) with first-hand knowledge of the local policy context.

Three researchers (KP, CP, EW) investigated between and within country trends. The between-country analysis examined the similarities and differences in the overall legal and policy frameworks that are currently in force. The within-country descriptive analysis examined the evolution in the adolescent-related content of relevant laws and policies in force in both countries between 2000 until 2018.

A stakeholder validation meeting was held at the Ugandan Ministry of Health (MoH) on December 6th, 2019 to discuss the preliminary findings. Due to the Coronavirus pandemic a comparable stakeholder validation meeting in Kenya was not possible.

RESULTS

Twenty-six documents were included in content analysis (See flow diagram in Figure 1). Sixty-seven documents were excluded from content analysis because they were never adopted (n=4); retired or superseded before 2010 (n=8); clinical in nature (n=3); no full text was available (n=5); or did not include content related to WHO's recommendations for contraception information and services (n=47). Of the included documents, 13 were from Uganda and 13 were from Kenya (Table 1).

Adolescent contraception policy landscape

National laws and policies currently in force in Uganda include six of the nine WHO recommendations (and 14/24 sub-recommendations) and in Kenya they include eight of the nine WHO recommendations (and 16/24 sub-recommendations) for adolescent contraception (Table 2).

National laws and policies addressed a median of one recommendation for adolescent contraception (range 0-4) in Uganda and two recommendations for adolescent contraception (range 0-6) in Kenya. Recommendations were concentrated in relatively few policies: Documents with four or more WHO recommendations were found in one Ugandan policy and four Kenyan policies (see Figure 2). Below we present evidence for each recommendation related to adolescent contraception from the legal and policy documents currently in force in Uganda and Kenya (see Tables 1 and 2, and Figure 2).

1. Non-discrimination

Non-discrimination refers to equal access that is free from discrimination, coercion, or violence (recommendation 1.1(R1.1)). Uganda's *Family Planning Cost Implementation Plan (2015-2020)* seeks to increase age-appropriate

knowledge and access to family planning amongst adolescents (ages 10-24 years), including to disadvantaged or marginalised populations through AYF corners and extended service delivery hours outside school hours (R1.2).

Kenya's *National Adolescent SRH Policy (2015)* foresees the provision of accurate information and services to prevent the early/unintended pregnancy. The *Family Planning Cost Implementation Plan (2017-2020)* focuses on social behavioural change communication strategy/policy, addressing myths and misconceptions about modern contraceptives; and providing information and services to special needs groups (ex. adolescents), and age-appropriate family planning information (R1.1, R1.2).

2. Availability

Availability requires that contraceptive commodities, supplies and equipment are integrated in the national essential medicine supply chain (R2.1). This was not addressed in relation to adolescent contraception in Uganda's policies currently in force.

Recommendation 2.1 was the most well covered domain in Kenyan policies. Availability is a focal point in the *National Guidelines for Provision of Adolescent and Youth Friendly (AYF) Services (2016)* (ex. a continuous supply of essential medical commodities via AYF service delivery points).

3. Accessibility

Accessibility concerns barriers to access to contraceptive information and services including information and education, financing, geography, conflict and violence, integration in SRH, maternal, and/or abortion care, and third-party authorisation.

The *Uganda Family Planning Cost Implementation Plan (2015-2020)* seeks to increase adolescent's knowledge and empowerment to use family planning services and avoid teenage pregnancy through peer educators, print and online media targeting adolescents, and 'edutainment' community events. These measures neither mention the scientific basis nor comprehensiveness of information (required for R3.1). This policy also addresses the contraceptive needs of those with difficulty accessing services (R3.3) through AYF services, corners, and delivery hours (ex. outside school hours). Uganda's *Adolescent Health Policy Guidelines and Service Standards (2012)* require that adolescents have

access to a range of SRH services, such as post abortion care and management (R3.7, R3.5 R3.6). Ugandan policies do not mention the elimination of financial barriers for adolescents (R3.2), provision to displaced adolescents, those in crisis settings, or survivors of violence (R3.4), nor the use of mobile outreach services to overcome geographic barriers to access (R3.8). The elimination of third party / parental authorisation in relation to adolescent contraception was not addressed in the policies currently in force (R3.9, R3.10).

Kenya's *National Family Planning Cost Implementation Plan (2017-2020)* addresses the contraceptive needs of those with difficulty accessing services (R3.3) through training and supporting peer educators, and through age-appropriate family planning information, and a provider-led approach to create demand for services among groups with special needs.

The *National Guidelines for Provision of AYF Services (2016)* define the essential package of services and information that must be available at AYF service points. The essential package integrates contraception counselling and provision of full range of contraceptive methods, including long-acting reversible contraceptive (LARC) methods, with other forms of SRH care (ex. HIV counselling, testing, and treatment) (R3.5), antenatal and postpartum care including pregnancy testing (R3.6), post abortion care (R3.7), and sexual and gender-based violence counselling, services and referrals (R3.4). The policy's four service delivery models aim to better reach adolescents through (1) community-based initiatives in non-medical settings to reach first time parents, fathers, and young mothers with limited mobility, (2) clinical settings, (3) school settings, and (4) virtually through digital platforms (R3.3). It also prescribes the Minimum Initial Service Package for Reproductive Health ('essential package'), which is a list of priority interventions designed to reduce mortality, morbidity, and disability among populations affected by crises. The Essential Package should ensure access to a broad mix of 'free' family planning methods (R3.2, R3.3, R3.4) that are integrated with HIV prevention and treatment, and maternal care (R3.5, R3.6).

The *National Adolescent SRH Policy (2015)* requires enhancing the provision of high-quality post-abortion services to adolescents, which includes contraceptives (R3.7). No legal documents in Kenya address the elimination of financial barriers for adolescents (R3.2), mobile outreach services (R3.8), nor third-party / parental authorisation (R3.9, R3.10).

4. Acceptability

Acceptability refers to gender-sensitive counselling and educational interventions (R4.1) and follow-up services for the management of contraceptive side-effects (R4.2).

These recommendations were not addressed in Uganda's policies currently in force. Kenya's *Adolescent SRH Policy (2015)* takes a gender-sensitive approach to interventions (R4.1) by promoting male involvement in the prevention of early and unintended pregnancy. Neither Ugandan nor Kenyan policies include R4.2 in relation to adolescents.

5. Quality

Quality refers to quality assurance processes for standards of care and client feedback (R5.1), services for the provision and follow-up of LARC methods (R5.2), and competency-based training and supervision of healthcare personnel (R5.3).

Current policies in Uganda and Kenya do not refer to recommendations 5.1-5.2 for adolescent contraception. Kenya's *Family Planning Cost Implementation Plan (2017-2020)* refers to competency-based training and supervision of healthcare personnel (R5.3) for the practical application of family planning skills, adolescent-friendly service approaches, and internships for graduates to enhance their family planning service provision.

6. Informed decision-making

Informed decision-making requires evidence-based, comprehensive information, education and counselling (R6.1) and the assurance that every individual has the opportunity to make an informed choice about their use of modern contraceptives (R6.2).

Uganda's *Family Planning Cost Implementation Plan 2015-2020* references provisions for empowering adolescents to use family planning services and AYF information channels with the objective of empowering youth to avoid teenage pregnancy. However, evidence-based information about a range of methods for comprehensive, informed choices is not addressed in relation to adolescent contraception (R6.1), nor is the use of modern contraception without discrimination (R6.2).

Kenya's *Family Planning Cost Implementation Plan 2017-2020* promotes behavioural change to address myths and misconceptions to improve

acceptance and continued use of family planning with a special focus on age-appropriate information, access, and the use of family planning among adolescents (ages 10-24). This policy alludes to the importance of contraceptive information, counselling, and education to ensure informed choice (R6.1) about own use of modern contraception without discrimination (R6.2) in relation to adolescents. Kenya's *National Guidelines for Provision of AYF Services* (2016) requires that contraception counselling and the full range of contraceptive methods are in essential packages of AYF services (R6.2).

7. Privacy and confidentiality

Privacy and confidentiality refer to the respect of an individual's privacy through the provision of contraception and confidentiality of medical and personal information (R7.1). Uganda's *2012 Adolescent Health Policy Guidelines & Service Standards* emphasise the offer of confidential counselling and information and provision of family planning to adolescents. Kenya's *National Adolescent SRH Policy 2015* requires that all adolescent SRH services in this policy (including contraception) should be offered in a non-judgmental and confidential way.

8. Participation

Participation encompasses the involvement of people directly affected by policies to have the opportunity to be meaningfully engaged in all aspects of programme and policy design (R8.1).

Uganda's *Family Planning Cost Implementation Plan (2015-2020)* specifically seeks to align with other national policies and strategies and strengthen family planning policy environment including through the participation of women, adolescents, and marginalised and excluded groups.

Kenya's *National Adolescent SRH Policy 2015* seeks to strengthen 'community involvement' to prevent early and unintended pregnancies. This policy seeks to involve adolescents in the planning, implementation, monitoring and evaluation of adolescent SRH programmes.

9. Accountability

Accountability requires that effective and accessible mechanisms exist for the delivery of contraceptive information and services to adolescents (R9.1) as well as programme evaluation and monitoring to ensure the highest quality services and respect of human rights (R9.2). Neither Uganda's nor Kenya's documents address these recommendations towards adolescents.

Table 2. Overview of the current Ugandan and Kenyan policy landscape for adolescent contraception according to the nine WHO recommendations. AC=Adolescent contraception; C=Contraception in general; LARC=long-acting reversible contraception; PBS=perform

WHO Recommendation	Uganda AC	Uganda C	Kenya AC	Kenya C
1. Non-discrimination in provision of contraceptive information and services				
1.1 Recommend that access to comprehensive contraceptive information and services be provided equally to everyone voluntarily, free of discrimination, coercion or violence (based on individual choice)	✔	✔	✔	
1.2 Recommend that laws and policies support programmes to ensure that comprehensive contraceptive information and services are provided to all segments of the population. Special attention should be given to disadvantaged and marginalized populations in their access to these services.	✔	✔	✔	
2. Availability of contraceptive information and services				
2.1 Recommend integration of contraceptive commodities, supplies and equipment, covering a range of methods, including emergency contraception, within the essential medicine supply chain to increase availability. Invest in strengthening the supply chain where necessary in order to help ensure availability.		✔	✔	✔
3. Accessibility of contraceptive information and services				
3.1 Recommend the provision of scientifically accurate and comprehensive sexuality education programmes within and outside of schools that include information on contraceptive use and acquisition.	✔	✔	✔	✔
3.2 Recommend eliminating financial barriers to contraceptive use by marginalized populations including adolescents and the poor, and make contraceptives affordable to all.		✔	✔	✔
3.3 Recommend interventions to improve access to comprehensive contraceptive information and services for users and potential users with difficulties in accessing services (e.g. rural residents, urban poor, adolescents).	✔	✔	✔	✔
3.4 Recommend special efforts be made to provide comprehensive contraceptive information and services to displaced populations, those in crisis settings, and survivors of sexual violence, who particularly need access to emergency contraception.		✔	✔	✔

Table 2. (continued)

WHO Recommendation	Uganda AC	Uganda C	Kenya AC	Kenya C
3.5 Recommend that contraceptive information and services, as a part of SRH services, be offered within HIV testing, treatment and care provided in the health-care setting.	✔	✔	✔	✔
3.6 Recommend that comprehensive contraceptive information and services be provided during antenatal and postpartum care.	✔	✔	✔	✔
3.7 Recommend that comprehensive contraceptive information and services be routinely integrated with abortion and post-abortion care.	✔	✔	✔	✔
3.8 Recommend that mobile outreach services be used to improve access to contraceptive information and services for populations who face geographical barriers to access.		✔		✔
3.9 Recommend elimination of third-party authorization requirements, including spousal authorization for individuals/women accessing contraceptive and related information and services.	✔	✔		
3.10 Recommend provision of SRH services, including contraceptive information and services, for adolescents without mandatory parental and guardian authorization/ notification, in order to meet the educational and service needs of adolescents.	✔	✔		
4. Acceptability of contraceptive information and services				
4.1 Recommend gender-sensitive counselling and educational interventions on family planning and contraceptives that are based on accurate information, that include skills building (i.e. communications and negotiations), and that are tailored to meet communities' and individuals' specific needs.	✔	✔	✔	✔
4.2 Recommend that follow-up services for management of contraceptive side-effects be prioritized as an essential component of all contraceptive service delivery. Recommend that appropriate referrals for methods not available on site be offered and available.		✔		✔
5. Quality of contraceptive information and services				
5.1 Recommend that quality assurance processes, including medical standards of care and client feedback, be incorporated routinely into contraceptive programmes.		✔		✔

Table 2. (continued)

	Uganda		Kenya	
WHO Recommendation	**AC**	**C**	**AC**	**C**
5.2 Recommend that provision of LARC methods should include insertion and removal services, and counselling on side-effects, in the same locality.				✔
5.3 Recommend ongoing competency-based training and supervision of health-care personnel on the delivery of contraceptive education, information and services. Competency-based training should be provided according to existing WHO guidelines.		✔	✔	✔
6. Informed decision-making				
6.1 Recommend the offer of evidence-based, comprehensive contraceptive information, education and counselling to ensure informed choice.	✔	✔	✔	✔
6.2 Recommend every individual is ensured the opportunity to make an informed choice for their own use of modern contraception (including a range of emergency, short-acting, long-acting and permanent methods) without discrimination.	✔	✔	✔	✔
7. Privacy and confidentiality				
7.1 Recommend that privacy of individuals is respected throughout the provision of contraceptive information and services, including confidentiality of medical and other personal information.	✔	✔	✔	✔
8. Participation				
8.1 Recommend that communities, particularly people directly affected, have the opportunity to be meaningfully engaged in all aspects of contraceptive programme and policy design, implementation and monitoring.	✔	✔	✔	✔
9. Accountability				
9.1 Recommend that effective accountability mechanisms are in place and are accessible in the delivery of contraceptive information and services, including monitoring and evaluation, and remedies and redress, at the individual and systems levels.			✔	✔

Table 2. (continued)

	Uganda		Kenya	
WHO Recommendation	**AC**	**C**	**AC**	**C**
9.2 Recommended that evaluation and monitoring of all programmes to ensure the highest quality of services and respect for human rights must occur.	✔		✔	
Recommend that, in settings where PBF occurs, a system of checks and balances should be in place, including assurance of non-coercion and protection of human rights. If PBF occurs, research should be conducted to evaluate its effectiveness and its impact on clients in terms of increasing availability.				
TOTAL **Recommendations for adolescent contraception (AC)**	6		8	
Sub-recommendations for adolescent contraception (AC)	14		16	

DISCUSSION

These results illustrate that the current Ugandan and Kenyan policy landscapes for adolescent contraception include important references to human rights and evidence-based practice (in WHO's recommendations); however, there is still room for improvement. Ugandan policies include infrequent (one-off) recommendations for 6/9 WHO recommendations, commonly in relation to contraception accessibility for adolescents. However, Ugandan policies miss entirely WHO's recommendations for adolescent contraception availability, quality, and accountability. On the other hand, most Kenyan policies consistently address multiple WHO recommendations, most frequently for contraception availability and accessibility for adolescents. Kenyan policies cover 8/9 WHO recommendations except for accountability. In light of the key policy gaps identified in this study, we provide specific recommendations based on WHO's guidance and the inter-country comparison for both Uganda and Kenya (See Table 3).

Inconsistencies in the content of different adolescent SRH-related laws and policies are a recognised challenge to sound policy implementation in the Sub-Saharan African region. (25, 26) One example from our study illustrates this challenge: The Ugandan *National HIV/AIDS Strategic Plan (2015-2020)* seeks
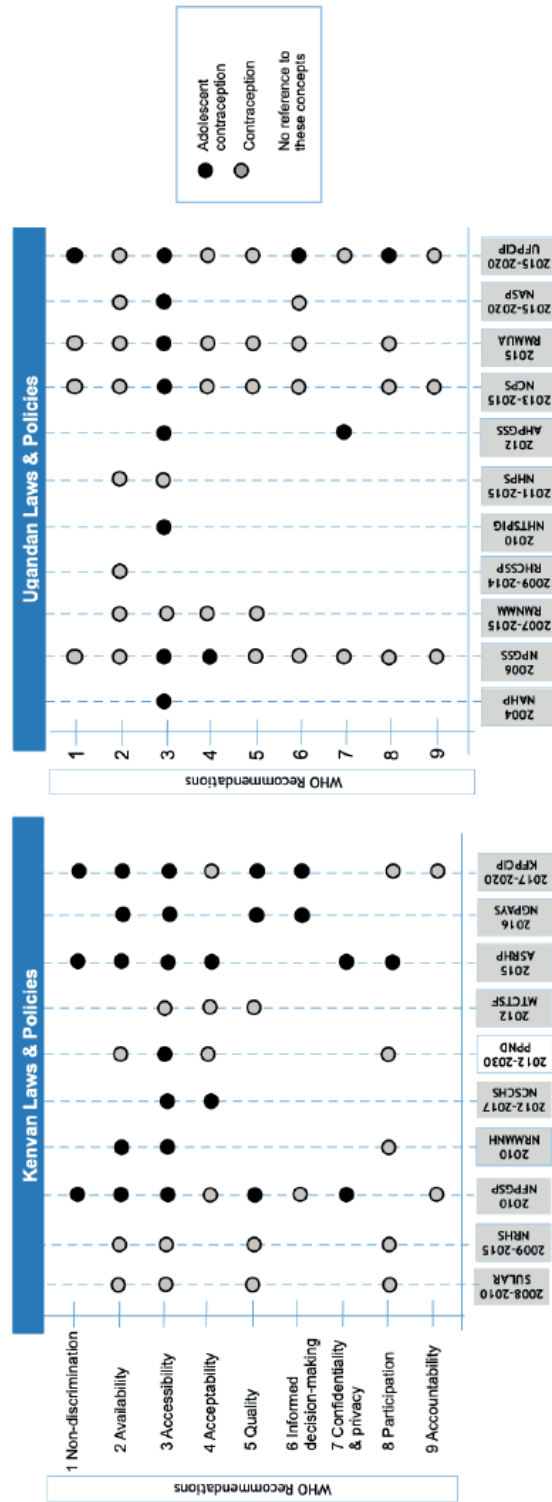
Figure 2. Evolution of provisions for adolescent contraception in legal and policy documents in Uganda and Kenya overtime

to scale-up comprehensive SRH/HIV programs targeting adolescents (both in and out of school) by providing AYF services including condom use and family planning information and commodities (27). In 2016, the Ugandan government introduced a parliamentary ban on 'comprehensive' sexuality education (beyond abstinence only) (28). This ban was repealed in 2018 with the launch of the *National Sexuality Education Framework* for adolescents, which does not include condom or contraceptive use(12, 29). As a result, Uganda has two incoherent policy frameworks in force with regards to the provision of information about contraception to adolescents. Notably, these policies were adopted by different government bodies (Ugandan HIV/AIDS Commission vs. Ministry of Education and Schools), which could further explain the incoherent content. In our study, recommendations for adolescent contraception were predominantly located in policies adopted by the ministries of health or medical services; no such recommendations were identified in policies adopted by the ministries of education (Table 1). There is need therefore to harmonise national laws and policies across sectors to avoid contradiction. In addition, a comparison of policy provisions at the national and sub-national levels would be an added value to understand how national framework legislation and policies are formulated, interpreted and applied. Kenya and Uganda are optimal sites for such future research given the decentralisation of health services in 47 counties and 134 districts, respectively. For example, the Makueni County adopted its Maternal and Newborn Child Health Act of 2017, which forbids the sale of condoms to adolescents and children but allows for the sale of any other form of contraception to adolescents who have a high chance of sexual exposure (30). While our study did not systematically investigate the scope and frequency of policy inconsistencies, they are a major challenge for effective policy implementation and should be further investigated in subsequent research.

This study identified 67 national laws and policies with the potential to address nine domains of adolescent contraception. Of these, only 26 policies had any detailed recommendations for adolescent contraception. This could be the result of public or political opposition to adolescent contraception and a preference for 'watered-down' policy statements that do not capture AYF services and information related to contraception. For example, Kenya's older policies do not include contraception for this reason (31).

This study also illustrates some strengths of Ugandan and Kenyan policy with respect to adolescent contraception (described in the Results). Although a robust policy can create a supportive environment for adolescent contraception, its greatest impact can only be achieved when it is coupled with sound policy implementation. Contraceptive and SRH policy implementation relies on the six building blocks of health systems (including governance, political will, and leadership, adequate financial resources, a skilled and motivated health workforce, reliable and quality service delivery, health information systems, and access to contraceptive commodities), which are persistent challenges in Kenya, Uganda, and other neighbouring countries (25, 31, 32). However, to the authors' knowledge, no literature explores how effectively or efficiently the policies in this study were implemented in practice. Yet the consistently low rates of modern contraceptive use among adolescent girls (described below) in Uganda and Kenya suggest that even strong policies are lacking consistent implementation. Drawing on recommendations for policy implementation in other Sub-Sahara African countries, several focal points could also enhance the implementation of Kenyan and Ugandan policies. First, further research on policy implementation that includes 'robust, pragmatically designed' evaluation is needed (25). Monitoring and evaluating the implementation of existing policy frameworks is the first step to addressing barriers to adolescent contraception. Second, implementers are advised to anticipate possible tensions in the policy roll-out (ex. between some health providers' beliefs or religious communities and policy goals) and proactively develop mitigation strategies (25). Third, greater cohesion between policy actors, such as donors, governmental ministries or agencies (addressed above), should be sought (25).

Population health indicators illustrate the historical evolution in SRH outcomes in Uganda and Kenya, although no causal relationship between policy changes and outcomes can be determined. The maternal mortality ratio (MMR) has decreased from 468 (2011) to 336 (2016) per 100,000 live births in Uganda and from 520 (2008) to 362 (2014) per 100,000 live births in Kenya. This is partly due to the increased percentage of women using modern methods of family planning from 8% (1995) to 35% (2016) in Uganda and from 39% (2008) to 53% (2014) in Kenya. However, the current use of modern contraceptives among adolescent girls aged 15-19 (who are sexually active and do not want a child in the coming two years) is still low in both countries at 39% in Uganda and 46% in Kenya (33, 34). Despite the improvements, neither country met the MDG targets on maternal mortality and neither are likely to meet the SDG target 3.1 of reducing

MMR to 70/100,000 live births unless adolescent contraception is improved (7, 8). To make progress towards the SGD targets, policy makers should utilise WHO's comprehensive list of recommendations to promote adolescent SHR and human rights and ensure their implementation.

The social, political, economic, and public health determinants influencing Uganda and Kenya's respective policy choices for adolescent contraception have been identified but a political solution has not been reached to address the challenges (29, 31, 35-37). For example, in both countries, adolescents aged below 18 years are considered children which brings moral questions for age of consent to contraceptive services and therefore the policies remain silent over the issue (12, 15). Structural barriers in the health system impair service provision such as inadequate physical space in clinics for adolescent contraception 'corners', insufficient human resources to staff those corners, and lack of availability of contraceptives affect access to contraceptives for adolescents (29, 31, 35-37). Future research should investigate the factors that determine the political priority accorded to SRH, and specifically adolescent contraception as a national policy issue. For example, the new Reproductive Healthcare Bill proposed in 2019 in Kenya is a unique opportunity to study political priority for adolescent reproductive health in real-time because it obliges the State to formulate and implement a national strategy and plan of action to realise the right to reproductive health including a specific part on the provision of AYF reproductive health care services (38).

This study's strengths are its use of primary sources (legal documents in their original language), its consideration of any legal instrument related to adolescent contraception (although not necessarily published by the Ministries of Health), and its use of the WHO recommendations as a standard measure of comparison. WHO's guidelines were a useful analytical framework for inter-country comparison, including with previous results from South Africa, the Philippines, and Paraguay (16-18). However, WHO's guidelines only allow researchers to indicate whether a policy is aligned (or not) with WHO's best practice, but not whether national policy is regressive. For example, WHO's recommendations assess whether information on contraceptives is given during or after abortion services, but do not evaluate if legal or accessible safe abortion is a policy priority. The risk of interpretation error was minimised by relying on the definitions of terms and concepts in the policies themselves or, if not provided in the policies, as provided by the MoH. The scope of this study

is 2010-2018 therefore extends beyond the WHO guidelines "Ensuring human rights in the provision of contraceptive information and services" which were published in 2014.The study does not examine the implementation of policies and their intermediate (such as budget allocation) nor final outcomes (such as better access for adolescents to contraceptives). No traditional stakeholder validation meeting could be held in Kenya due to the travel restrictions and social distancing measures adopted in response to the Coronavirus pandemic.

Table 3. Key areas of improvement for Uganda and Kenya legal and policy frameworks based on WHO recommendations

WHO 9 main recommendations	Priority improvement based on WHO's Recommendations (Recommendations are for both countries unless otherwise indicated).
1. Non-discrimination in provision of contraceptive information and services	No specific recommendations.
2. Availability of contraceptive information and services	**For Uganda only, policy documents should consistently:** 2.1: Prioritise the continuous supply of contraceptive commodities and supplies available through AYF service delivery points. 2.1: Ensure the full financing of family planning commodities in the public and private sectors to prevent stock-outs that affect adolescents and young people
3. Accessibility of contraceptive information and services	3.2: Eliminate financial barriers to contraceptive use by marginalized populations including adolescents and the poor, and make contraceptives affordable to all. 3.8: Ensure mobile outreach services are used to improve access to contraceptive information and services for populations who face geographical barriers to access. **For Uganda only:** 3.8: Establish different service delivery models to reach adolescents and youth through community-based initiatives in non-medical settings (i.e. youth groups, churches, support groups, etc.), clinical settings, school settings, and virtually including through digital platforms. 3.9-3.10: Eliminate third-party authorisation requirements, including spousal and parental authorisation for individuals, including adolescents and young people accessing sexual and reproductive health services, including contraceptive information and services.

Table 3. (continued)

WHO 9 main recommendations	Priority improvement based on WHO's Recommendations (Recommendations are for both countries unless otherwise indicated).
4. Acceptability of contraceptive information and services	**For Uganda only:** 4.1: Ensure gender-sensitive counselling and educational interventions on family planning and contraceptives for adolescents and young people. **For Uganda only:** 4.1: Prioritise programmes for male involvement in the prevention of early and unintended pregnancy among adolescents and young people. **For Uganda only:** 4.1: Establish community-based service delivery points and distribution of contraception to reach first time parents or young mothers whose mobility is limited, as well as to engage with couples and fathers in their new parenting roles. 4.2: Provide adolescents and young people with follow-up services for management of contraceptive side-effects as an essential component of all contraceptive service delivery. 4.2: Provide adolescents and young people with referrals for methods not available on site be offered and available.
5. Quality of contraceptive information and services	5.1: Ensure quality assurance processes, including medical standards of care and client feedback, be incorporated routinely into contraceptive programmes for adolescents and young people. 5.2: Provide long-acting reversible contraception (LARC) methods to adolescents and young people, including insertion and removal services, and counselling on side-effects, in the same locality. **For Uganda only:** 5.3: Ensure ongoing competency-based training and supervision of health-care personnel on the delivery of contraceptive education, information and services to adolescents and young people. **For Uganda only:** 5.3: Strengthen human resources and skills, build capacity on all FP methods, strengthening pre-service training for practice, youth-friendly service approaches, and create internship training for new graduates.
6. Informed decision-making	**For Kenya only:** 6.1-6.2: Provide evidence-based information about a range of methods for comprehensive, informed choices, and the use of modern contraception without discrimination to adolescents and young people

Table 3. (continued)

WHO 9 main recommendations	Priority improvement based on WHO's Recommendations (Recommendations are for both countries unless otherwise indicated).
7. Privacy and confidentiality	**For Kenya only:** 7.1: Respect the privacy of individuals at any service delivery point (AYF or otherwise), particularly regarding contraceptive information and services.
8. Participation	8.1: Ensure that communities, particularly people directly affected, have the opportunity to be meaningfully engaged in all aspects of contraceptive programme and policy design, implementation and monitoring for adolescents and young people.
9. Accountability	9.1: Establish effective accountability mechanisms that are accessible for adolescents and young people in the delivery of contraceptive information and services, including monitoring and evaluation, and remedies and redress, at the individual and systems levels.
	9.1: Ensure that adolescents have easy access to a complaints-mechanism or ombudsperson who can help assess and remedy barriers to accessing contraception in a timely way for the individual in question and on a systems level.
	9.2: Evaluate and monitor all programmes to guarantee the highest quality of services and respect for human rights particularly for adolescents and young people.
	9.2: Include indicators specific to young people, including the teenage pregnancy rate and inclusion of women who are unmarried in the calculation of unmet need for contraceptive services.
	9.2: In settings where performance-based financing (PBF) occurs, provide a system of checks and balances for adolescents and young people, including assurance of non-coercion and protection of human rights. If PBF occurs, evaluate its effectiveness and its impact on adolescents and young people in terms of increasing availability.

CONCLUSION

Policies in Uganda and Kenya address human rights aspects in the provision of contraceptive information and services to adolescents. However, Kenya's policies address more of WHO's recommendations for adolescent contraception than Uganda's policies. This study highlights strengths, gaps, and areas of incoherence in policies on adolescent contraception in Uganda and Kenya, which are areas of action in future policy frameworks, such as Uganda's future (national) Adolescent Health Policy and the Reproductive Healthcare Bills that are adopted at the level of Kenyan counties. Aligning national laws and policies with WHO's recommendations on contraceptive information and services for adolescents may support interventions to improve health outcomes, provided these legal frameworks are effectively implemented.

ACKNOWLEDGMENTS

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ANNEX 1

List of documents screened for inclusion in the article 'A comparative human rights analysis of laws and policies for adolescent contraception in Uganda and Kenya'.

Uganda

1918	Venereal Diseases Act (Act No. 46)
1935	Ugandan Public Health Act
1950	Uganda, Penal Code Act (Cap. 120)
1971	Pharmacy and Drugs Act (Cap 280)
1993	Uganda Family Planning and Maternal Health Policy Guidelines 1993
2000	National Health Policy
2000	National Adolescent Health Policy 2000
2001	National Youth Policy
2003	Policy for reduction of mother-to-child HIV transmission in Uganda
2003	Revised National Strategic Framework for HIV/AIDS Activities in Uganda: 2003/04 – 2005/06
2004	National Adolescent Health Policy for Uganda
2006	National Policy Guidelines and Service Standards for Sexual and Reproductive Health and Rights (to be monitored for **5 years**)
2007	Roadmap for Accelerating the Reduction of Maternal and Neonatal Mortality and Morbidity in Uganda 2007-2015
2007	National Policy on HIV/AIDS and the World of Work
2007	National HIV and AIDS Strategic Plan (duration: 5 years)
2007	Uganda National Gender Policy 2007
2007	Roadmap for Accelerating the Reduction of Maternal and Neonatal Mortality and Morbidity in Uganda, 2007– 2015
2008	National School Health Policy 2008

2009   Reproductive Health Commodity Security Strategic Plan, 2009/10–2013/14

2009   Patients' Charter

2010   National HIV Testing Services Policy and Implementation Guidelines Uganda

2010   Uganda HIV Counselling and testing Policy 3rd Edition December, 2010 (based on previous policies, likely duration is 5 years)

2010   Paediatric HIV Communication Campaign Strategy

2010   Prohibition of Female Genital Mutilation Act

2010   Second national health policy: Promoting people's health to enhance socio-economic development (**no clear duration**)

2011   National HIV Prevention Strategy for Uganda 2011-15

2011   National Adolescent Health Strategy 2011-2015 (Ministry of Health)

2011   NATIONAL STRATEGIC PLAN FOR HIV&AIDS 2011/12 -2014/15 (Revised)

2011   National Policy Guidelines and Service Standards for Sexual Reproductive Health and Rights of 2011

2012   Adolescent Health Policy and Guidelines and Service Standards

2013   National Condom Programming Strategy

2014   HIV and AIDs Prevention Control Act,2014

2.015   Reducing Morbidity and Mortality from Unsafe abortions in Uganda: standards and Guidelines

2015   Uganda Family Planning Cost Implementation Plan 2015-2020 (Ministry of Health)

2015   National Strategic Plan for HIV/AIDS 2015/16-2019/20 and Priority Action Plan

2015   Uganda Health Sector Development Plan 2015/16 - 2019/20

2015   National School Health Policy 2015 (stalled but Dennis not completely sure on status)

2016   National Integrated Early Childhood Development Policy Action Plan of Uganda (2016-2021)

2016   Uganda Ministry of Health, National Policy Guidelines and Service Standards for Sexual and Reproductive Health and Rights (2016/2018) (stalled)

2016   National Youth Policy (Ministry of Gender, Labour and Social Development)

2017   Child and Adolescent Mental Health Policy Guidelines 2017

2018   National Sexuality Education Framework

Kenya

2000   National HIV/AIDS Strategic plan 2000-2005

2001   National Condom Policy and Strategy 2001-2005

2003   Adolescent Reproductive Health and Development Policy 2003

2003   Education re-entry policy, 2003

2003   Persons with Disabilities Act, 2003

2004   Policy on HIV in the Education Sector, 2004

2005   Adolescent Reproductive Health and Development Policy Plan of Action

2006   HIV & AIDS Prevention and Control Act, 2006

2006   Sexual Offences Act, 2006

2006   National Youth Policy, 2006

2007   Kenya Nutrition and HIV/AIDS Strategy 2007-2010

2007   National Reproductive Health Policy 2007

2008   Strategy for Improving the Uptake of Long-acting and Permanent Methods of Contraception in the Family Planning Program 2008-2010

2008   Kenya Vision 2030 Midterm Strategic Plan 2 2008-2012

2008   Ministry of Medical Services Strategic Plan 2008-2012

2008   Ministry of Public Health and Sanitation Strategic Plan 2008-2012

2008   Gender Policy in Education, 2008

2009   National Reproductive Health Integration Strategy 2009 – 2015

2009   National AIDS Strategic Plan 2009/10-2012/13

2009   National HIV and AIDS Monitoring, Evaluation and Research Framework (2009/10-2012/13)

2009   National Condom Policy and Strategy, 2009–2014

2009   National School Health Policy, 2009

2009   Decentralization Guidelines for HIV/AIDS care and Treatment (2009)

2009   The National Youth Council Act, No. 10 of 2009

2010   National Road Map for Accelerating the Attainment of the MDGs Related to Maternal Health and Newborn Health in Kenya (2010) - Introduction implies implementation will run until 2015, end of MDGs.

2010   National Family Planning Guidelines for Service Providers (Ministry of Public Health & Sanitation)

2010   National Quality management Guidance framework for HIV Testing and Counselling in Kenya (2010)

2010   Reproductive Health Communication Strategy, Implementation Guide 2010–2012

2010   Constitution of Kenya 2010

2011   Prohibition of Female Genital Mutilation Act, 2011

2011   Gender Policy, 2011

2011   Kenya National School Health Strategy, 2011–2015

2012   Towards the Elimination of Mother to Child Transmission (eMTCT) of HIV and Keeping Mothers Alive- Strategic Framework 2012

2012   National Communication Strategy for Community Health Services, 2012–2017

2012   Population Policy for National Development, 2012–2030

2012   Kenya HIV Prevention Intervention Assessment Tool

2012   Public Health Act 1986, revised 2012

2013   Kenya Health Sector Strategic and Investment Plan (2013-2017)

2013   Kenya Vision 2030 Midterm Strategic Plan 2 2013-2017

2013   Education Sector Policy on HIV and AIDS, 2013

2014   Kenya Health Policy 2014-2030

2014   Marriage Act, 2014

2014   Kenya HIV Quality Improvement Framework (KHQIF) 2014

2014   Reproductive Health Bill 2014 (proposed)

2014   Adolescents Package of Care in Kenya

2015   National Adolescent Sexual and Reproductive Health Policy 2015

2016   National Guidelines for Provision of Adolescent and Youth Friendly Services in Kenya 2016

2016   Children's Act, 2001, revised 2016

2017   National Family Planning Costed Implementation Plan 2017-2020

2018   Kenya Vision 2030 Midterm Strategic Plan 3 2018-2022

2018   National Youth Service Act, 2018

3

**AVAILABILITY AND AFFORDABILITY OF
SEXUAL AND REPRODUCTIVE HEALTH
COMMODITIES IN SUB-SAHARAN AFRICA**

3.1

AVAILABILITY, PRICES AND AFFORDABILITY OF UN COMMISSION'S LIFESAVING MEDICINES FOR REPRODUCTIVE AND MATERNAL HEALTH IN UGANDA

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ABSTRACT

Background

Uganda was one of seven countries in which the United Nations Commission on Life Saving Commodities (UNCoLSC) initiative was implemented starting from 2013. A nationwide survey was conducted in 2015 to determine availability, prices and affordability of essential UNCoLSC maternal and reproductive health (MRH) commodities.

Methods

The survey at health facilities in Uganda was conducted using an adapted version of the standardized methodology co-developed by World Health Organisation (WHO) and Health Action International (HAI). In this study, six maternal and reproductive health commodities, that were part of the UNCoLSC initiative, were studied in the public, private and mission health sectors. Median price ratios were calculated with Management Sciences for Health International Drug Price Indicator prices as reference. Maternal and reproductive health commodity stocks were reviewed from stock cards for their availability for a period of six months preceding the survey. Affordability was measured using wages of the lowest paid government worker.

Results

Overall, none of the six maternal and reproductive commodities was found in all the surveyed health facilities. Public sector had the highest availability (52%), followed by mission sector (36%) and then private sector had the least (30%). Stock outs ranged from 7 to 21 days in public sector; two to 23 days in private sector and three to 27 days in mission sector. During the survey, maternal health commodities were more available and had a smaller number of stock-out days than reproductive health commodities. Median price ratios (MPR) indicated that medicines and commodities were more expensive in Uganda compared to international reference prices. Furthermore, MRH medicines and commodities were more expensive and less affordable in private sector compared to mission sector.

Conclusion

Access to MRH commodities is inadequate in Uganda. Maternal health commodities were more available, cheaper and thus more affordable than reproductive health commodities in the current study. Efforts should be undertaken by the Ministry of Health and stakeholders to improve availability, prices and affordability of MRH commodities in Uganda to ensure that Sustainable Development Goals are met.

BACKGROUND

Maternal mortality is a major public health concern in Uganda. In 2016, Uganda's maternal mortality was estimated at 336 deaths per 100,000 live births (1). Judged against the Millennium Development Goal 5, Uganda did not achieve the 75% reduction in maternal mortality from the 1990 levels by 2015 (2). Most of these maternal deaths are associated with events directly related to pregnancy and child birth, such as unsafe abortion and obstetric complications, severe bleeding, infections, pre-eclampsia and obstructed labour, and the proportion of deaths among women of reproductive age that are due to maternal causes is 13.4% (3). Additionally, pregnancy increases the risk of maternal death from causes of malaria, diabetes, hepatitis, anaemia and HIV/AIDS. Indeed, 3.1% percentage of HIV/AIDS deaths is related indirectly to maternal causes (4). Studies have shown that these deaths could have been averted if there was adequate access to maternal and reproductive health services (5-7).

The state of sexual reproductive health remains poor in Uganda with a high fertility rate of 5.8 children per woman of child bearing age (1), high rates of teenage pregnancies (24%) (8) and unsafe abortions accounting for 11% of maternal deaths annually (8). In addition, there is limited demand for, and uptake of, reproductive health services, with only 20.4% of Ugandan women using a modern contraceptive method. The Contraceptive Prevalence Rate (CPR) stands at 30% and the unmet family planning need stands at 28% (9). This situation is exacerbated by supply chain bottlenecks that impair the last mile delivery (10).

In 2010 the UN General Secretary launched the; *Every Woman Every Child* (EWEC) movement to address challenges and bottlenecks to reduction of maternal and child mortality. The preceding review to the EWEC movement had identified unavailability and inadequate access to proven life-saving low-cost medicines and commodities. Therefore, the UN Commission on Life Saving Commodities (UNCoLSC) identified and highlighted thirteen underused, low-cost and high impact medicines and medical devices for reproductive, maternal, new-born and child health with the greatest potential to reduce preventable deaths (11). It also proposed mechanisms to increase the availability, adequate access and rational use of the thirteen identified life-saving commodities.

Given the poor progress towards achieving MDG goal 5, Uganda received technical and financial support to conduct a reproductive, maternal, new born and child health (RMNCH) situation analysis to inform the development

of an evidence-based country specific implementation plan (8). Following a two-year implementation period, a nationwide survey was conducted to determine the availability and prices of the six maternal and reproductive health commodities from among the UNCoLSC commodities within the public, private and mission sectors. Additionally, this study also determined the stock out duration for the same basket of commodities to provide information on how fast the system responds to stock outs.

METHODS

A survey measuring the availability, price and affordability of maternal and reproductive health (MRH) commodities at health facilities in Uganda was conducted in September 2015, using an adapted World Health Organisation (WHO) and Health Action International (HAI) standardized methodology (12). This method was validated (13) and used by others (14-16). It is based on quantitative techniques to analyse availability and prices of health commodities in the public, private and mission health sectors. Public, private and mission sector health centres of level III or higher participated in the survey. MRH commodity availability on day of survey and in six months preceding the survey was assessed and prices paid by patient were collected.

Selection of outlets

The central region which is the largest in the country and has the capital city was selected first. Three regions of Eastern, Western and Northern Uganda within one day's travel from the central region were then selected to provide a realistic representation of the diverse epidemiological, geographical and medicine supply chain characteristics in Uganda. Health facilities from both urban and rural areas were included in the study sample.

In each region, the main regional referral hospitals were selected with guidance of the Uganda Ministry of Health list of health facilities; public health centres level III or higher were randomly selected. Then private and mission sector health facilities that were within a three-hour drive radius from the enrolled regional referral hospitals were selected, respectively. Consecutive sampling was done with an intention of having 10 health facilities per sector in each region coming up to a total sample frame of 120 facilities. This was done to ensure that each sector had a minimum representation of 30 health facilities in the survey (12). Health Centres level III are the lowest level of care at which MRH commodities

are delivered according to the Ministry of Health (MoH) scheduling of basic of health services in Uganda (17).

Selection of medicines and commodities

The medicines and commodities surveyed included the six reproductive and maternal health medicines and commodities, which are required either to prevent or manage pregnancy as specified by the "United Nations Commission on Life Saving Commodities for Women and Children" (UNCoLSC). UNCoLSC prioritized a core list of 13 life-saving commodities and medicines for reproductive, maternal, newborn and child health, and it specified their formulation or presentation. All countries, Uganda inclusive, were encouraged to grant marketing authorization to these medicines and commodities. The final list of products measured is shown in Table 1 below:

Data collection and analysis

Eight data collectors with previous experience of conducting medicine surveys worked in pairs of a pharmacist and a social scientist under close supervision of a qualified survey manager. Prior to data collection, these pairs were trained on the WHO/HAI methodology of monitoring medicine availability and prices. Data collectors used a semi-structured questionnaire to interview facility managers while ascertaining physical count and stock card records of surveyed medicines.

Table 1. List of medicines and commodities surveyed

Reproductive Health Medicine	Use
1- Female condom (any brand)	Contraception
2- Contraceptive implants:	Contraception
Etonogestrel 68 mg/rod (Implanon)	
OR	
Levonorgestrel 0.75mg/rod (Jadelle)	
3- Emergency contraceptive pill:	Emergency contraception
Levonorgestrel (1.5 mg or 0.75 mg) tablet	
Maternal Health	
4- Oxytocin injection 10IU, 1ml	Prevention and management of post-partum Haemorrhage
5- Misoprostol 200 µg tablet	Prevention and management of post-partum Haemorrhage
6- Magnesium sulphate 500mg/ml injectable (2ml, 5ml, 10ml ampoule)	Management of pre-eclampsia and eclampsia

Availability was measured by the physical presence of a product in the outlet at the time of the survey. For each medicine surveyed, data collectors recorded the stated product name for both the highest and lowest priced medicines available, the manufacturer, unit price of the product and number of stock-out days in the previous six months. In the public sector where medicines are free of charge to the care seekers, only availability and stock out days were recorded.

Once data collection was complete, survey data was entered centrally into the pre-programmed Microsoft Excel Workbook provided as part of the WHO/HAI methodology. Data input was independently checked for errors. Additional quality control measures were executed at various stages throughout the study. An advisory team provided the overall quality assurance by reviewing survey process, tools for data collection and validation of findings. The survey tools were pre-tested before the survey and prior to data collection. In addition, all survey personnel participated in training and field testing of the survey. Each regional/district team had a supervisor who cross checked the data on a daily basis for completeness, legibility and consistency and reported to the survey manager. A survey manager made field visits and follow-up telephone interviews to validate data in 10% of the sampled outlets. Prior to data entry all relayed data was checked for completeness and consistency.

The availability of individual medicines was calculated as the percentage of sampled medicine outlets where the medicine was found. Data were reported in aggregate as public, private or mission sector medicine outlets. Overall availability per sector was calculated as median of medicines surveyed. For stock data, facilities that had not stocked a particular medicine for six months preceding the survey were expressed as a percentage of total number of facilities. For those that reported to stock the medicine, a monthly average of stock-out days was calculated.

Patient prices were collected in Uganda Shillings and the median, minimum and maximum unit prices were estimated. To facilitate cross-country comparisons, medicine prices obtained during the survey were expressed as ratios relative to a standard set of international reference prices (18) by dividing the median local unit price by the international reference unit price. Medicine price ratios were calculated only for medicines with price data from at least four medicine outlets. The exchange rate used to calculate MPRs was 1$ = 3667.9 Uganda Shillings; this was the mid-rate (average of purchase and sale rate) taken from Bank Uganda website on the first day of data collection (19).

Affordability was calculated using the number of days it requires to pay for standard treatment or dose of treatment based on the daily income of the lowest-paid unskilled government employee (12). The daily wage of the lowest paid government worker (attendants) is approximately UGX 6255 (USD 1.78) as per Uganda Ministry of Public Service salary structure (20). Treatments that required more than one day's wages to purchase were considered unaffordable (12).

RESULTS

A sample of 114 facilities comprising of 37 public, 41 private and 36 mission sector health facilities participated in the study as is shown in table 2 below.

Availability on the day of data collection

Availability of medicines on day of data collection is shown in figure 1. Overall, none of the maternal and reproductive health commodities studied was found in all the surveyed health facilities. The public sector had the highest median (52%), followed by mission sector (36%) and then private sector had the least (30%). The most available commodity was oxytocin injection (86% in mission facilities and 84% in public facilities). The least available commodity was the female condom (in 5% of private facilities, 8% of mission facilities and 22% of facilities). In the public sector, three out of seven items were available in less than 50% of facilities. In the private sector, six of seven items were available in less than 50% of facilities whereas in mission sector five medicines were available in less than 50% of facilities.

Table 2. Number and distribution of health facilities surveyed

Sector	CENTRAL	EASTERN	WESTERN	NORTH	TOTAL
Public	10	08	11	08	37
Private	13	09	09	10	41
Mission	11	07	09	09	36
Totals	**34**	**24**	**29**	**27**	**114**

Maternal health commodities were more available than reproductive health commodities. Among reproductive health commodities, the long-term contraceptive etonogestrel implant (brand name Implanon) was most available at 76% in public facilities.

Medicine stock-out duration

During the review period, a large number of facilities (44% public facilities, 49% private facilities, 59% mission facilities on average) had not stocked MRH commodities in the six months preceding the survey; 38% public facilities had not stocked misoprostol, 19% private facilities had not stocked levonorgestrel tablets and 30% mission facilities had not stocked levonorgestrel implants (see figure 2).

For the facilities that had stocked the items in the previous six months preceding the survey, the stock out days ranged from 7 days to 20 days in the public sector; 2 days to 23 days in the private sector and 3 days to 27 days in the mission sector, respectively (see figure 3). Although ranges of stock out days were similar, pronounced differences existed between sectors for some commodities e.g. for levonorgestrel tablets. Maternal health commodities had less stock out days in the six months preceding the survey than reproductive health commodities. Female condoms were the least stocked commodity across all sectors.
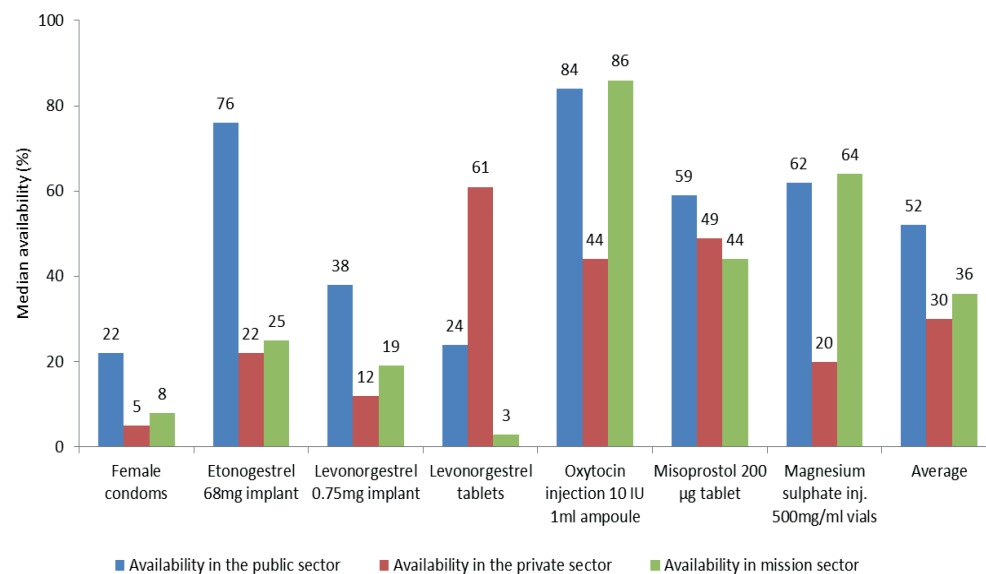

Figure 1. Median availability of reproductive and maternal health medicines and commodities
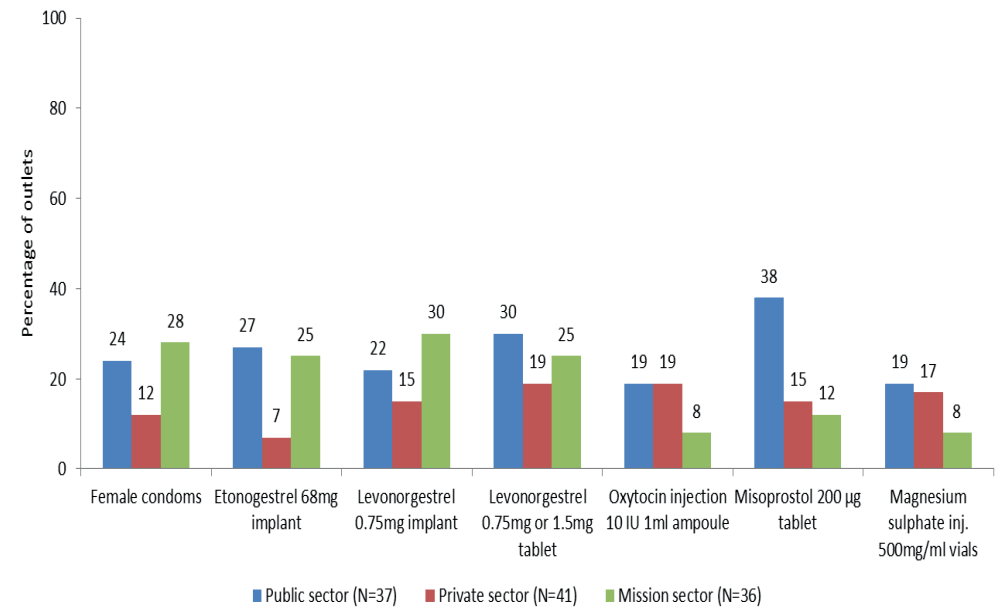

Figure 2. Percentage of surveyed outlets that had not stocked the named reproductive or maternal medicine or commodity in 6 months preceding survey
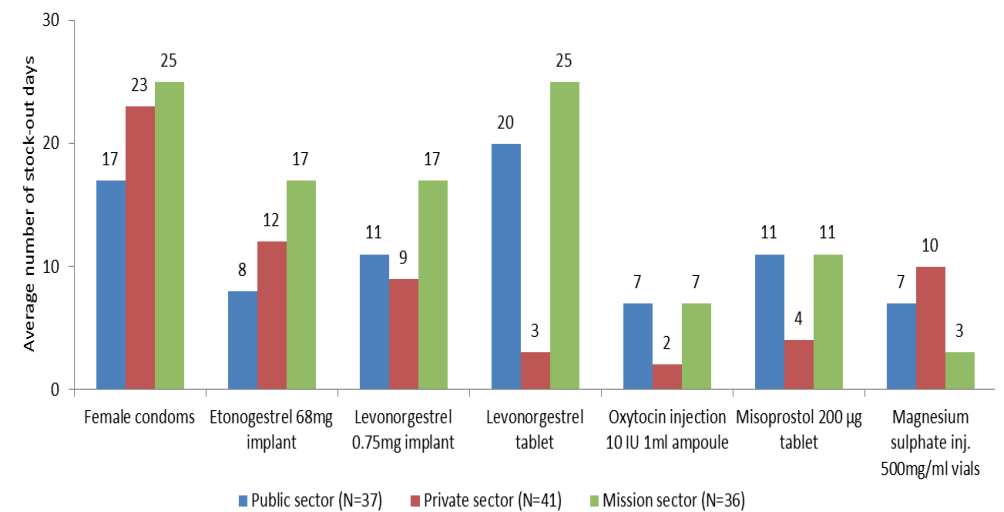

Figure 3. Average number of stock-out days per month of each reproductive and maternal medicine or commodity at surveyed outlets in 6 months preceding survey

Prices and affordability of commodities in private and mission sectors

Median price ratios (MPR) indicated that medicines and commodities were up to over four times more expensive in Uganda compared to international reference prices (Table 3). Also, medicines and commodities were more expensive and less affordable in the private sector than the mission sector.

DISCUSSION

Overall, no MRH commodity was available in all the surveyed facilities. Commodities were available in just half of public facilities and in about one third of both mission and private sector facilities. Up to one in three facilities had not stocked many of the MRH commodities in a period of six months. Medicines and commodities were more expensive in Uganda than to the international reference prices and were less affordable in private sector than to mission sector.

A core obligation of state as regards the right to reproductive health is to ensure the availability, accessibility, acceptability and quality of services (21). Essential commodity supplies are required to ensure that healthy reproductive care is made possible. Childbearing individuals have a right to choose, obtain and use contraceptives to avoid unintended pregnancies, to prevent and treat sexually transmitted infections (STIs), and to ensure healthy pregnancy and delivery. This concept is known as *Reproductive Health Commodity Security* (RHCS) and requires governments to ensure and maintain access to and availability of reproductive health commodities (22).

Table 3. Prices and affordability of treatment

Medicine	Unit Price in USD (MPR)		Treatment unit	Affordability per treatment unit (in days)	
	Priv.	Mission		Private sector	Mission sector
Etonogestrel 68 mg /rod x 1 implant	3.03	-	1 implant	1.6	-
Levonorgestrel 0.75 mg tablet	1.52	-	2 tablets	1.6	-
Misoprostol 200 µg Tablet	1.52 (4.39)	0.91 (2.63)	l tablet	0.8	0.48
Oxytocin Injection 10IU, 1ml	0.61 (3.49)	0.61 (3.49)	1 ampoule	0.32	0.32
Magnesium sulfate Injection 500mg/ml	2.04 (1.54)	1.52 (1.15)	1 ampoule	1.1	0.8

This survey found that universal access to medicines and commodities for reproductive and maternal health has not been achieved in Uganda. Availability was low, stock outs frequently occurred, or medicines and commodities had not been stocked during the six months preceding the study and they were largely unaffordable because of high prices. This is similar to studies elsewhere; Silal et al found access to obstetric services in South Africa was impeded by among others availability and affordability barriers and Adjei et al found low availability of contraceptives in Ghana (5, 23).

Availability of maternal health commodities was better than availability for reproductive health commodities. Between 2012 and the current survey in 2015, availability of reproductive health commodities did not improve but there was an improvement in availability of maternal health commodities in the public sector. For example there was even a reduction in availability of emergency contraceptives from 61% to 24% in the public sector (24). There was increase in availability of oxytocin in the public sector from 61% to 84% whereas it decreased slightly in the mission sector from 90% to 86% and in the private sector from 86% to 44%. Similarly, availability of magnesium sulphate in the public sector improved from 47% to 62% but reduced in mission facilities from 100% to 64%. Availability in the private sector remained minimal consistent with a previous survey (10). This indicates that management of supplies for family planning programs remains a challenge. The improvement in the public sector may be related to the various government and civil society efforts to improve maternal health in this sector. These campaigns should also be targeted to the other sectors.

The results may indicate limited prioritisation of demand generation activities for reproductive and maternal health commodities by improving knowledge of providers and consumers of the commodities. Policy makers ought to emphasise among others provider skills and overcoming gender inequity and negative social norms to improve access to reproductive and maternal health commodities (25, 26).

Stock outs were high across all sectors but least prone in public sector; on average 63% of public facilities had a stock out in previous six months of survey, compared to 80% of mission facilities and 84% of private facilities. However, stock out duration per month was least in the private sector. This implies that the private sector had the most readiness to respond to a stock-out.

Consumer prices for medicines and commodities were very high and unaffordable. For example, the "emergency pill" levonorgestrel 0.75mg had a median unit price of USD 1.52 per tablet and therefore the lowest government worker would have to spend 1.6 days' wages to afford two tablets required for a dose of treatment. This finding is consistent with many studies done in low- and middle-income countries which show that medicine prices are often high (27-29). Efforts should be undertaken by the Ministry of Health and stakeholders like manufacturers, development partners and civil society to reduce commodity prices through measures such as price caps, subsidies, pooled purchasing mechanisms by all sectors and cost-effective strategies to increase the distribution coverage area of wholesalers (30, 31).

The WHO/HAI medicines Prices and Availability survey data can play an important role in analysing access, availability and affordability of essential medicines in low and middle-income countries. The major strength of this study is the use of a tested, reliable, standardized and validated methodology which allows for the measurement of medicine prices and availability (13). The study provides details on availability, cost, and affordability of individual medicines across three sectors (public, private and mission) and the methodology was adopted to incorporate stock-out rates for the various medicines and commodities and therefore provides a more reliable and accurate picture of availability over a longer period beyond the day of data collection. The study also explored alternative therapeutic alternatives, dosage forms and strengths of the medicines and commodities. Findings in this study may not be generalizable to other countries with pharmaceutical markets and structures markedly different from Uganda's. However, such information can form an important component of advocacy efforts for rational pharmaceutical policies. In order to provide more useful information for effective policy intervention, and to counter the main limitations of this study, methods to elucidate factors influencing the differences in results between sectors, for example, should be incorporated.

CONCLUSIONS

Results indicate that access to medicines and commodities for reproductive and maternal health has not been achieved in Uganda. Access in terms of availability, prices and affordability was better for maternal health compared to reproductive medicines and commodities. The Ministry of Health therefore ought to emphasise among others, provider skills and overcoming gender inequity and negative social norms to improve access to reproductive and maternal health commodities. Efforts should be undertaken by the Ministry and stakeholders to reduce commodity prices for retailers and other measures such as subsidies, pooled purchasing mechanisms and cost-effective strategies to increase the distribution coverage area of wholesalers.

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3.2

ACCESS TO SEXUAL AND REPRODUCTIVE HEALTH COMMODITIES IN EAST AND SOUTHERN AFRICA: A CROSS-COUNTRY COMPARISON OF AVAILABILITY, AFFORDABILITY AND STOCK-OUTS IN KENYA, TANZANIA, UGANDA AND ZAMBIA

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ABSTRACT

Background

Access to sexual and reproductive health services continues to be a public health concern in Kenya, Tanzania, Uganda and Zambia: use of modern contraceptives is low, and unmet family planning needs and maternal mortality remain high. This study is an assessment of the availability, affordability and stock-outs of essential sexual and reproductive health commodities (SRHC) in these countries to inform interventions to improve access.

Methods

The study consisted of an adaptation of the World Health Organisation/Health Action International methodology, *Measuring Medicine Prices, Availability, Affordability and Price Components*. Price, availability and stock-out data was collected in July 2019 for over fifty lowest-priced SRHC from public, private and private not-for-profit health (PNFP) facilities in Kenya (n=221), Tanzania (n=373), Uganda (n=146) and Zambia (n=245). Affordability was calculated using the wage of a lowest-paid government worker. Accessibility was illustrated by combining the availability (≥ 80%) and affordability (less than 1 day's wage) measures.

Results

Overall availability of SRHC was low at less than 50% in all sectors, areas and countries, with highest mean availability found in Kenyan public facilities (46.6%). Stock-outs were common; the average number of stock-out days per month ranged from 3 days in Kenya's private and private-not-for-profit (PNFP) sectors, to 12 days in Zambia's public sector. In the public sectors of Kenya, Uganda and Zambia, as well as in Zambia's PNFP sector, all SRHC were free for the patient. In the other sectors unaffordability ranged from 2 to 9 SRHC being unaffordable, with magnesium sulphate being especially unaffordable in the countries. Accessibility was low across the countries, with Kenya's and Zambia's public sectors having six SRHC that met the accessibility threshold, while the private sector of Uganda had only one SRHC meeting the threshold.

Conclusion

Accessibility of SRHC remains a challenge. Low availability of SRHC in the public sector is compounded by regular stock-outs, forcing patients to seek care in other sectors where there are availability and affordability challenges. Health system strengthening is needed to ensure access, and these findings should be used by national governments to identify the gaps and shortcomings in their supply chains.

BACKGROUND

Worldwide, more than 800 women a day die due to complications related to pregnancy and childbirth, and annually an estimated 5.3 million children do not reach the age of five, with half of these deaths occurring in Sub-Saharan Africa (1,2). In addition to the threat of death, 210 million women a year experience serious pregnancy-related injuries and disabilities, which often lead to long-term morbidity (3). Research has estimated that the lives of four million women, newborns and children in sub-Saharan Africa could be saved if coverage of interventions such as emergency obstetric care, breastfeeding counselling, and treatment for infections such as diarrhoea and pneumonia increased to 90% of families (4). Contraceptive prevalence rates remain low in many developing countries among both men and women, with over 214 million women experiencing unmet family planning needs, and the limited demand and uptake of reproductive health services and education around reproductive health issues pose significant challenges (5–8). In addition, it is estimated that in 2020 there will be an annual shortfall of $233 million needed to pay for contraceptive supplies (6). In 2016 alone, there were also an estimated 376 million new cases of one of the four most common curable sexually transmitted infections (STIs) (chlamydia, gonorrhoea, syphilis and trichomoniasis), with syphilis responsible for more than 200,000 stillborn and newborn deaths (9). Access to essential commodities and services for sexual and reproductive health (SRH) can prevent a significant proportion of these deaths and disabilities. However, access remains a problem for almost 2 billion people (10).

Reflecting global trends, access to SRH services continues to be a public health concern in Kenya, Tanzania, Uganda and Zambia. In all four countries, maternal mortality remains high, ranging from 224 to 510 maternal deaths per 100,000 live births (11,12). The use of modern contraceptives is low, especially in Uganda and Tanzania, where only 27.5% and 33.5% of married women, respectively, used modern contraceptive methods. In Kenya, Tanzania and Zambia, about 20% of married women aged 15-49 had unmet family planning needs, while 30% of married women in Uganda were experiencing this problem (7). In Zambia, 81.9% of unmarried, sexually active adolescent girls aged 15-19 were not using contraception (13). The other three countries also have high percentages of unmarried, sexually active adolescent girls not using contraception (59.3% to 68.8%) (14–16). Not surprisingly, overall unmet needs for contraceptives among this population was high; across the four countries it ranged from 38.6% to 66.9% (14,17). Consequences of unmet family planning needs can be serious, especially amongst adolescents: it can lead to unwanted pregnancies, resulting in increases in unsafe abortions, which significantly increase the risk for morbidity and mortality. Further, teenage pregnancies can lead to school dropout, which diminishes the chances of girls finding employment opportunities later in life, continuing the poverty cycle (18). Significant changes are thus needed to reach the Sustainable Development Goals' targets of a global maternal mortality ratio of less than 70 per 100,000 live births and universal access to sexual and reproductive healthcare services (19).

Despite the clear need for access to sexual and reproductive health commodities (SRHC) in Kenya, Tanzania, Uganda and Zambia, access has not been fully achieved and unavailability, unaffordability, regulatory provisions and supply chain issues persist (20). Previous research in these countries has focused on identifying the barriers to access on both the supply and demand side (21–26), but detailed research on availability and affordability of these medicines at the health system level is lacking. In Uganda research on availability of medicines for SRH has been conducted previously, showing that access remains suboptimal (27,28). However, this research did not cover an extensive list of SRHC, nor included medical devices essential in offering quality SRH services. The research presented here is an assessment of the availability, affordability and stock-outs of over fifty essential SRHC, including medicines and medical devices, in Kenya, Tanzania, Uganda and Zambia to identify current accessibility of SRHC and to inform interventions to improve access.

METHODS

Study design

The study was designed as a cross-sectional survey. Data collection comprised a health facility survey in which the availability, price, and stock-outs of sexual and reproductive health commodities were measured.

Ethical approval was granted by the Amref Ethics and Scientific Review Committee in Kenya, the National Institute for Medical Research in Tanzania, Makerere University School of Health Sciences in Uganda, and the National Health Research Authority in Zambia. Letters of introduction to health facilities were provided by County Directors of Health in Kenya, and Ministries of Health in Tanzania, Uganda and Zambia.

Study setting and participants

This survey was conducted in ten counties in Kenya, twelve counties in Tanzania, six regions in Uganda, and ten provinces in Zambia. The provinces selected included each country's main urban region and five or more other regions, using a random sampling strategy. Each survey area within a province covered a population of 100,000 to 250,000. Health facilities were identified for inclusion, using a stratification method, as public-, private-, and private not-for-profit (PNFP) facilities. Within each stratum, four health facilities were randomly sampled from rural and urban areas. In this study urban areas were defined per country according to the definition held by the corresponding National Bureaus of Statistics: an urban area was defined in Kenya and Uganda as an area with a population of 2,000 or higher, in Zambia with a population of 5,000 or higher, and in Tanzania with a population of 10,000 or higher (29). In each case, one of the selected urban areas included the main public provincial health facility. The inclusion criteria for the other health facilities were that facilities had to be within three hours' travel from the main public provincial health facility, and all selected health facilities had to provide SRH services.

Data collection tool

A data collection tool, adapted from the standardised World health Organization (WHO)/Health Action International (HAI) Medicine Prices Monitoring Tool and validated in many countries, was used for collecting data (30–34). The 'basket' of commodities assessed was developed by combining the WHO's Essential Medicines for Reproductive Health, the Interagency List of Essential Medicines for Reproductive Health, the Interagency List of Medical Devices for Essential Interventions for Reproductive, Maternal, Newborn and Child Health, and the United Nations Commission on Life Saving Commodities for Women and Children: Commissioner's Report (35–38). In combination with in-country expertise via a specialist advisory group and after piloting the methodology, after which slight alterations were made to the commodity basket, the commodities list presented was believed to be a selection of the most essential SRHC within the study region. Commodity strengths and dosage forms were based on the national essential medicine lists (NEMLs) (39–43). Commodities cover family planning, maternal and child health, and STI management, and when listed with multiple dosage forms or strengths, all the formulations were included in the survey (see Additional file 1 for a complete overview of surveyed commodities). Previous cycles of the research took place in 2017 and 2018 in Kenya, Tanzania, Uganda and Zambia.

Data collection

Data collection took place in July 2019 using a mobile data collection application. In each country, local data collectors were trained by the authors (GIO and DK) on how to use the data collection tool during a two-day workshop, which included a field test. During the workshop the data collectors were provided with one tablet each, and taught how to use the mobile application through a step-by-step walkthrough. During the field test they practiced the use of the mobile application.

Data collectors worked in pairs, supervised in each country by a survey manager. Data on availability, patient prices, brand information and stock-out days was only collected when commodities were visibly present. Product name, name of manufacturer, actual pack size and pack price were recorded for the lowest price for each commodity available. Stock-outs were only recorded if a stock card was available and seen. Stock-outs were noted for the six months prior to the day of data collection.

Data analysis

After completion of data collection, data was uploaded to the server and downloaded into an excel spreadsheet. Data entries were double-checked for accuracy by the researchers. If data was missing or incorrectly entered, it was excluded from the analysis or rectified after verification with the data collectors. Thereafter, analysis was completed in a previously developed Excel analysis tool using descriptive statistics.

The availability of a commodity was calculated as the mean of the sampled facilities where the medicine was found at the time of the survey, expressed as a percentage. Mean availability of SRHC per sector and country was calculated in a two-step manner: firstly, the mean availability per commodity across the sampled facilities was calculated, after which the mean of these mean availabilities was calculated. For each commodity, availability was only measured when the level of care at which a commodity should be available corresponded with the surveyed facility. For example, calcium gluconate should be available at hospital levels and up in Kenya, Tanzania and Zambia, and from health centre III level in Uganda. In the PNFP sector, availability of family planning commodities was only calculated if family planning services were provided by the facility. Availability was calculated per commodity, as well as in groups for similar use (the birth control pill, injectable contraceptive and implant) or

for different formulations of the same medicine (i.e. for magnesium sulphate, amoxicillin, clotrimazole, ferrous salt, folic acid, zinc and ORS sachets). When availability was calculated for a grouping of commodities, it was an aggregate of the availability and calculated as the mean percentage of sampled facilities where either of the formulations or commodities with similar medicinal use were available. Availability of 80% or higher was considered acceptable as per WHO guidelines (44). Two-sample F-tests for variance were computed to test for normal distribution and independence, after which two-sample T-tests were calculated to test whether significant differences existed between means, using a significance cut-off value of 0.05.

Stock-outs were calculated longitudinally as the mean percentage of facilities that reported a stock-out of a commodity any time in the six months prior to the day of data collection. Stock-out days were also calculated longitudinally over a six-month period, and were calculated as the average number of days a commodity was stocked out per month. Stock information was surveyed only for medicines, not for medical devices.

Affordability was calculated using the median price of a commodity, and the number of days a lowest-paid government worker (LPGW) needs to work in order to pay for a standard treatment regimen for a commodity. The daily wage of an LPGW was 449.40 Kenyan Shillings (Kenya), 3077.15 Tanzanian Shillings (Tanzania), 6169.65 Ugandan Shillings (Uganda), and 33.12 Kwacha (Zambia) (45–48). According to the WHO/HAI methodology, treatment was considered unaffordable if it cost more than a day's wage for an LPGW (30). Affordability was calculated only for medicines, not for medical devices.

Accessibility was illustrated combining the availability and affordability measures. This resulted in a categorical variable, in which accessibility was achieved when a commodity had an 80% or higher availability, and when a treatment regimen cost less than a day's wage of an LPGW.

RESULTS

Across the public, private and PNFP sectors, 221, 373, 146 and 245 facilities were surveyed in Kenya, Tanzania, Uganda and Zambia, respectively. Stock information was collected from 221 facilities in Kenya, 212 facilities in Tanzania, 105 facilities in Uganda, and 182 facilities in Zambia. An overview of the distribution of the facilities is provided in Table 1.

Table 1. Distribution of surveyed facilities with availability, price and stock data, by country, sector and area.

		Public	Private	PNFP	Total
Kenya Availability and price data					
	Urban	33	63	24	120
	Rural	46	25	30	101
	Total	79	88	54	221
Stock data					
	Urban	33	63	24	120
	Rural	45	25	30	100
	Total	78	88	54	220
Tanzania Availability and price data					
	Urban	131	55	35	221
	Rural	132	5	15	152
	Total	263	60	50	373
Stock data					
	Urban	100	25	21	146
	Rural	56	1	9	66
	Total	156	26	30	212
Uganda Availability and price data					
	Urban	22	33	23	78
	Rural	33	15	20	68
	Total	55	48	43	146
Stock data					
	Urban	21	16	21	58
	Rural	29	0	18	47
	Total	50	16	39	105
Zambia Availability and price data					
	Urban	59	58	4	121
	Rural	77	9	38	124
	Total	136	67	42	245
Stock data					
	Urban	48	30	4	82
	Rural	57	5	38	100
	Total	105	35	42	182

PNFP: Private not-for-profit.

Availability of SRHC

Across countries

The research surveyed 55 commodities in Kenya, 56 in Tanzania and Zambia, and 59 in Uganda. Aggregation led to 43 surveyed SRHC in all countries. Mean availability of SHRC in general on the day of data collection was lower than 50% in all sectors. Highest mean availability was found in Kenya for all sectors, with the highest overall mean availability found in Kenya's public sector (46.6%). Mean availability in Tanzania's (37.9%), Uganda's (37.9%) and Zambia's (38.6%) public sectors was comparable to each other. Zambia's private sector had the lowest mean availability across the countries and sectors (28.3%). Comparing the countries to each other showed that mean availability of SHRC in the PNFP sector was significantly higher in Kenya (45.7%, n=55) than in Tanzania (33.5%, n=56) ($p = 0.01$). No significant differences in mean availability were found across the countries for any other sectors.

Country level

In none of the countries did the mean availability of SHRC differ significantly between sectors. In Uganda mean availability within the PNFP sector differed significantly when comparing urban and rural facilities: mean availability of SRHC in urban PNFP facilities (44.8%, n=59) was significantly higher than in rural PNFP facilities (30.6%, n=59) ($p = 0.009$) (Figure 1). There were no significant differences in mean availability when comparing urban and rural areas within a sector in the other countries.

In all countries, the public sector had the most commodities with an 80% availability or more. Kenya's public sector had 10 SRHC with an 80% or higher availability, followed by Zambia (8 SRHC), and Uganda and Tanzania (both 6 SRHC) (see Table 1). In all countries, the private sector had the most commodities available at 50% or less of facilities: 25 of 43 SRHC in Kenya, 27 of 43 SRHC in Uganda, 30 of 43 SRHC in Tanzania, and 33 of 43 SRHC in Zambia.

Family Planning

In the countries, male condoms were most likely to be available in more than 80% of the facilities across the different sectors (see Table 2). Only in Kenya's and Tanzania's PNFP sector, and Tanzania's and Uganda's private sector was the availability below 80%. Female condoms were available at 60% or less of the facilities across the countries. Kenya's public sector had the most family planning commodities available at more than 80% of facilities, this included
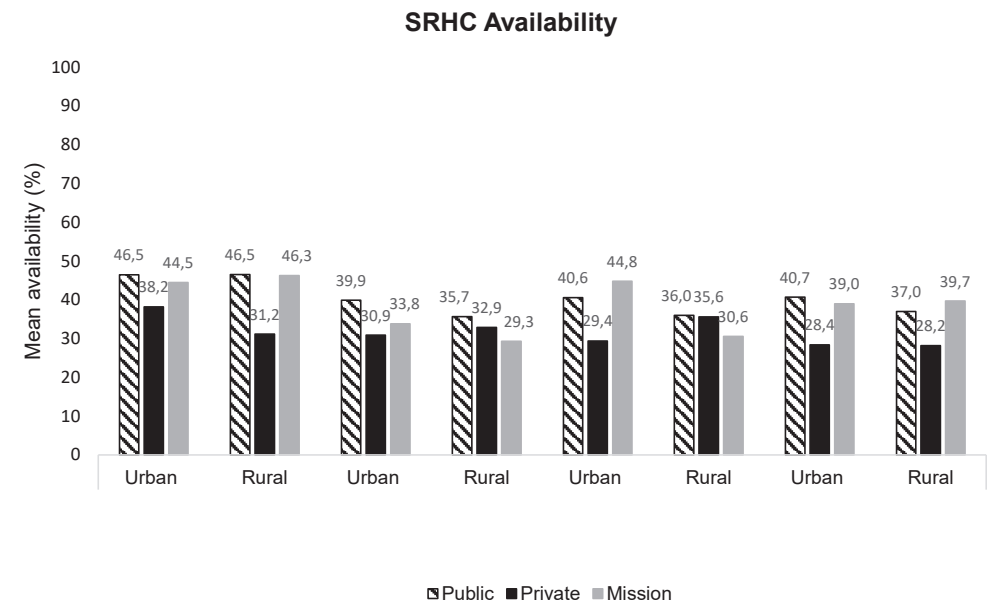

Figure 1. Mean availability of SRHC across sectors and areas, by country.

the combination measures of oral contraceptive, injectable contraceptive and the implant. Levonorgestrel 750 mcg, an emergency contraceptive, had a low availability across the countries, with Tanzania only providing it in 8% of public facilities, and in none of the private or PNFP facilities.

Maternal Health

Maternal health commodities were on average less available than family planning commodities. Oxytocin only had an 80% or higher availability in the public sectors of Kenya, Uganda and Zambia. Misoprostol had a low availability across the countries; only in Uganda's public sector was availability above 80%. Zambia had lowest availability across the sectors, ranging from 11% to 27%. Methyldopa had a relative high availability in all sectors in Kenya and Tanzania, while in Uganda and Zambia it was much lower. Magnesium sulphate had a low availability across the countries, especially in Zambia and the countries' private sector.

Antibiotics and Antifungals

In all countries, metronidazole had the highest availability in facilities. In Zambia, all sectors had an 80% or higher availability, while an 80% or higher availability was also found for the private and PNFP sectors in the other

countries. Availability of clotrimazole, either the pessary or cream formulation, was considerably low in Tanzania and Zambia (less than 50% across the sectors), and only the PNFP sector in Kenya had either formulation available at more than 80% of facilities. Similarly, amoxicillin (125mg or 250mg), had a low availability in the countries; only in Zambia's private and PNFP sector did the availability go above 80%. The benzylpenicillins had a suboptimal availability in most of the countries' sectors.

Newborn and Child Health

Kenya had the best availability of newborn and child health commodities. Zinc had an 80% or higher availability across the sectors, while dexamethasone and ORS sachets also had a high availability. Overall, ORS sachets had the highest availability across the countries, with the exception of Zambia where availability was below 50% in the public and PNFP sectors. Chlorhexidine 4% had a low availability across all countries, with highest availability in Kenya's public sector (38%).

SRH Medical Devices

Availability of SRH medical devices was generally low, with Kenya doing slightly better than the other countries. In all countries, availability of the vasectomy kit, tubal ligation kit, ventilator, resuscitator and infant-size training mannequin was below 50%. In Zambia's private sector, all commodities, with the exception of the foetal scope, were available at less than 50% of facilities. Availability of the foetal scope was also high in the other countries.

Stock-outs

Stock-out data was collected for 41 SRHC in Zambia, 42 SRHC in Kenya and Tanzania, and 45 SRHC in Uganda. Zambia had the highest percentage of SRHC stock-outs across the sectors. In the public sector, an average of 46.9% of facilities reported stock-outs, compared with 35.6% in Uganda, 25.1% in Tanzania and 23.2% in Kenya (see Table 3). In the private sector stock-outs occurred less often than in the public sector in Kenya and Uganda, while in Tanzania stock-outs occurred more often. Zambia's stock-outs in the private sector were similar to the public sector. Stock-outs in the PNFP sector were much higher in Zambia than in the other three countries.

The average duration of stock-outs was also highest in Zambia, where stock-outs lasted 9 to 12 days per month across sectors. Stock-out duration in the public and private sectors of Kenya, Tanzania and Uganda were similar, ranging from

Table 2. Mean availability of individual SRHC across sectors, by country.

| Commodities | Mean Availability (%) | | | | | | | | | | | |
| | Kenya | | | Tanzania | | | Uganda | | | Zambia | | |
	Public	Private	PNFP	Public	Private	PNFP	Public	Private	PNFP	Public	Private	PNFP
Family Planning												
Oral contraceptive[a]	91	80	72	69	47	40	75	36	43	91	67	83
Levonorgestrel 750 mcg	47	71	32	8	0	0	35	30	24	41	61	41
Injectable contraceptive[b]	92	32	66	82	59	53	62	51	67	72	30	79
Male condoms	84	85	79	82	52	47	93	72	81	89	89	86
Female condoms	56	13	39	33	22	27	18	17	33	60	5	48
Intrauterine contraceptive device[n]	82	29	48	62	65	53	72	39	56	51	2	41
Implant[c,n]	87	30	79	84	78	73	89	64	67	71	0	62
Diaphragm	0	0	4	0	0	0	0	0	0	0	0	0
Maternal Health												
Oxytocin injection[n,p]	87	41	67	75	42	56	80	50	64	94	50	78
Misoprostol	33	34	35	49	35	22	82	48	56	11	27	26
Methyldopa[k,m,n]	77	77	83	76	73	73	24	14	36	12	51	17
Magnesium sulphate[d,n,p]	59	10	44	70	18	48	69	10	42	13	0	12
Calcium gluconate[k,m,n,q]	71	29	71	44	0	44	43	8	27	67	0	0
Ferrous salt	57	50	43	5	3	4	4	27	37	75	55	71
Folic acid	55	77	79	63	50	48	64	71	63	80	82	79
Ferrous Salt: Folic Acid Tablet[g]	62	8	48	20	5	14	27	10	33	1	7	2
Antibiotics and Antifungals												
Metronidazole	68	80	87	61	92	86	75	94	84	88	87	93
Clotrimazole[e]	70	74	83	39	47	38	67	63	67	24	45	17
Gentamicin[n]	58	39	61	43	45	40	30	67	67	48	33	50

Table 2. (continued)

Commodities	Mean Availability (%)											
	Kenya			Tanzania			Uganda			Zambia		
	Public	Private	PNFP	Public	Private	PNFP	Public	Private	PNFP	Public	Private	PNFP
Procaine benzylpenicillin	NS	NS	NS	26	33	36	33	48	44	2	34	7
Benzathine benzylpenicillin[n]	39	16	30	80	60	70	70	72	67	60	69	74
Benzylpenicillin	46	34	50	NS	NS	NS	NS	NS	NS	82	34	86
Amoxicillin[f]	62	38	43	74	30	42	40	40	49	77	88	81
Newborn- and Child Health												
Dexamethasone[k,o,q]	81	82	63	10	27	32	76	50	46	67	50	0
Zinc ORS co-pack	68	28	41	29	3	4	44	6	26	13	5	17
Zinc[h]	86	82	93	36	75	74	44	70	67	53	46	60
ORS sachets[i]	77	73	83	75	72	82	53	70	63	32	57	48
Chlorhexidine 4%	38	9	30	7	3	6	26	6	19	6	3	10
SRH medical devices												
Vasectomy kit[k,ln]	19	6	8	3	5	0	17	8	15	7	4	14
Tubal ligation kit[k,ln]	23	35	13	13	9	5	17	11	24	10	1	10
Manual vacuum aspiration kit[ln]	66	59	56	38	38	26	48	36	48	54	38	64
Speculum[j,o]	86	78	84	84	67	66	88	75	92	84	38	94
Cervical dilator[j,n]	34	41	49	12	17	14	46	31	58	28	25	25
Incubator	68	47	79	11	13	16	16	4	14	27	13	53
Monitor[k,n]	39	53	63	11	15	16	22	11	33	14	13	17
Ultrasound scan[k,o]	45	53	63	13	45	36	52	63	92	19	50	22
Ventilator[k,n]	32	41	42	5	5	6	9	8	3	9	25	17
Foetal scope[j,n]	82	78	88	97	80	92	94	92	91	86	63	78
Resuscitator (adult size)[j,n]	45	33	49	31	22	18	33	44	45	28	25	39

Table 2. (continued)

Commodities	Mean Availability (%)											
	Kenya			Tanzania			Uganda			Zambia		
	Public	Private	PNFP	Public	Private	PNFP	Public	Private	PNFP	Public	Private	PNFP
Resuscitator (infant size)[j,n]	63	44	53	63	38	46	65	56	70	50	38	72
Bag and mask (size 0)[j,o]	58	52	77	59	37	46	68	25	62	52	38	75
Suction device[j]	68	67	79	71	52	62	65	54	81	75	50	81
Training mannequin (infant)[j,n]	20	15	23	36	22	32	26	6	27	26	0	33

NS: not surveyed.

a "Oral contraceptive' combines availability of ethinylestradiol + levonorgestrel (multiple formulations) and/or ethinylestradiol + norethisterone (multiple formulations) and/or ethinylestradiol + desorgestrel (multiple formulations) and/or levonorgestrel 30mcg at the facility.

b "Injectable contraceptive' combines availability of medroxyprogesterone acetate (150mg in 1ml vial or 104mg in 1 ml vial) and/or norethisterone enanthate 200mg/ml in 1ml vial and/or estradiol cypionate + medroxyprogesterone acetate (5mg + 25mg) at the facility.

c "Implant' combines availability of levonorgestrel implant and/or etonogestrel implant at the facility

d "Magnesium sulphate' combines availability of magnesium sulphate 500mg in 1ml and/or magnesium sulphate 500mg in 2ml and/or magnesium sulphate 500mg in 10ml at the facility.

e "Clotrimazole' combines availability of clotrimazole cream (1%, 15g tube) and/or clotrimazole pessary (100mg, 200mg or 500mg)

f "Amoxicillin' combines availability of amoxicillin 125mg and/or amoxicillin 250mg at the facility.

g "Ferrous salt: folic acid tablets' combines availability of the ferrous salt: folic acid (60mg + 400mcg) and/or ferrous salt: folic acid (150mg + 500mcg) and/or ferrous salt: folic acid (200mg + 500mcg) at the facility.

h "Zinc' combines availability of zinc 10mg in 5ml syrup and/or zinc 20mg and/or zinc ORS co-pack at the facility.

i "ORS sachets' combines availability of ORS sachets of 200ml and/or 500ml and/or 1L and/or zinc ORS co-pack at the facility.

j Available from health centre and up in Kenya.

k Available from primary/county hospital and up in Kenya.

l Available from health centre and up in Tanzania.

m Available from council hospital and up in Tanzania.

n Available from health centre III and up in Uganda.

o Available from health centre IV and up in Uganda.

p Available from general hospital and up in Zambia.

q Available from central hospital and up in Zambia.

6 to 8 days per month in the public sector, and 3 to 5 days in the private sector. Tanzania's PNFP sector stock-outs were comparable to Zambia's, while in Uganda and Kenya they were lower.

Affordability

Pricing information was missing for 0.6% (17/2946) of SRHC in Uganda, 1.1% (48/4469) of SRHC in Zambia, 2.5% (110/4316) of SRHC in Kenya and 6.5% (473/7289) of SRHC in Tanzania. In Kenya, Uganda and Zambia's public sector all commodities were affordable to the patient because commodities were provided for free (see Table 4). Zambia's PNFP sector also provided all SRHC for free to the patient. In Tanzania's public sector, two SRHC cost more than a day's wage for an LPGW: 2.27 days for a treatment of procaine benzylpenicillin, and 1.30 days for a treatment of gentamicin.

Uganda's private sector had the most commodities that cost more than a day's wage (n=9), with a magnesium sulphate 500mg/10ml treatment costing more

Table 3. Percentage of facilities reporting stock-outs in the last six months, and number of stock-out days per month.

	Stock-outs	
	Facilities reporting stock-outs (%)	**Average number of stock-out days/month**
Kenya		
Public	23.2	6
Private	17.4	3
PNFP	12.0	3
Tanzania		
Public	25.1	8
Private	31.4	5
PNFP	14.5	9
Uganda		
Public	35.6	7
Private	16.6	4
PNFP	15.9	6
Zambia		
Public	46.9	12
Private	45.7	9
PNFP	41.7	10

PNFP: Private not-for-profit

than 16 days' wage. Two long-acting reversible contraceptives, levonorgestrel 750mcg and the intrauterine contraceptive device, also cost more than a day's wage. Kenya and Tanzania had 4 and 6 commodities, respectively, that cost more than a day's wage in the private sector, with a magnesium sulphate treatment also costing the most days. Zambia's private sector had 7 commodities that cost more than a day's wage; all were maternal health commodities or antibiotics. Affordability patterns in the PNFP sector, although slightly better, were comparative to their private sector counterparts in Kenya, Tanzania and Uganda, with many of the commodities that cost more than a day's wage in the PNFP sector also costing more than a day's wage in the private sector.

ACCESSIBILITY

Accessibility was low across the countries. In the public sector, where medicines are often provided free of charge, Kenya and Zambia had the highest accessibility, with six commodities considered accessible, followed by Tanzania (four commodities) and Uganda (two commodities). Accessibility was lower in the private sector. For instance, in Tanzania only two SRHC were accessible: ORS sachets 1L and metronidazole (Figure 2). Six commodities were both unaffordable and available in less than 80% of facilities: ferrous salt (1.22, 3%), gentamicin (4.06, 45%), magnesium sulphate 500mg/10ml (5.85, 11.7%), procaine benzylpenicillin (7.31, 33%), methyldopa (7.31, 73%) and magnesium sulphate 500mg/2ml (11.70, 6.7%). However, the problem for most SRHC seems to be availability, and not affordability, as many commodities are not available in 80% or more of facilities but do cost less than a day's wage.

In Zambia's private sector three SRHC met the accessibility threshold (amoxicillin 125mg, male condoms and metronidazole), in Kenya two did (dexamethasone and male condoms), while in Uganda only one commodity (metronidazole) met the threshold. In Uganda and Zambia, six SRHC were also both unaffordable (more than a day's wage) and had a low availability (less than 80%). In Kenya this was the case for four commodities. The PNFP sector had similar accessibility patterns as the private sector in the countries, with two or three commodities considered accessible across the countries' PNFP sectors. Please refer to Additional file 2 for detailed information per country and sector.

Table 4. Affordability of SRHC for an LPGW, per country and sector.

| | | Affordability (Days of Wages) | | | | | | | | | | | |
| | | Kenya | | | Tanzania | | | Uganda | | | Zambia | | |
Commodities	Treatment regimens	Public	Private	PNFP	Public	Private	PNFP	Public	Private	PNFP	Public	Private	PNFP
Ethinylestradiol + levonorgestrel	1 strip	0	0.13	0	0	0	0	0	0.16	0	0	0.30	0
Ethinylestradiol + norethisterone	1 strip	0	0.09	NA	0	0.19	NA	0	NA	NA	0	NA	NA
Ethinylestradiol + desorgestrel	1 strip	NA	NA	NA	0	0	NA	NA	NA	NA	NA	NA	NA
Levonorgestrel 30mcg	1 tablet	0	0.09	0.04	0	0	0	0	NA	NA	0	0.30	0
Levonorgestrel 750mcg	1 tablet	0	0.22	0.07	0	NA	NA	0	1.13	0.32	0	0.80	0
Medroxyprogesterone acetate 150ml	1 vial	0	0.22	0.09	0	0	0	0	0.81	0	0	0.60	0
Medroxyprogesterone acetate 104ml	1 vial	0	0.22	0.06	NA	NA	NA	0	0.32	0.08	NA	NA	NA
Norethisterone enanthate	1 vial	NA	NA	NA	NA	NA	NA	NA	NA	NA	0	0.63	0
Male condoms	1 pack	0	0.11	0	0	0	0	0	0.11	0	0	0.15	0
Female condoms	1 pack	0	0	0	0	0	0	0	0	0	0	0.27	0
Intrauterine contraceptive device	1 device	0	1.00	0	0	0	0	0	2.43	0	0	0.00	0
Implants: levonorgestrel	1 device	0	0.67	0	0	0	0	0	0.81	0	0	NA	NA
Implants: etonogestrel	1 device	0	0.89	0.33	0	0	0	0	1.62	0	0	NA	NA
Diaphragm	1 device	NA	NA	0	0	NA	NA	NA	NA	NA	NA	NA	NA
Oxytocin injection	1 vial	0	0.20	0.22	0	0.32	0	0	0.49	0.24	0	0.42	0
Misoprostol	1 vial	0	0.18	0.16	0	0.65	0	0	0.49	0.16	0	1.19	0
Methyldopa	90 tablets	0	1.00	1.00	0	7.31	5.85	0	1.46	3.65	0	3.80	0
Magnesium sulphate 500mg/ 2ml	18 vials	0	8.81	0.70	0	11.70	0	NA	NA	NA	NA	NA	0
Magnesium sulphate 500mg/ 10ml	18 vials	0	17.76	5.41	0	5.85	0	0	16.12	14.59	NA	NA	0
Calcium gluconate	1 ampoule	0	0.29	0.22	0	NA	0	0	2.92	14.59	0	NA	0
Ferrous salt	30 tablets	0	0.07	0.07	0	1.22	NA	0	0.02	0.01	0	0.45	0
Folic acid	30 tablets	0	0.13	0.07	0	0.97	0.02	0	0.49	0.24	0	1.59	0

Table 4. (continued)

| | | Affordability (Days of Wages) | | | | | | | | | | | |
| | | Kenya | | | Tanzania | | | Uganda | | | Zambia | | |
Commodities	Treatment regimens	Public	Private	PNFP	Public	Private	PNFP	Public	Private	PNFP	Public	Private	PNFP
Ferrous Salt: Folic Acid 60/400	30 tablets	0	0.67	0.07	0	0.97	0	0	0.49	0.16	0	0	0
Ferrous Salt: Folic Acid 150/500	30 tablets	0	NA	0.07	0	0.49	0	0	0.49	0.26	NA	2.26	NA
Metronidazole	30 tablets	0	0.07	0.13	0	0.97	0.88	0	0.49	0.49	0	0.45	0
Clotrimazole pessary	6 tablets	0	0.28	0.11	0.06	0.89	0.65	0	2.92	2.92	0	0.79	0
Clotrimazole cream	1 tube	0	0.13	0.1`	0.49	0.97	0.81	0	0.49	0.41	0	0.45	0
Gentamicin	10 amp	0	0.45	0.67	1.30	4.06	4.87	0	3.24	2.43	0	1.51	0
Procaine benzylpenicillin	10 vials	NA	NA	NA	2.27	7.31	6.50	0	6.48	3.24	0	3.62	NA
Benzyl penicillin	10 vials	0	1.11	1.11	NA	NA	NA	NA	NA	NA	0	3.62	0
Benzathine benzylpenicillin	1 vial	0	0.11	0.17	0.15	0.97	0.65	0	0.49	0.49	0	0.42	0
Amoxicillin 125mg	15 tablets	0	1.67	0.17	0.10	0.44	0.24	0	0.24	0.24	0	0.45	0
Amoxicillin 250mg	15 tablets	0	0.10	0.03	0	0.49	0.26	0	0.24	0.49	0	0.23	0
Dexamethasone	1 vial	0	0.11	0.11	0	0.97	0.49	0	0.41	0.32	0	0.60	0
Zinc syrup	1 bottle	0	0.33	0.22	NA	0.97	0.89	NA	0.41	NA	NA	0.68	NA
Zinc tablet	10 tablets	0	0.22	0.11	0	0.41	0.32	0	0.32	0.16	0	0.60	0
Zinc ORS co-pack	1 kit	0	0.22	0.13	0	0.32	0.02	0	0.32	0.24	0	0.06	0
ORS sachets 200ml	1 sachet	0	0.03	0.	NA	0.16	NA	NA	NA	NA	0	0.27	NA
ORS sachets 500ml	1 sachet	0	0.02	0.02	0	NA	NA	NA	NA	0.08	NA	NA	NA
ORS sachets 1L	1 sachet	0	NA	NA	0	0.16	0.16	0	0.08	0.08	0	0.09	0

PNFP: Private not-for-profit.
ORS: Oral rehydration salts.

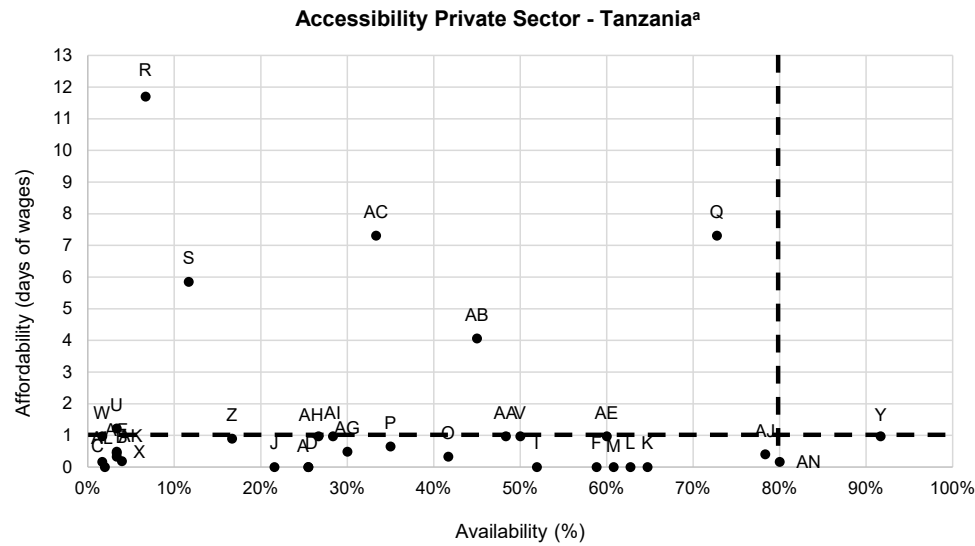**Accessibility Private Sector - Tanzania[a]**

Figure 2. Accessibility of SRHC in Tanzania's private sector. [a]A: Ethinylestradiol + levonorgestrel; B: Ethinylestradiol + norethisterone; C: Ethinylestradiol + desorgestrel; D: Levonorgestrel 30mcg; E: Levonorgestrel 750mcg; F: Medroxyprogesterone acetate 150ml; G: Medroxyprogesterone acetate 104ml; H: Norethisterone enanthate; I: Male condoms; J: Female condoms; K: Intrauterine contraceptive device; L: Implants: levonorgestrel; M: Implants: etonogestrel; N: Diaphragm; O: Oxytocin injection; P: Misoprostol; Q: Methyldopa; R: Magnesium sulphate 500mg/ 2ml; S: Magnesium sulphate 500mg/ 10ml; T: Calcium gluconate; U: Ferrous salt; V: Folic acid; W: Ferrous Salt: Folic Acid 60/400; X: Ferrous Salt: Folic Acid 150/500; Y: Metronidazole; Z: Clotrimazole pessary; AA: Clotrimazole cream; AB: Gentamicin; AC: Procaine benzylpenicillin; AD: Benzyl penicillin; AE: Benzathine benzylpenicillin; AF: Amoxicillin 125mg; AG: Amoxicillin 250mg; AH: Dexamethasone; AI: Zinc syrup; AJ: Zinc tablet; AK: Zinc ORS co-pack; AL: ORS sachets 200ml; AM: ORS sachets 500ml; AN: ORS sachets 1L.

DISCUSSION

Findings and Implications

This study researched the availability, affordability, stock-outs and accessibility of more than fifty sexual and reproductive health commodities considered essential by the WHO, in four Eastern and Southern African countries. The research showed that overall availability of these commodities remains low at less than 50% in all sectors, areas and countries, with highest mean availability found in Kenyan public facilities (46.6%). Stock-outs were a common occurrence across the countries; average number of stock-out days per month ranged from 3 days in Kenya's private and PNFP sectors, to 12 days in Zambia's public sector. In the public sectors of Kenya, Uganda and Zambia, as well as

in Zambia's PNFP sector, all SRHC were free for the patient. In the remaining sectors magnesium sulphate was the least affordable SRHC. Accessibility was low across the countries, with Kenya's and Zambia's public sectors having six SRHC that met the accessibility threshold, while the private sector of Uganda had only one SRHC meeting the threshold.

Similar trends highlighting in which aspects access to SRHC is lacking and where there is room for improvement were observed in the four countries. Availability of levonorgestrel 750mcg, the emergency contraceptive, was for example low across the countries, and this finding is reflected in the trends of use (49–52). Comparable to other studies, magnesium sulphate, critical in managing pre-eclampsia and eclampsia, also had a low availability in all countries, with an especially low availability in Zambia (28,53,54). Medical devices also had a suboptimal availability: tubal ligation and vasectomy kits had a very low availability across the countries, while availability of ultrasound scans was shown to be variable, with a higher availability in Kenya's and Uganda's public sector than in Tanzania and Zambia. An important note to make on the ultrasound scan is that according to the NEMLs, in Kenya it is available starting at county hospitals and in Uganda starting at Health Centres IV, while in Tanzania and Zambia it ought to be available at lower level facilities as well (40–43).

Low availability of many of the SRHC is exacerbated in these four countries by regular stock-outs, which often last for a significant part of the month. Further, even though affordability does not seem to aggravate access issues in the public sectors, it does constitute a problem in the private and PNFP sectors, where people turn to if SRHC are unavailable in the public sector (55,56). In these sectors, affordability might pose an even bigger issue than illustrated in this research due to the fact that a large proportion of the population does not earn the wage of an LPGW. For instance, in Zambia an LPGW earns the equivalent of about 4.50 USD, while in 2016 36.1% of the population was living below the poverty line of 1.90 USD (47,57).

Other health system challenges beyond the price and availability of the commodities at the health facility, which were not measured in this research, also influence accessibility. These challenges include policy and regulatory issues, infrastructural issues, lack of knowledge amongst the population and healthcare workers, cultural beliefs, and lack of skilled healthcare workers

(25,58,67,59–66). The physical availability of an ultrasound scan, for example, does not mean it is routinely used or functional; lack of healthcare workers trained in its use, lack of electricity or high user costs are also barriers (61). Use and acceptability of male and female sterilization is also dependent on lack of knowledge and negative attitudes of clients and healthcare workers, religious beliefs, fear of surgery and side effects, lack of equipment, long travel distances, and long waiting times (62–66,68).

Barriers to access are also created by policies and regulations. When a commodity is expected to be provided only at higher levels, as is the case for ultrasound scans, it increases the distance patients have to travel and reduces access (60,66,68). Related, a slightly higher use of the emergency contraceptive in Kenya (1.7%) than in the other countries (0.2%-0.5%), might be explained by the fact that only in Kenya is this contraceptive available without a prescription (49–52). Another example is that major barriers to the availability magnesium sulphate previously identified in Zambia included lack of policy implementation, lack of procurement by the Ministry of Health and stock-outs at the central distributor (59). Efforts from governments thus ought to focus on improving availability, affordability, geographical accessibility and quality of SRH services offered on the one hand, and SRH client and community education on the other hand.

Key to improving access to SRHC is strengthening the health system, with a specific focus on the supply chain. Stock-outs are a serious issue across the countries, and governments ought to ensure that stock management systems are in place in health facilities; this research showed that especially in Tanzania and Zambia, there are still a number of facilities who do not have stock cards or an electronic stock management system in place. Further, better quantification of medicines is needed, as stock-outs are partly caused by the use of estimations for the needed medicines, and not on previous consumption data, and anticipated burden and need (55,69). Improved stock management at the central level is also critical, as poor stock management at this level results in commodities not delivered for extended periods, or commodities delivered that have not been ordered (26,69). In line with this, the government needs to ensure timely payment of commodity suppliers, as irregular or delayed payments can lead to a delayed or diminished supply until payment is received (55,70).

A tool that can be used by governments to improve availability is Universal Health Care (UHC) packages. At the moment, UHC is a priority on the countries'

development agenda, and governments are adopting and implementing UHC and UHC packages (71–74). A simple way to increase availability of essential SRHC could be to include the SRHC in these packages.

To tackle the negative attitudes and lack of knowledge on use of family planning services among the community, and to improve healthcare workers' knowledge on SRHC and their professionalism, community sensitisation programmes and healthcare workers' refresher trainings should be promoted and implemented. A review has shown that programmes using a combination of healthcare worker training, opening youth friendly health corners in health facilities, and sensitisation in communities and schools and through the media are most effective in improving knowledge of and demand for SRHC (75).

Strengths and Limitations

The major strength of this study is the use of a standardized and validated methodology which allows for the measurement of medicine prices, availability and affordability (30,31). This research also used a combined measure of availability and affordability to illustrate accessibility, as first introduced by Ewen et al. (76). The added value of this combined measure is that it easily illustrates in what respects the WHO's target for availability and affordability of essential medicines is falling short (44). However, the used methodology also has some limitations, which have been previously identified (77). One of the limitations of the methodology is collection of availability data at only one point in time. This research included the collection of commodity stock-out information with the aim to provide a more accurate picture of the availability situation across time. However, stock-data was collected only for the previous six months, so some seasonal or financial year differences might not have been captured.

The methodology further calculates affordability using the wage of an LPGW to allow for easy comparisons of data across countries (30). However, in many developing countries, the wage of an LPGW is higher than what a large proportion of the population earns. It is therefore likely that the affordability projections here are an over-estimation of the actual affordability. Further, in this study 'accessibility' should be construed in the basic sense of the word as it is explained here, and it should be noted that socioeconomic factors as potential determinants for low access were not taken into account as data on this went beyond the scope of the research. When considering the recommendations, this should be kept in mind.

Another limitation of the existing methodology is that it only collects data for the outcome measures for one dosage form or strength, while a commodity might be available in other dosage forms. This research tried to mitigate this by aligning the surveyed commodities' strengths and dosage forms to those on the countries' corresponding national essential medicine lists (NEMLs). When a commodity was listed with multiple dosage forms or strengths, they were all included. Further, in the PNFP sector, availability of family planning commodities is likely to be an overestimation of the actual situation in the countries. In this sector, only facilities offering family planning services were included in the analysis for contraceptives availability. Lastly, in this research, the oral contraceptive is a combined measure of multiple formulations and strengths. Availability seems high, but this is the availability of any oral contraceptive, while for women it might make a difference which oral contraceptive is available. Switching on a regular basis between different oral contraceptives due to unavailability of the preferred method can easily lead to side effects or discontinuation of use.

CONCLUSION

This research has shown that accessibility of essential commodities for sexual and reproductive health remains a challenge in Eastern and Southern Africa. Low availability of SRHC in the public sector is compounded by regular stock-outs, which may force patients to seek care in private and PNFP sector facilities, where availability is also often low, where some services might not be offered or where the commodities might be unaffordable to a large proportion of the population. This research indicates that health system strengthening and community sensitisation is needed to ensure adequate access to essential SRHC. The findings of this research should be used by national governments and policy makers as a starting point to identify where the gaps and shortcomings in their health systems lie, and what commodities need priority attention.

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3.3

AVAILABILITY, PRICES AND AFFORDABILITY OF OXYTOCIN AND MISOPROSTOL FOR MANAGEMENT OF POST-PARTUM HAEMORRHAGE IN KENYA, UGANDA AND ZAMBIA

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ABSTRACT

Objective

To assess access (availability and affordability) to oxytocin and misoprostol at health facilities in Kenya, Uganda and Zambia to improve prevention and management of postpartum haemorrhage (PPH).

Design

The assessment was undertaken using data from Health Action International (HAI) research on sexual and reproductive health commodities based on a cross-sectional design adapted from the standardized WHO/HAI methodology.

Setting

Data was collected from 376 health facilities in in Kenya, Uganda and Zambia in July and August 2017.

Outcome measures

Availability was calculated as mean percentage of sampled medicine outlets where medicine was found on the day of data collection. Medicine prices were compared to international reference prices (IRP) and expressed as median price ratios (MPRs). Affordability was calculated using number of days required to pay for a standard treatment based on the daily income of the lowest-paid government worker.

Results

Availability of either oxytocin or misoprostol at health facilities was high; 81% in Kenya, 82% in Uganda, and 76% in Zambia. Oxytocin was more available than misoprostol, and it was most available in the public sector in the three countries. Availability of misoprostol was highest in the public sector in Uganda (88%). Oxytocin and misoprostol were purchased by patients at prices above IRP, but both medicines cost less than a day's wages and were therefore affordable. Availability of misoprostol was poor in rural settings where it would be more preferred due to lack of trained personnel and cold storage facilities required for oxytocin.

Conclusion

Availability and affordability of either oxytocin or misoprostol at health facilities met the WHO benchmark of 80%. However, countries with limited resources should explore mechanisms to optimize management of PPH by improving access to misoprostol especially in rural areas.

BACKGROUND

The risk of women dying due to pregnancy and childbirth remains a major global health challenge. In 2017 there were approximately 295,000 maternal deaths globally, of which 94% occurred in low-and middle-income countries (LMICs). Sub-Saharan Africa contributed about 66% to these deaths (1). The global leading cause of maternal mortality is haemorrhage, accounting for 27% of all maternal deaths (2).

Postpartum haemorrhage (PPH) which occurs after childbirth accounts for most (72%) of the three forms of haemorrhage. Antepartum haemorrhage which occurs during pregnancy accounts for 24% while intrapartum haemorrhage (during childbirth) accounts for three percent [2]. PPH is responsible for 34% of maternal deaths in Kenya, 25% in Uganda and 34% in Zambia (3-5).

The World Health Organization (WHO) recommends oxytocin as the medicine of choice for management of PPH, and misoprostol as the second line alternative when injection capability is lacking and/or storage conditions for oxytocin are not met. Other uterotonics such as ergometrine and carbetocin are also recommended when use of oxytocin is not feasible (1).

The relevance of oxytocin and misoprostol to health systems was further emphasised by the United Nations Commission on Life-saving Commodities for women and children when they were listed among the 13 lifesaving, low-cost medicines with greatest proven potential to avert preventable deaths (6). Both oxytocin and misoprostol are included in national essential medicine lists in Kenya, Uganda and Zambia (7-9).

The quality, efficacy and safety of oxytocin and misoprostol have been widely studied (10-23). Oxytocin is temperature sensitive and should therefore be stored under refrigeration at temperatures between 2 and 8°C to prevent degradation expected at higher temperatures (10). Degradation reduces potency and consequently the effectiveness of the medicine. Oxytocin stability through the supply chain has proven a worry to policy makers and has been a subject of numerous investigations to ascertain quality and efficacy (11-13). Some studies on the quality of oxytocin found analyzed samples to contain less active pharmaceutical ingredients than was claimed in the label, while some samples also failed sterility tests (14-16). LMICs with low resources may also lack facilities required for adequate storage conditions for oxytocin to ensure integrity of the product, while they may also lack trained health workers for

its administration (17). Women living among displaced populations, in conflict areas, hard to reach areas, who deliver at home or with a traditional birth attendant seldom have access to a trained health worker. Hence, they do not have access to oxytocin or if they do, it is not safely used (24). As a result of these challenges, prevention and treatment of PPH in low-resource settings using oxytocin has not provided the desired impact (18, 19).

Misoprostol, a prostaglandin, is an alternative to oxytocin in the management of PPH. It is cheap, stable at room temperature and more convenient to administer. It can be administered sublingually, orally and vaginally (19, 22, 25, 26). It has been demonstrated through various studies that use of misoprostol is feasible, improves uterotonic coverage, reduces incidence of PPH and that it is effective for use at community and household level in low-resource settings (20-22).

In 2015, the WHO expert committee on the selection and use of medicines recommended the addition of misoprostol for the prevention and treatment of postpartum haemorrhage when oxytocin is not available or cannot be used safely (23). At different occasions the inclusion of misoprostol in the list of WHO recommended medicines was debated for both efficacy and safety reasons, but the 2015 decision to recommend misoprostol in addition to oxytocin for prevention of PPH was reaffirmed in 2019 by a WHO expert committee (27). Before 2015 misoprostol was indicated by WHO for use in induction of labour and management of spontaneous and induced abortion (28). The historical use of misoprostol for termination of pregnancies may have affected its acceptability for routine use in prevention of PPH, despite available convincing evidence of its therapeutic effect and relative safety in management of PPH. Another challenge is that the high doses of misoprostol required for post-partum haemorrhage often result in troublesome side effects such as vomiting and shivering (29). Further, the longer half-life of the medicine means that it stays longer in the body and has potential to cause complications (30).

These two medicines could be used complementarily to overcome challenges and barriers in policy, health sector infrastructure and health service delivery that at the moment inhibit the optimal management of PPH (24, 31). However, there is a knowledge gap on the accessibility of both medicines in low-resource settings. This is a missed opportunity in closing the gap in the reduction of maternal mortality in developing countries. This paper therefore assesses access to oxytocin and misoprostol in urban and rural health facilities in Kenya, Uganda

and Zambia through a cross-sectional assessment of availability, prices and affordability at the patient level of the two medicines to facilitate the optimal management of PPH.

METHODS

A secondary assessment of availability and prices of oxytocin and misoprostol was undertaken using data from Health Action International (HAI) research on sexual and reproductive health commodities (*SRHC: Measuring Prices, Availability & Affordability (32)*. The data was collected in Kenya, Uganda and Zambia in July and August 2017 using a cross-sectional design with quantitative methods adapted from the standardized WHO/HAI methodology (33), which has been validated (34) and used extensively in several countries (35-37).

Patient and Public Involvement

The research agenda for this study was set by the multi-stakeholder platform Medicines Transparency Alliance (MeTA) Councils in Kenya, Uganda and Zambia. The study protocols were reviewed and approved by MeTA Councils. Data collectors were selected from the membership of MeTA within the countries. Results were validated by stakeholders including civil society. Dissemination plans were made by MeTA councils and results were disseminated to wide country and inter-country platforms including Ministries of Health, Parliamentarians, private sector as well as civil society members to inform policy.

Data collection

For this study, the data on availability, price and affordability of the highest and lowest-priced products of oxytocin 10IU, 1ml injections and misoprostol 200 µg tablets were extracted.

In each of the three countries, six geographical areas (districts, municipalities or counties) were selected; the country's main urban centre and five other areas which were randomly selected. All survey areas were reachable within one day's travel from the country's main urban centre using a car or bus. Each survey area covered a population of between 100 000 and 250 000 people.

The WHO/HAI methodology prescribes a minimum of 30 health facilities from each of the sectors, i.e. public, private and mission sectors, giving a minimum total of 90 facilities per country (33). In each survey area, the main public hospital was selected first. Then, eight public health facilities, four each from

urban and rural areas, representing levels of care at which SRHCs should be made available, were randomly selected (38). Additionally, eight private (for profit) and eight mission sector (not for profit) health facilities (four each from urban and rural areas) that were within a three-hour drive radius of the main hospitals were selected. Thus, a total of 24 health facilities were sampled from each of the six survey areas in Kenya, Uganda and Zambia, respectively, giving a total of 144 facilities per country.

Eight data collectors with experience of conducting medicine surveys worked in pairs of a pharmacist and a social scientist under close supervision of a qualified survey manager. Prior to data collection, the team was trained on the methodology. Data collectors used a semi-structured questionnaire administered to facility managers while physically ascertaining the availability of surveyed medicines. Availability was measured by the physical presence of a product in the outlet at the time of the survey. For each medicine surveyed, data collectors recorded the product name for both the highest and lowest-priced medicines available, the manufacturer and unit price of the product. In the public sector in Uganda and Zambia where medicines are free of charge to care seekers, prices were not recorded.

Once data collection was complete, survey data was entered into a pre-programmed Microsoft Excel Workbook provided as part of the modified methodology. Data input was independently checked for errors. Additional quality control measures were executed at various stages throughout the study by a survey manager. The survey tools were pre-tested in Uganda in 2016 and a field test was conducted by all data collectors prior to data collection. Each data collection team had a supervisor who cross checked the data on a daily basis for completeness, legibility and consistency and reported to the survey manager. Prior to data entry all relayed data was checked for completeness and consistency.

Data analysis
The availability of oxytocin and misoprostol was calculated as the percentage of sampled medicine outlets where the medicine was found. Availability was also calculated for the presence of either oxytocin or misoprostol at a facility. Data were reported in aggregate as public, private or mission sector medicine outlets. Overall availability per sector was calculated as mean of the two medicines surveyed.

Patient prices were collected in local currency including Shillings in Uganda and Kenya, and Kwacha in Zambia. The mean, minimum and maximum unit prices were calculated. To facilitate cross-country comparisons, medicine prices obtained during the survey were expressed as ratios relative to a standard set of international reference prices by dividing the mean unit price (in dollars) by the Management Sciences for Health international buyers' reference unit price derived on September 25th 2018 (39). Mean price ratios (MPRs) were only calculated for oxytocin and misoprostol products that had price data from at least four medicine outlets per sector (33). The exchange rate used to calculate MPRs was 1 USD = 102.67 Kenya Shillings (KES), 1 USD = 3667.9 Uganda Shillings (UGX), 1 USD = 8.85 Zambia Kwacha (ZMW) taken on 1st July, 2017 prior to the first day of data collection (40, 41).

Affordability was calculated using the number of days' wages it requires to pay for standard treatment or dose of treatment based on the daily income of the lowest-paid government worker (LPGW) (33). The daily wage of a LPGW is approximately KES 411 (USD 4) in Kenya, 6255 UGX (USD 1.78) in Uganda, and ZMW 96.7 (USD 10.92) in Zambia, as per public service salary structures (42). Treatments that required more than one day's wages to purchase were considered unaffordable (33).

RESULTS
A total of 376 health facilities, including 120, 124 and 132 health facilities in Kenya, Uganda and Zambia, respectively, were surveyed as shown in figure 1 and 2.

Availability across sectors
Figure 1 shows the availability of either oxytocin or misoprostol at the surveyed health facilities in the three countries. Overall availability of either oxytocin or misoprostol met the WHO benchmark of 80% in Kenya (81%) and Uganda (82%) but was marginally lower in Zambia (76%). Availability of oxytocin was higher than misoprostol except in Uganda. Availability of either oxytocin or misoprostol was comparable between the public and mission sectors.

In the public sector, the three countries met the WHO benchmark for availability of oxytocin. Misoprostol was only optimally available in the public sector in Uganda (88%), with availability in Kenya and Zambia lower (36% and 21%, respectively). In the private sector, none of the countries met the WHO

recommended availability for misoprostol. Availability in Zambia was especially low (24%).

Availability in urban versus rural areas

Figure 2 shows availability in urban versus rural areas. Oxytocin was available in over 80% of all public urban and rural facilities across the three countries. Optimum availability of 80% was further achieved for oxytocin in Kenya mission urban facilities (89%) and in Zambia's mission sector for both urban and rural facilities (83% and 94%, respectively). Optimum availability of misoprostol was only achieved in Ugandan public urban and rural facilities (90% and 86%, respectively).

In Kenya, oxytocin had a higher availability than misoprostol across all urban and rural facilities in the three sectors. Availability of misoprostol was lowest in the public sector: availability in urban facilities was 45%, and 27% in rural facilities. In the private sector, there was a higher availability in rural facilities than in urban facilities for both oxytocin and misoprostol.

In Uganda, the public sector was optimally stocked with both oxytocin and misoprostol across urban and rural facilities. Rural public facilities had a higher availability of oxytocin than urban public facilities. In the private sector, rural facilities also had a higher availability of oxytocin and misoprostol compared to urban facilities.

Oxytocin had a high availability in Zambia's public and mission sectors across both urban and rural facilities. Availability in the private sector was very low. Availability of misoprostol was low across the sectors and areas, with highest availability found in urban mission facilities (50%). Although both oxytocin and misoprostol were poorly available in the private sector, oxytocin was more available in rural than urban facilities, while misoprostol had a higher availability in urban facilities than in rural facilities.

Prices and affordability

Oxytocin and misoprostol were free for patients in the public and mission sectors in Zambia, and in the public sector in Uganda. In Kenya's public sector, the lowest price was noted for oxytocin, with a median price ratio (MPR) of USD 0.174 (Table 1). Both misoprostol and oxytocin cost less than a day's wages for a LPGW across all countries and sectors, and can therefore be considered affordable.

Notwithstanding the sectors in which the medicines were for free, the MPRs for oxytocin and misoprostol were above one in the countries, ranging from 1.37 for misoprostol in Kenya's public sector to 29.95 for misoprostol in the private sector in Zambia. This meant that both misoprostol and oxytocin were accessed by patients at prices that were more expensive compared to international reference prices.

Figure 1. Availability of oxytocin and misoprostol across sectors in Kenya, Uganda and Zambia
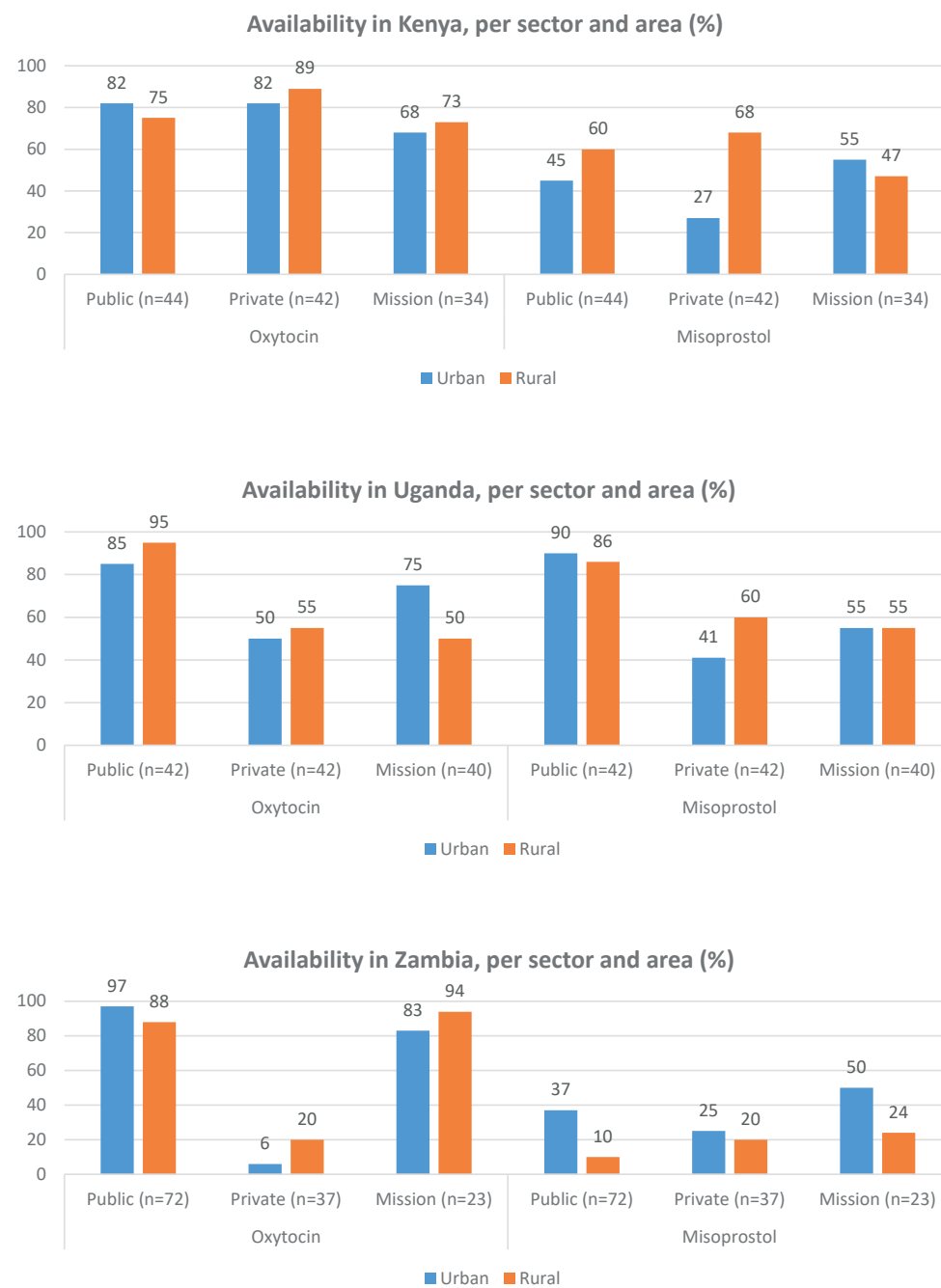
Availability in Kenya, per sector and area (%)

Availability in Uganda, per sector and area (%)

Availability in Zambia, per sector and area (%)

Figure 2. Availability of oxytocin and misoprostol in urban and rural facilities across countries

Table 1. Prices and affordability of misoprostol and oxytocin across countries

		Public			Private			Mission		
		Price (USD)	Mean Price Ratio	Affordability of treatment (number of day's wages)	Price (USD)	Mean Price Ratio	Affordability of treatment (number of day's wages)	Price (USD)	Mean Price Ratio	Affordability of treatment (number of day's wages)
Kenya	Oxytocin	0.029	0.17	0.01	1.354	8.14	0.34	0.672	4.04	0.30
	Misoprostol	0.273	1.37	0.07	1.967	9.84	0.49	1.217	6.09	0.17
Uganda	Oxytocin	0	NA	NA	0.998	5.99	0.57	0.408	2.45	0.23
	Misoprostol	0	NA	NA	0.589	2.95	0.34	0.39	1.95	0.22
Zambia	Oxytocin	0	NA	NA	0.678	4.08	0.06	NA	NA	NA
	Misoprostol	0	NA	NA	5.989	29.95	0.55	NA	NA	NA

NA=not applicable, USD=United States Dollar

DISCUSSION

This paper assesses access to oxytocin and misoprostol in urban and rural health facilities in Kenya, Uganda and Zambia through a cross-sectional assessment of availability, prices and affordability at the patient level of the two medicines to facilitate the optimal management of PPH.

Overall, availability of uterotonics, expressed as the presence of either oxytocin or misoprostol, was high in Kenya and Uganda, and just below the WHO benchmark of 80% in Zambia. Misoprostol was markedly less available than oxytocin. Oxytocin and misoprostol were accessed by patients in the private sector at prices that were more expensive than the international reference prices. However, both medicines cost less than a day's wages, which is considered affordable. The availability of misoprostol across urban and rural areas did not show the expected pattern of having a higher availability of the medicine in rural areas, which are more prone to health system barriers for use of oxytocin.

Oxytocin availability was high in the public and mission sectors but lower in the private sector, particularly in Zambia. In the private sector, none of the countries met the WHO availability benchmark of 80% for the two medicines. Besides the public sector in Uganda, misoprostol was not optimally available in the other countries or sectors. Misoprostol had a low availability, particularly in rural areas where the medicine ought to play a major role given that facilities in these areas tend to lack adequately trained health workers and the health infrastructure required to maintain cold chain to safeguard the quality of oxytocin (17). Its poor availability in Kenya and Zambia may be a result of slow diffusion of the intervention into the health system (43, 44). Moreover, misoprostol has been recommended by WHO for use in PPH since 2015 after several rounds of weighing the benefits and risks, but the debate about its role in PPH prevention has continued over the years (23, 27). The fear and stigma amongst health workers about the use of misoprostol to induce abortions may also have contributed to the situation (29). In contrast, Uganda's efforts as an early adaptor (43, 44) to ensure availability of misoprostol through government procurement and community level distribution strategies may explain why it has a higher availability of misoprostol, as well as lower PPH levels compared to Kenya and Zambia (25% in Uganda versus 34% in both Kenya and Zambia) (3-5).

Urban facilities have better health infrastructure such as cold chain facilities, and also tend to have more health workers compared to rural facilities (45-47).

It would therefore be expected that these urban areas would have a higher availability of oxytocin and lower availability of misoprostol than rural facilities. However, there were instances when rural facilities had a higher availability of oxytocin and a lower availability of misoprostol. This may indicate that stocking of oxytocin and misoprostol by health facilities does not take into consideration challenges faced by the facilities to administer the medicines. It will require more research in this area to better understand the data and for policy makers to look into how to address context-specific barriers related to these medicines by ensuring that they are deployed where they can have maximum impact (48, 49). For example, efforts should be made to deploy more misoprostol in rural areas where there is a lack of adequately trained personnel and a lack of health infrastructure to properly use oxytocin, and to ensure that both medicines are available to complement one another depending on circumstances.

PPH levels across the countries are high despite health facilities having reached the WHO benchmark for availability of either oxytocin or misoprostol across the three countries. This may confirm the finding from a study by Ononge et al that despite use of uterotonics, incidence of PPH remains high (5). It may be that some oxytocin found at health facilities may not have the quality and efficacy for optimum management of PPH (14-16). Countries should strive for universal access as the 80% availability benchmark by WHO still leaves one in five facilities without required medicine. However, availability of a medicine alone does not guarantee that it is used, health worker beliefs and knowledge as well as necessary infrastructure such as electricity and equipment are needed to reduce PPH levels.

Studies have shown that combinations of uterotonics have proven to be more effective. For example, a misoprostol plus oxytocin combination was found to be more effective in preventing PPH than the currently used standard of oxytocin only (50). This argument further emphasizes that having both oxytocin and misoprostol available at the health facility could help to improve PPH management.

Although oxytocin and misoprostol were affordable to patients, the private sector prices were varied and more expensive compared to IRPs. For example, the MPR of misoprostol ranged from 1.37 in Kenya to 29.95 in Zambia. Therefore, even though availability met the WHO benchmark, individual patients may still be confronted with unavailability in the public sector, pushing them to seek

care in the private sector where they may not be able to afford the prices of medicines. This suggests that countries need to explore pricing policies to improve affordability of the medicines.

The WHO/HAI methodology that was used for this study is tested, reliable, standardized and validated for the measurement of medicine prices and availability (34). The study provides details on availability, price, and affordability of individual medicines across three sectors (public, private and mission). The methodology uses a cross-sectional design and therefore historical data trends were not traced. The study only used two frontline medicines for PPH, while countries may have had other alternative therapies including carbetocin which were not captured. Twenty three mission facilities were surveyed in Zambia which was below the minimum 30 recommended for the methodology per sector (33). The findings presented here may not be used to predict country pharmaceutical supply chain but are intended to stimulate policy discussions on deliberate targeting and the use of available technologies to improve access.

CONCLUSION

Availability of oxytocin and misoprostol met the WHO benchmark in Kenya and Uganda but was just below the WHO benchmark in Zambia. In general, oxytocin was more available than misoprostol. Oxytocin and misoprostol were purchased by patients at prices above international reference prices but both medicines cost less than a day's wages for a LPGW and were therefore considered affordable. However, there was no strategy in place that looked at which medicine could be best utilized in which area. Countries with limited resources should explore mechanisms to balance access to both oxytocin and misoprostol between rural and urban areas to optimize management of PPH.

ACKNOWLEDGEMENTS

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3.4

TRENDS IN ACCESS TO ANTIMALARIAL TREATMENT IN THE PRIVATE SECTOR IN UGANDA: AN ASSESSMENT OF AVAILABILITY AND AFFORDABILITY OF FIRST LINE ANTIMALARIALS AND DIAGNOSTICS BETWEEN 2007 AND 2018

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ABSTRACT

Background

Malaria is the single largest cause of illness in Uganda. Since the year 2008, the Global Fund has rolled out several funding streams for malaria control in Uganda. Among these are mechanisms aimed at increasing the availability and affordability of artemisinin-based combination therapy (ACT) medicines. This paper examines the availability and affordability of first-line malaria treatment and diagnostics in the private sector which is the preferred first point of contact for 61% of households in Uganda between 2007 and 2018.

Methods

Cross-sectional surveys were conducted between 2007 and 2018, based on a standardized World Health Organization/Health Action International (WHO/HAI) methodology adapted to assess availability, patient prices, and affordability of ACT medicines in private retail outlets. A minimum of 30 outlets were surveyed per year as prescribed by the standardized methodology co-developed by the WHO and Health Action International. Availability, patient prices, and affordability of malaria rapid diagnostic tests (RDTs) was also tracked from 2012 following the rollout of the test and treat policy in 2010. The median patient prices for the artemisinin-based combinations and RDTs was calculated in US dollars (USD). Affordability was assessed by computing the number of days' wages the lowest-paid government worker (LPGW) had to pay to purchase a treatment course for acute malaria.

Results

Availability of artemether/lumefantrine (A/L), the first-line ACT medicine, increased from 85% to 100% in the private sector facilities during the study period. However, there was low availability of diagnostic tests in private sector facilities ranging between 13% (2012) and 37% (2018). There was a large reduction in patient prices for an adult treatment course of A/L from USD 8.8 in 2007 to USD 1.1 in 2018, while the price of diagnostics remained mostly stagnant at USD 0.5. The affordability of ACT medicines and RDTs was below one day's wages for LPGW.

Conclusion

Availability of ACT medicines in the private sector medicines retail outlets increased to 100% while the availability of diagnostics remained low. Although malaria treatment was affordable, the price of diagnostics remained stagnant and increased the cumulative cost of malaria management. Malaria stakeholders should consolidate the gains made and consider the inclusion of diagnostic kits in the subsidy program.

BACKGROUND

In 2017, the World Health Organization (WHO) African Region contributed 92% of the estimated 219 million cases of malaria that occurred worldwide (1). Uganda has the third-highest global burden of malaria cases and contributes to 18% of the malaria cases in East and Southern Africa (2). Malaria is highly endemic in 95% of Uganda and is the third leading cause of mortality in the country, after neonatal disorders and HIV/AIDS (3). Pregnant women and children under five years of age are the most vulnerable population to malaria (4).

Early diagnosis and treatment of malaria contributes to a reduction in malaria transmission, disease burden and prevents deaths. Universal access to anti-malarial treatment is one of the key strategies of the WHO's Global Technical Strategy for Malaria 2016-30 aiming to reduce malaria mortality rates by at least 90% by 2030 (5).

In 2006, the WHO recommended the use of artemisinin-based combination therapy (ACT) as the first-line treatment for uncomplicated malaria in the effort to address resistance of *Plasmodium falciparum* to monotherapies and improve treatment outcomes (6). By 2009, there were concerns about access to quality-assured ACT medicines in many low-income countries (LMICs) that were grappling with a high burden of malaria, especially among the poorest people (7). Low-cost medicines, for example, chloroquine and sulfadoxine, were widely available and heavily relied on for treatment of uncomplicated malaria, particularly in the private sector outlets (8, 9). Unfortunately, however, these medicines had gradually become ineffective against malaria parasites. In addition, non-artemisinin-based therapies, artemisinin monotherapies, and low-quality artemisinin-based combinations were widely available (10).

The private sector plays a key role in the fight against malaria (11-13). In Uganda, the private sector is the preferred first point of contact for about 61% of households (14). One of the key barriers of access to quality assured anti-malarial treatment is the high price for ACT medicines and malaria Rapid Diagnostic Tests (RDTs) (15). Price is a major contributor to limited access to medicines because of its impact on affordability, especially for poor people (16). By 2009, there were few available brands of ACT medicines in the private sector, most of them unaffordable. For example, it was not uncommon to find a dose of a quality-assured, first-line ACT medicines in private sector outlets retailing at six to 21 times higher than the most commonly sold anti-malarial monotherapy regimens (often non-artemisinin-based in composition) (17).

Furthermore, there were equity concerns; children treated for malaria in the public sector were significantly more likely to receive ACT medicines than those treated in the private sector facilities (7).

As a result, initiatives such as the Global Fund's (GF) Affordable Medicines Facility-malaria (AMFm) pilot in 2011 and later the private sector co-payment mechanism (CPM) in 2013 were implemented to improve access to ACT medicines in the private sector through subsidies. Subsidies supported by interventions to improve demand are important for improving the availability and affordability of ACT medicines in the private-for-profit sector (18). The AMFm pilot comprised of three components to promote the appropriate use of ACT medicines in the public, private-for-profit and private-not-for-profit sectors. These components were; price reductions through negotiations with prequalified ACT medicines manufacturers to offer 90% price subsidy to selected importers, support of interventions such as behaviour change communication and establishment of price monitoring (19). In December 2013, the AMFm programme was rebranded to the CPM to focus only on the private sector (20) and offered a 70% price subsidy for ACT medicines, but not for RDTs (21). These efforts were expected to culminate into a trickledown effect of reduced ACT medicines prices in the anti-malarial supply chain to the end user. Details of the CPM are outlined elsewhere (21, 22). Table 1 below lists the interventions conducted.

Whereas the report on the effect of the multi-country (including Uganda) AMFm pilot was published in 2012 under the ACTwatch group (18-22, 25, 26), there is a paucity of evidence relating to access to anti-malarials prior to and beyond the end of the AMFm pilot. Between 2008 and 2018, the Global Fund disbursed a cumulative total of USD 414,963,377 for strategies to improve access to anti-malarial commodities in Uganda (27). Despite these continued efforts to support access to anti-malarial commodities in Uganda, there are limited data to show whether the initially observed positive effects were sustained in later years. This paper examines trends in availability and affordability of first-line malaria treatment and diagnostics in Uganda between 2007 and 2018.

Table 1. List of interventions for increased access to ACTs in Uganda

Year	Intervention
2005	National policy on malaria treatment recommends ACTs as first line treatment for malaria case management following emergence of parasite resistance to the medicines such as chloroquine and sulfadoxine/pyrimethamine [23]
2010	WHO introduces *Test and Treat* policy for malaria. With universal access to parasitological diagnosis of malaria possible using rapid diagnostic tests (RDTs), WHO recommended that all cases of suspected malaria should have a test to confirm diagnosis [24]
2011	GF introduces AMFm program in Uganda: 80% subsidy for anti-malarials Monitoring of anti-malarial availability and prices
2015	GF introduces CPM program in Uganda: 70% subsidy for anti-malarials Monitoring of anti-malarial availability and prices Training of health workers Behaviour change communication program for community

Methods

A cross-sectional design with quantitative methods was used to assess the availability, price and affordability of ACT medicines and diagnostics using a standardized methodology co-developed by the WHO and Health Action International (HAI), adapted for anti-malarials and diagnostics (28). This methodology prescribes a minimum of 30 facilities per sector and has been validated and used widely (29-32).

Annual studies were conducted prior to 2016 and in 2018 while quarterly studies were conducted for the period of October 2016 to Dec 2017. However, the 2007-2010, and 2014-2015 surveys did not measure the availability and prices of RDTs.

Selection of survey areas and medicine outlets

Data was collected from six regions in the country: Central, Eastern, Western, Northern, Southern and West Nile. The regions were selected as a realistic representation of the geographical characteristics of the country. One major town within one day's car travel from the capital city was selected from each of the regions. The facilities surveyed were randomly sampled.

In each region, the main public hospital was used as an anchor from which private medicine outlets were selected within three hours' travel of the hospital. The final list of outlets surveyed was approved by the National Malaria Control Programme (NMCP). Only registered drug outlets were considered in the survey. The official list of registered pharmacies from the national medicines' regulatory agency (National Drug Authority) was used to locate, select and verify registration status. Table 2 shows the sample frame for the surveys.

Surveyed ACT medicines and RDTs

A list of ACT medicines and RDTs was developed including the formulation and strength of each medicine. This paper however focuses on artemether/lumefantrine (A/L), adult 24 tablet pack, which is the first line recommended treatment for uncomplicated malaria (1) and also has the largest market share of ACT medicines in Uganda and was the main first line anti-malarial consistently surveyed in all the years (9, 33).

Data collection

Data collection teams of six persons per region worked in pairs composed of a pharmacist and social scientist. The teams were coordinated by a regional supervisor who was a pharmacist by profession. Prior to data collection, survey personnel participated in the training.

One key respondent was targeted for the survey at health facility level; either the in-charge, attendant, owner or any suitable person delegated by the in-charge/owner. The respondents included medical doctors, clinical officers, nurses, nursing assistants, midwives, pharmacists and dispensers.

For each medicine available at the outlet on the day of the visit, data collectors recorded: the brand names of two products; the highest and lowest priced medicine in Uganda Shillings (UGX); the strength and price found. Any discounts

Table 2. Sample for retail outlets between 2007 and 2018

Year	2007	2008	2009	2010	2012	2013	2014	2015	2016	2017	2018
Sample size	30	30	30	30	120	120	30	30	450	450*	30
Surveyed	23	35	33	32	185	189	41	37	477	494*	38

* Quarterly surveys were conducted in 2017

or other considerations affecting the price to patients were documented. Originator medicines were included if found available.

Each regional supervisor checked all the filled data collection forms for completeness, legibility and consistency, at the end of each day and validated the data collected in 10% of the sample outlets in the region. In addition, the survey manager checked all the data collection forms for completeness and consistency. Data entry was done into an expanded standardized WHO/HAI International Price workbook with multiple quality assurance processes; for example, double entry of the unit prices and use of the workbook's inbuilt data checking process.

Data analysis

Computation of medicine availability, prices and affordability was done according to the WHO/HAI methodology (28). The availability of A/L was calculated as the percentage of sampled medicine outlets where the medicine was found on the day of the visit. For 2017 where quarterly studies were conducted, the annual average was taken.

The median, minimum and maximum patient prices were estimated for A/L and RDT patient prices. Medicine prices obtained during the survey were expressed as ratios relative to a standard set of international reference prices by dividing the median local unit price by the international reference unit price (34). Medicine price ratios (MPRs) were calculated only if price data from at least four medicine outlets were available. The medicines prices (in UGX) were converted into US dollars (USD) using the prevailing mid-month exchange rates taken from the Bank Uganda website on the first day of data collection (35). Affordability was assessed by estimating the number of daily wages required for one course of treatment using the daily salary of the lowest-paid government worker (LPGW) in Uganda, for the respective survey year (36).

RESULTS

Availability of A/L and RDTs

Between 2007 and 2018, the availability of A/L in the private sector facilities gradually increased from 85% to 100%. There was an increase in availability of A/L from 85% to 93% between 2007 and 2009, from which it thereafter dropped from 93% to 75% between 2010 and 2013. However, A/L availability increased

from 75% to 94% between 2013 and 2014, then later peaking at 100% in 2017 and 2018. Overall, low availability of RDTs was noted despite the rise from 13% in 2012 to 37% in 2018. Trends in availability of A/L and RDTs are shown in Figure 1.

Patient prices and affordability of A/L and RDTs

There was a gradual reduction in prices of A/L from a high of USD 8.8 in 2007 to a stable USD 1.1 between 2016 and 2018, while the price of RDTs was mostly consistent at USD 0.5. There was an increment in the prices for A/L from USD 1.7 and USD 2.3 between the end of the AMFm in 2012 and just before the introduction of the CPM in 2013. Affordability of A/L gradually dropped from 4 days' wages in 2008 to half-a-day's wages in 2018. Affordability of RDTs improved from about 0.6 in 2012 to about 0.3 days' wages for LPGW by 2018. Trends in prices and affordability of A/L and RDTs are shown in Figure 2.
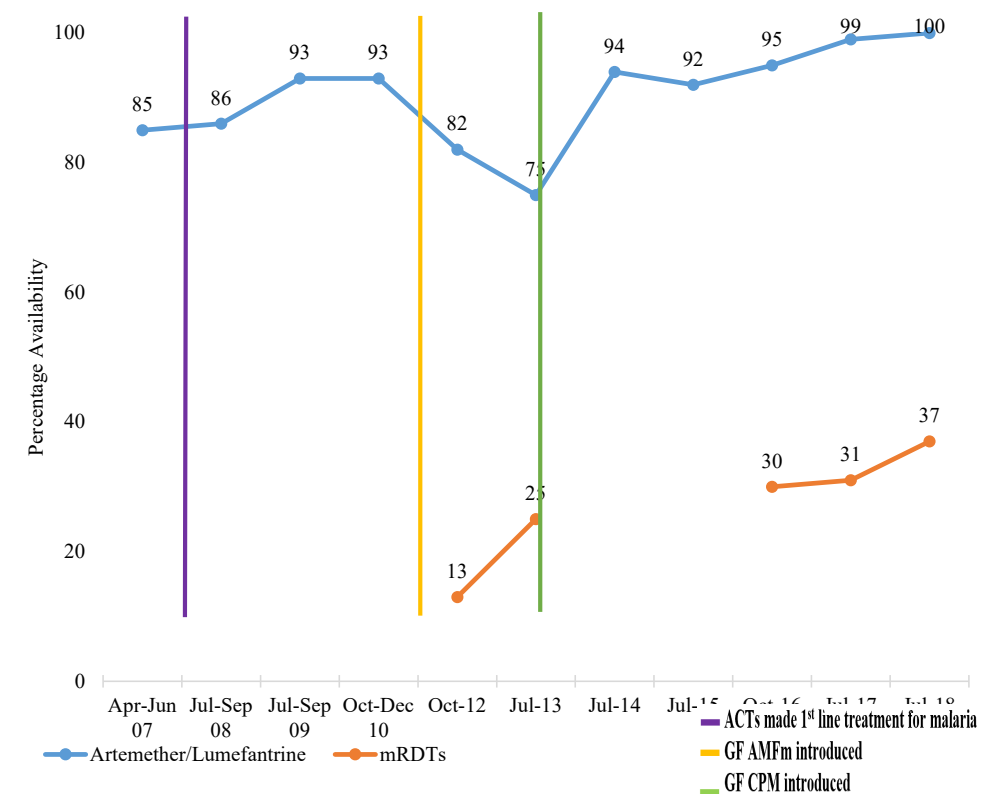

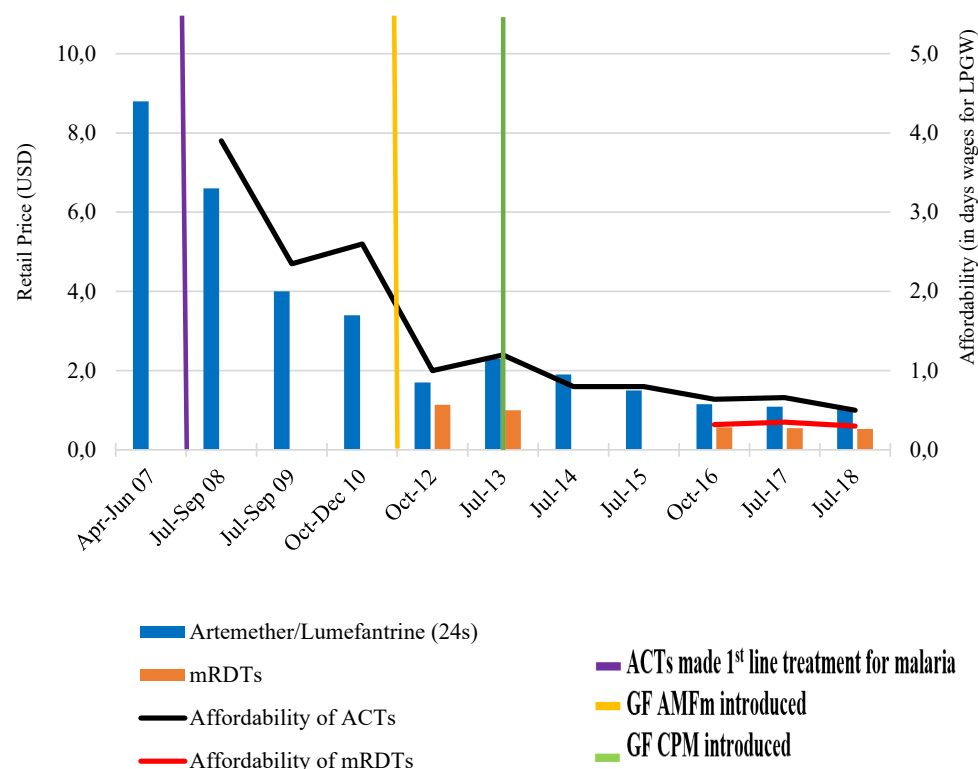**Figure 1.** Trends in availability of A/L and mRDTs in the private sector in Uganda

Figure 2. Trends in prices (in USD) and affordability of A/L and mRDTs in private facilities in Uganda

DISCUSSION

This paper presents trends in the availability, prices and affordability of first line anti-malarial treatment and diagnosis in the private sector in Uganda between 2007 and 2018. There was high availability of first line treatment A/L: at least nine of every ten private medicine outlets surveyed were found with A/L in stock reaching 100% availability in 2018. However, availability of RDTs remained below 40%. There was also a marked reduction in prices of A/L during the period from USD 8.8 to USD 1.1, but price of RDTs remained mostly stagnant at USD 0.5. Affordability of an adult dose of ACT medicine improved from 4 days' wages to 0.5 days' wages of the LPGW, and affordability of RDTs remained at about 0.3 day's wages for LPGW.

Findings from this study are consistent with those reported from a similar programme by ACTwatch that reported an increase in availability of RDTs between 2009-2015, but availability remained lower in the private sector compared to the public sector in countries where AMFm program was

administered by the Global Fund (9). The findings not only focus on RDTs but include ACT medicines, cover a longer period and confirm a sustained effect of the program in Uganda.

There was a decline in the availability of A/L between 2010 and 2013 dipping below the 80% WHO benchmark in 2013, which may be the result of the high volatile prices of ACT medicines on the market after the introduction of AMFm (21, 37). After 2013, availability of A/L gradually improved to 100% which could be attributed to consistent supply together with support interventions such as behaviour change communication to improve demand and price monitoring to study changes in the private sector (38). The changes observed could have been influenced by increased generic competition which led to a reduction in prices of the ACT medicines. It is important to also note that supporting activities to increase awareness about malaria treatment guidelines by health practitioners in the private sector, as well as continuous stakeholder engagements at all levels was helpful (33). Health system actors particularly in the public sector should therefore learn from and scale up this experience.

Parasitological confirmation particularly with RDTs at community level is important to reduce unnecessary treatment with anti-malarial drugs and to improve the diagnosis of other febrile illnesses. However, availability of RDTs improved slightly over the study period but remained low (below 40%) due to the fact that there were no incentives geared towards making the commodity more available and affordable. Also, contextual aspects such as RDTs being regarded in the private sector as a product sale and not a paid service may have played a role (38). The high RDT prices push the overall price of malaria diagnosis and treatment to nearly one day's wages for LPGW. This makes starting treatment almost unaffordable – the WHO benchmark for affordability is one-day wages (28) - which may lead to suspected malaria patients being treated without confirmatory tests. This is a bottleneck towards successful optimization for the 'Test, Treat and Track' Policy for malaria in the private sector (39). Administering the anti-malarial medicines without a confirmed positive diagnosis may, in the long run, expose the patient to development of resistant strains of the *Plasmodium* as well as the wastage of resources, especially in case the patient does not have malaria (40, 41).

Cumulatively, enormous investments have been made towards malaria control in Uganda, contributing towards improved availability of commodities and

the gradual decline of burden of mortality in the country (42-44). An estimated 90% of the Global Fund grants are annually spent on the procurement of medicines and health commodities (45). However, disbursement for malaria control interventions was relatively stagnant between 2007 and 2018, with the exception of 2015 when the private sector CPM's supportive interventions were also implemented to meet the growing demand for the medicines (39, 45). Consistent and sufficient financing of all recommended strategies is important to ensure elimination of malaria.

The marked reduction in prices of A/L over the review period may warrant further investigation but was largely attributed to global and national efforts aimed at making the products more affordable. In addition, improved access to cheap generics led to increased price competition in the market which improved affordability of treatment of acute malaria. Furthermore, the Ministry of Health of Uganda in 2016 instituted an initiative to regulate the prices of ACT medicines on the private sector market by setting a Recommended Retail Price (RRP) for the ACT medicines (by pack size) which could also have influenced the stability of A/L prices. It should be noted that the prices of ACT medicines remained stable at USD 1.1 between 2016 and 2018, which may further demonstrate that a combination of subsidies, support interventions and price capping policy initiatives could be effective towards ensuring affordability and sustainable access to medicines (46). However, this RRP was higher than that set earlier on during the AMFm pilot of USD 0.47 for an adult dose of ACT medicine (25).

The anti-malarial market still faces other challenges including uncertainty about the quality of the anti-malarial medicines and RDTs, market speculations at the end of the CPM funding rounds which force hoarding of products by wholesalers and absence of health insurance for majority of the vulnerable populations. In addition, there are concerns about the sustainability of the gains made by the CPM given that the programme is largely donor-funded and there are minimal strategies in place for business continuity in case donor funding ceases, as well as plans to absorb any possible after-shocks (47). On the other hand, the results observed in this study present opportunities for learning from the private sector that can be utilised for the public sector.

This assessment has been made using a standardized, tested, reliable, and validated WHO/HAI methodology that has been used widely across the world for the measurement of access to medicines (29). The WHO/HAI methodology uses a cross-sectional design, but this assessment provides a longitudinal view of historical trends over a period of 12 years which increases reliability. The assessment is based on several studies conducted annually or quarterly and, therefore, used different samples. This should not be a problem because the standard WHO/HAI methodology recommends thirty outlets in a sector for a survey to achieve enough data points for analysis (29), which was achieved in all years. The findings presented here are not intended to give a full view of the country's pharmaceutical supply chain but to stimulate policy discussions. The study was conducted in the formal private sector and therefore informal/unlicensed facilities which mainly offer treatment to the majority of the rural population were not included. Also, the study does not explore various supply chain and socio-economic factors which affect availability and affordability.

CONCLUSION

Subsidies to the private sector have had a positive impact on the availability and affordability of A/L that should improve malaria management especially among the vulnerable population of pregnant women and children. However, future considerations could be made towards providing subsidies for RDTs in the private sector to improve affordability of the cumulative cost of the test and treatment of malaria.

ACKNOWLEDGEMENTS

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4

GENERAL DISCUSSION

BACKGROUND

The fulfilment of sexual and reproductive health and rights (SRHR) is critical to the wellbeing of individuals and to the prosperity and resilience of families, communities and nations (1-3). The estimated annual death of 350,000 women and 5.6 million children worldwide due to complications of pregnancy and childbirth (4) indicates that SRHR are still a far cry from being realised. This affects national development in especially developing countries which account for 99% of the above deaths (5).

Despite the improvement of SRH over the last two decades, many countries failed to meet the Millennium Development Goals (MDG) targets on maternal mortality. The global maternal mortality ratio declined from 342 deaths to 211 deaths per 100,000 live births (a 38 per cent reduction) between 2000 to 2017 (6). However, many countries particularly in Sub-Saharan African (SSA) fell short of the MDG target of three quarters reduction between 1990 and 2015 (4) and are unlikely to meet the Sustainable Development Goals (SDG) target 3.1 of reducing maternal mortality ratio (MMR) to 70/100,000 live births (7).

Access to medicines is important to avert the SRH related morbidity and death burden (8). This thesis assessed the situation on access to SRH commodities in Sub-Saharan countries by reviewing public policies and practices at national and international levels and by measuring availability and affordability of different SRH commodities at health facility level.

EFFORTS BY THE INTERNATIONAL COMMUNITY AND NATIONAL GOVERNMENTS

International human rights principles oblige governments to safeguard the right to life, health, equality, and non-discrimination including the right to safe pregnancy and childbirth (9). A number of human rights instruments recognise that the integration of human rights perspectives into international and national responses to maternal mortality and morbidity could contribute positively to reducing of preventable maternal mortality and morbidity (10, 11). The highest possible standard of health and healthcare for all people, including women should be progressively realised to ensure non-discrimination, availability, accessibility, acceptability, quality, accountability and universality (12).

The international community plays a key role in SRH; the World Health Organization (WHO) and the Interagency Working Group conduct research and develop policy

guidance for the inclusion of a selection of SRH commodities to help countries in compiling essential medicines lists (13). In various ways, global multilateral institutions and the donor community also support the improvement of access to health services and SRH commodities in low- and middle-income countries (LMICs) (14). Such support may include, but is not limited to development of health technologies, research, supply chain systems, service delivery, advocacy and aid. In fact, richer countries have committed to spend a target of 0.7% of their gross national income (GNI) on international aid (15, 16).

As has been asserted by other authors, global health should be an international obligation to help disadvantaged countries to fulfil (not merely respect or even protect) the right to health (17, 18). Despite the United Nations' recognition of maternal mortality as a human rights issue, relevant policy communities have not yet managed to shift the policy agenda to prioritise the global right to health norm as a shared responsibility (19). The international community must therefore provide reliable assistance while allowing LMIC governments (such as of Uganda) to increase their recurrent health expenditure in the long-run (20). There is evidence that technical aid has a positive and significant impact on recipient country's growth unlike non-technical aid (21).

Donor aid and investments by low income country governments in SRH

In chapter **2.1** we characterized donor commitments and disbursements to SRH aid in four sub-Saharan countries of Kenya, Tanzania, Uganda and Zambia. Donor commitments for SRH aid grew on average by 23% annually from USD 313.85 million to 1,638.72 million while disbursements grew by 26% annually from USD 178.22 million to 1,796.43 million between 2002 and 2016. The overall disbursement rate of commitments made was 90%. We noted that for the period 2009 to 2013 disbursements continued to grow while commitments declined but between 2013 and 2015; there was a decline in both donor commitments and disbursements to the four countries. Development Assistance Cooperation (DAC) countries donated the largest proportion (72%). Kenya took the largest share (33%), followed by Tanzania (26%), Uganda (23%) and then Zambia (18%). Despite the aid, improvement in SRH indicators remained slow which may be attributed to unpredictability and insufficiency of aid and limited overall funding to meet SRH targets.

As other studies have shown, donor aid for SRH has grown globally since 2000 (22). However, the rise in donor funding has not been sufficient to help LMICs meet the health needs of their populations (23). Some of the challenges of donor aid are that recipient countries do not have any control over it; it is based on donor activities and preference for countries and therefore may not be targeted to recipient country priorities (15). Donor focus also changes based on prevailing government policy; for example, the United States (US) Mexico City Policy prohibits US foreign assistance to any organisation that performs or provides counseling on abortion. This policy was first announced by Republican President Ronald Reagan and has since been lifted and reinstated by presidents along partisan lines, with effect on increased use of modern contraception and reduced abortion rates during the period when the policy was rescinded (24). Such unpredictability may be disruptive to aid recipient countries' planning.

The challenges associated with donor aid such as discussed above, may make it unreliable for recipient countries' dependency to achieve their SRH targets. LMICs should therefore progressively move from reliance on donors to full ownership and sustainability of country health investments in SRH (25). That said, governments of LMICs have not made adequate investments in health (26). In 2010, LMICs had an average total health expenditure (THE), including all spending from public, private and from both domestic and external sources, of $32 per capita on health, falling far below a target of $60 (23). For example, figure 1 shows the national contraceptive needs and budget allocations for Tanzania, Uganda and Zambia. The four-year trends indicate that the three countries have either not allocated a budget or budgeted for far less than the projected need. Therefore, the limited spending on health by LMIC governments coupled with challenges of donor aid has meant that households have had to fill the gap to meet their healthcare costs (27, 28).

Gorik et al. argued that both the government of Uganda and the international community were failing to comply with their right-to-health-related obligations towards the people of Uganda and therefore the government of Uganda should live up to its own obligations in order to expect additional international assistance (20). Donors should ensure that recipient countries also meet their end of bargain.
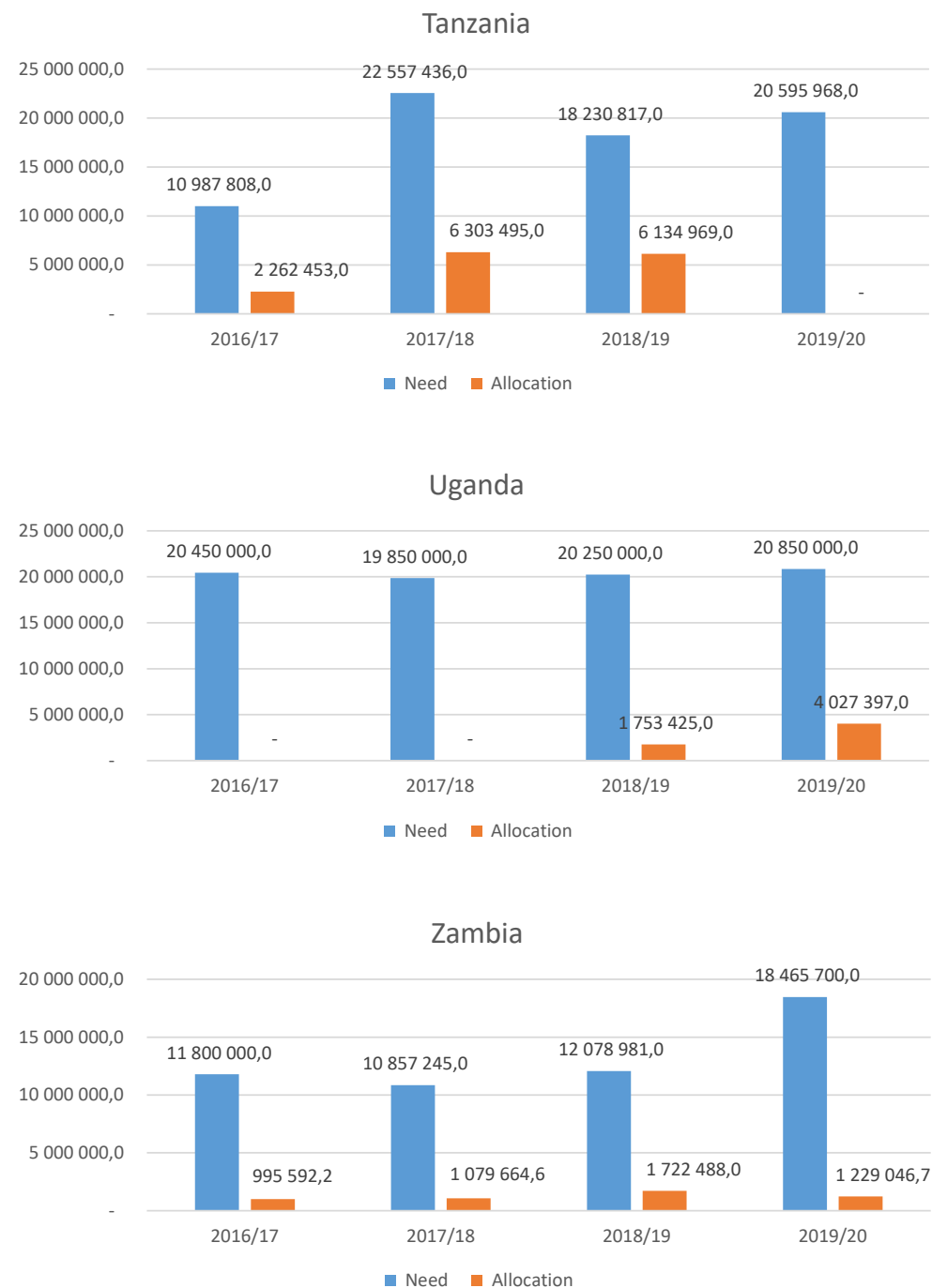
Tanzania

Uganda

Zambia

Figure 1. National contraceptive need and budget allocation (USD) in Tanzania, Uganda and Zambia between 2016/17 and 2019/20 (29)

Country policy alignment with global standards to improve SRH indicators

Alignment of national laws and policies with the global standards can help improve SRH. Global Strategies (14), WHO guidelines, operational frameworks and action plans (30-32) provide a resource for countries to inform advocacy, policy planning, programing, monitoring, evaluation and research. The guidelines are based on sound scientific evidence and their development is through robust approaches which include formulating key questions, evidence retrieval and synthesis, and appraisal of the quality of the evidence based on a broad array of context-specific clinical, public health, health system, health promotion and implementation strategies (33).

In Chapter **2.2**, we conducted a comparative human rights analysis of laws and policies concerning adolescent contraception in Uganda and Kenya to understand the degree to which national laws and policies were consistent with the global standards in WHO's guidance on contraceptive information and services. We found that the current national laws and policies for adolescent contraception in Uganda incorporate 6/9 WHO recommendations (14/24 sub-recommendations) but miss entirely WHO's recommendations for adolescent contraception availability, quality, and accountability. On the other hand, most Kenyan policies cover 8/9 WHO recommendations (16/24 sub-recommendations) except for accountability. Although national laws and policies in Uganda and Kenya addressed human rights aspects of the provision of contraceptive information and services to adolescents, Kenya's policies were more closely aligned with WHO's recommendations for adolescent contraception than Uganda's. This may partly explain why Kenya has made more progress on adolescent contraception outcomes.

Steiner-Khamsi, in an analysis on policy borrowing and lending by and between different countries, asserts that the political, economic, and cultural reasons for the attractiveness of a reform from elsewhere in most cases draws on broadly defined international standards or "best practices" (34). The social, political, economic, and public health determinants influencing Uganda's and Kenya's respective policy choices for adolescent contraception are well understood (35, 36). However, related studies on SRH reveal that political priority is dependent on different combinations of: key actor's power and ideas, stakeholder representation, key characteristics of the issue, and the political context (37, 38). The above situation may be similar in other low-income countries but warrants further investigation to address the challenges surrounding SRH. Nonetheless, to make progress towards the SDG targets, policy

makers should utilise WHO's comprehensive list of recommendations to promote adolescent SRH and human rights.

ACCESSIBILITY OF SRH COMMODITIES REMAINS A CHALLENGE

Whereas it is widely acknowledged that many SRH ailments could be prevented by ensuring access to healthcare and services (39), access to SRH commodities - which is a key component to ensuring that human rights obligations to women and children are met - has not been adequately studied.

In chapters **3.1**, **3.2**, **3.3** and **3.4** we studied access (availability and affordability) of SRH commodities including treatment for malaria which causes high burden of mortality to pregnant women and children in LMICs. In all of these chapters we found that access to these commodities was still a challenge. In chapter **3.1**, a nationwide survey was conducted to determine access to six commodities for maternal and reproductive health under the 13 lifesaving commodities prioritised by the United Nations Commission on Life Saving Commodities (UNCoLSC) initiative for women and children. The assessment conducted in Uganda, one of the seven pathfinder countries for UNCoLSC, found that the public sector had the highest availability (52%), followed by mission sector (36%) and then private sector had the least (30%). Stock outs ranged from 7-21 days in public sector, 2-23 days in private sector and 3-27 days in mission sector. Maternal health commodities were more available and had a smaller number of stock-out days than reproductive health commodities. Whereas medicines were free in the public sector, median price ratios (MPR) indicated that medicines and commodities were more expensive to patients in Uganda compared to international reference prices. Furthermore, maternal and reproductive health medicines and commodities were more expensive and less affordable in private sector compared to mission sector. Therefore, efforts should be undertaken by the Ministry of Health and stakeholders to improve availability, prices and affordability of MRH commodities.

In chapter **3.2**, a cross-country assessment of access to over 50 SRH commodities in Kenya, Tanzania, Uganda and Zambia, found low availability of SRH commodities (less than 50% in all sectors, areas and countries). Stock-outs were also common; the average number of stock-out days per month ranged from 3 days in Kenya's private and private-not-for-profit (PNFP) sectors, to 12 days in Zambia's public sector. Although SRH commodities were free to patients in

the public sectors of Kenya, Uganda and Zambia, as well as in Zambia's PNFP sector, unavailability meant that patients had to go to other sectors which were unaffordable. Unaffordability ranged from two to nine SRH commodities being unaffordable, with magnesium sulphate for management of pre-eclampsia being especially unaffordable in the countries.

Our findings on access SRH commodities are similar to access to medicines for other diseases/conditions. A study on access to essential medicines to treat chronic respiratory disease in low-income countries, for example, found the availability of medicines for asthma as 30.1% and 43.1% in the public and private sectors respectively (40). Similarly, Beran et al. found that medicines for non-communicable diseases were not available when needed in many countries and if available, were unaffordable (41). As has been proposed elsewhere, to meet Universal Health Coverage, it will require strengthening health-care systems, as well as financial resources, priority setting, and monitoring and evaluation systems (41).

In chapter **3.3** we assessed access to oxytocin and misoprostol at health facilities. Both are considered frontline medicines to improve prevention and management of postpartum haemorrhage (PPH) in Kenya, Uganda and Zambia. PPH is the global leading cause of maternal mortality (42). Sub-Saharan Africa contributes about two-thirds of the maternal deaths (43, 44). Therefore, management of PPH is paramount in reducing maternal deaths. In the study, we found that availability of either oxytocin or misoprostol at the surveyed health facilities was high at 81% in Kenya, 82% in Uganda, and 76% in Zambia. Oxytocin the most effective and also first line treatment for PPH was more available than misoprostol, and it was most available in the public sector in the three countries. Availability of misoprostol was highest in the mission sector in Kenya and Zambia (68% and 30%, respectively), and in the public sector in Uganda (88%). Oxytocin and misoprostol were purchased by patients at prices above international reference prices (IRP), but both medicines cost less than a day's wages and were therefore affordable. Although the availability and affordability of either oxytocin or misoprostol at health facilities was high, countries with limited resources should explore mechanisms to optimize management of PPH by improving access to misoprostol especially in rural areas.

It is important to note that access to uterotonics in many LMICs is hampered by the quality of those available. Oxytocin quality is not only compromised by

manufacturing deficiencies, poor regulatory oversight but also by cold-chain storage challenges in many LMICs (45, 46). On the other hand, misoprostol, a heat stable alternative to oxytocin when cold-chain cannot be guaranteed, also had documented quality problems (47). A study in Malawi found misoprostol tablets containing only 13% of content declared on label (48). Medicine quality can be compromised at multiple stages along the supply chain but limited monitoring makes it difficult to ascertain the quality of medicine at user level (46).

Other medicines to treat PPH whose awareness and knowledge should be scaled up to increase uptake include tranexamic acid and carbetocin. However, tranexamic acid requires an intravenous administration, limiting its potential for use in many LMICs (49, 50). On the other hand, carbetocin is heat-stable, therefore does not require cold chain storage but is in early stages of registration and requires introduction efforts in countries and ensuring that availability and affordability are secured (51). There is therefore a need to develop new medicine formulations and delivery methods with the potential to overcome supply chain and service delivery barriers especially in underserved areas.

In chapter, **3.4** we studied how the support from Global Fund (GF) since the year 2008 helped to improve access to artemisinin-based combination therapies (ACTs) for treatment of malaria in Uganda's private sector. Malaria is the single largest cause of illness in Uganda and mostly affects pregnant women and children below the age of five (52, 53). The paper examined the availability and affordability of first line malaria treatment and diagnostics in the private sector in Uganda between 2007 and 2018. Availability of artemether/lumefantrine (A/L), the first line ACT, increased from 85% to 100% in the private sector facilities during the study period but there was low availability malaria rapid diagnostics tests (mRDTs) in private sector facilities where the range was between 13% (2012) and 37% (2018). There was a large reduction in patient prices for an adult treatment course of A/L from USD 8.8 in 2007 to USD 1.1 in 2018, while the price of diagnostics remained mostly stable at USD 0.5. Affordability of ACTs and malaria RDTs was below one day's wages for LPGW. The improvement in availability and affordability of malaria treatment was notable but there is also a need to consider inclusion of diagnostic kits in the subsidy program and to consolidate the efforts to ensure sustainability of the gains beyond GF support.

The trends of improved access to antimalarial medicines observed in the private sector in the above paper provide insight for health actors in general and in the public sector in particular. Similar examples include the Comprehensive Case Management Programme (CCMP) initiative by Pradhan et al. in 2013 to assess the impact of universal access to diagnosis and treatment and improved surveillance on malaria transmission in different settings in Odisha state, India (54). The program included training and supervision, ensuring no stock-outs of malaria tests and drugs, analysing verified surveillance data, stratifying areas based on risk factors, and appointing alternative providers to underserved areas. The program provided insights into how to achieve universal coverage of malaria services through a routine, state-run programme. Timor Leste or "East Timor" made remarkable progress from malaria control to malaria elimination in a span of 10 years by embracing malaria elimination and control interventions based on: high-quality case management, vector control, and surveillance (55). These examples from Asia show how the public sector can play a central role in ensuring access to malaria treatment, including for pregnant women and children.

The scale-up of effective malaria control tools and technologies together with renewed political leadership and financial commitment has led to an increased number of countries moving toward the elimination of malaria (56). Despite these advances, malaria elimination and eradication still faces significant technical, operational, and financial challenges and continued efforts are needed (56).

Overall, this thesis showed that access to SRH commodities is still inadequate and below the WHO target of 80% availability, and supports the findings of similar studies for medicines such as antidiabetics, antihypertensive and anticancer medicines (57-61). As previous studies confirm, access to medicines in LMICs has been greatly aided by international initiatives such as the Global Fund to Fight AIDS, Tuberculosis and Malaria (GFTAM), the President's Emergency Plan for AIDS Relief (PEPFAR) and the President's Malaria Initiative (PMI) but supply chain management skills remain problematic, and require the involvement and collaboration of local training institutions to ensure sustainability of the programmes (62, 63).

This thesis is the first time the HAI/WHO methodology has been used to study a wide range of SRH commodities, beyond medicines as the original methodology did, and confirms that the methodology can be adapted to suit specific disease areas, as has previously been done for some chronic diseases such as diabetes and cancer(64, 65).

POLICY IMPLICATIONS FROM THIS THESIS

This thesis points to areas of weakness that contribute to poor access to SRH commodities. Unless and until these pressure points are addressed, sustainability of access to medicines and health commodities, especially those for SRH, will remain at best, unpredictable. There are then, opportunities for the international community and national governments to fill the gaps identified in the case studies presented in this thesis.

Financing for SRHR should become sustainable

This thesis has found that despite increased donor aid, SRH targets have not been met in LMICs. Concretely, concerted efforts are required to mobilize governments, donors and other stakeholders to ensure sustained and predictable funding for SRH (25). The aspiration of the United Nations (UN) Secretary-General's *Global Strategy for Women's, Children's and Adolescents' Health, 2016-2030 (39)* and the Tokyo Declaration to Universal Health Coverage (66) should be emphatically reemphasised. However, at the same time, donor recipient countries should progressively reduce their dependency on aid while increasing government financial investments to have a firmer grip of their countries' health systems.

In this thesis (chapter **2.1**) we conclude that donors mostly meet the aid commitments they make. However, there is need to further explore what motivates donor aid and how donor priorities come about. In addition, donor aid predictability, including whether donors disburse what they commit, and how the donor aid is used by recipient countries needs to be monitored and evaluated. Only then will we learn when it is effective and gain insight into how donors influence priority-setting by recipient countries (67). Finally, any future research should investigate the factors that determine the political priority accorded to SRH generally and adolescent contraception in particular, as a national policy issue by political leaders (68).

Human rights principles should guide policy development and implementation

This thesis has found that access to SRH commodities remains a challenge in LMICs and is by consequence a denial of international human rights obligations of governments to safeguard pregnancy and childbirth (9). National governments have to do more to live up their obligations (20) and should be held to account for failure. Meanwhile, the international community must provide reliable assistance (20) and as other authors have asserted, the international obligation to help countries to meet the health needs of their populations (18, 19) should be given more focus in global health, if SDG targets are to be met.

Health system strengthening is still required to improve SRH

Access to commodities is influenced by a variety of health system factors including governance, health information, health financing, human resources, and health infrastructure that should be addressed concurrently (69). Policies set the standards and priorities for health systems. However, this thesis has noted that policies in some countries are not aligned with global standards. Health stewards and duty bearers should benchmark from countries with similar challenges to help formulate policies that take into account global recommendations in a way that best suits their country context.

Bigdeli's framework of health system building blocks is structured in five levels: **Level I** - *Individuals, households, community- demand level;* **Level II**- *Health service delivery;* **Level III**- *Health sector level;* **Level IV** - *Public policies cutting across sectors; and* **Level V**- *International and regional level (69).* This thesis finds that emphasis is required at levels IV and V to provide political and policy priority to support the levels II and III.

As we have noted in chapter **3.2,** other important service delivery challenges that should be addressed to improve access to medicines include regulatory matters, health facility infrastructural problems such as functional equipment like cold chain storage and diagnosis tests and supply chain systems. Efforts should be made to ensure sufficient numbers of adequately trained and well remunerated health workforce.

METHODOLOGICAL CHALLENGES

The research in chapter **3** of this thesis was based on a widely used, standardized and validated methodology to measure medicine availability, prices, and affordability (57-61). However, some limitations of the methodology have been described in detail before in chapter **3.1** to **3.4**. First, availability data is collected cross-sectionally. To provide a more accurate picture of availability, commodity stock-out information was collected based on written evidence in the studies described in these chapters. However, stock-data was collected only for the previous six months which may be influenced by seasonal fluctuations. More continuous assessment of availability, stock-outs and prices by countries

may provide a more realistic picture to evaluate adherence and effect of their national medicine policies.

The WHO essential medicines and health products price and availability monitoring mobile application (WHO EMP MedMon) or 'MedMon App' was developed in 2016 to rapidly collect and analyse data on price and availability of medicines in health facilities and procurement centres. It is an innovative multi-language tool that allows users to routinely monitor medicines' prices and availability in a sustainable, cost-effective, and timely manner, regardless of the users' access to internet or cellular data. The app is based on elements of the WHO/HAI methodology for "measuring medicine prices, availability, affordability and price components" (70). The app can help countries to replace ad-hoc studies with small samples and differences in definitions with a regular monitoring of medicines using a cheap, reproducible method. This will help overcome information gaps and duplication of efforts while and provide trends over time (71). It will also be helpful if the data is immediately made freely available to the public through an observatory or media.

The methodology employed in the WHO/HAI methodology and thus in this thesis calculates affordability using the wage of the lowest paid government worker (LPGW) as a benchmark. This was formulated to allow for comparisons of data across countries (57). However, the wage of an LPGW is in itself a variable, and in many countries may be higher than the average income. As such, it may provide an unrealistic estimation of the actual affordability for the majority of the population (72). Niëns et al. have proposed two alternative methods for measuring affordability in developing countries: the impoverishment approach which measures the shift in the proportion of a country's population living under the national poverty line (NPL) if everyone in that population bought the medicine in question and the catastrophic approach which estimates the proportion of the population who risk making a catastrophic expenditure that is above some threshold of their daily budget by the purchase of a treatment (72, 73). Both measures use income level and income distribution data from the World Bank's WDI which has been shown to be biased towards higher consumption (74). Therefore, the WHO/HAI metric of affordability is still the most widely used metric and has also been adopted in the SDG indicator 3.b.3 methodology (75).

Another limitation of the methodology is that it only collects data for the outcome measures for one dosage form or strength, while a commodity might be available in other dosage forms. This research tried to mitigate this by aligning the surveyed commodities' strengths and dosage forms to those on the countries' corresponding NEMLs. For example, in chapter **3.4**, we studied artemether/lumefantrine 24 tablet pack which is an adult dose. When a commodity was listed with multiple dosage forms or strengths, they were all included.

Finally, this methodology assesses availability and affordability as two separate features of access to medicines. As noted by Wirtz, there are cases where medicine availability is high but affordability (capacity to pay) is low (and vice versa) which creates a paradox for access (76). Therefore, efforts to refine, standardise and assess as one the SGD Indicator 3.b.3 "proportion of health facilities that have a core set of relevant essential medicines available and affordable on a sustainable basis" would be helpful.

FUTURE OUTLOOK
SRH policy should be a priority for politics
Davids et al in their systematic scoping of available policies and guidelines for SRH-related policy for adolescent girls and young women South Africa found that despite the availability of many policies and guidelines to address issues of family planning, HIV prevention and care and antenatal and maternal care, high rates of pregnancy and HIV transmission continue unabated (77). This suggests a mismatch between policy and practice. As we found in chapter **2.2**, and as other studies have shown (35, 36, 78), the determinants influencing adolescent contraception policy choices are known but a political solution has not been reached. In many instances, politics plays a critical role in health affairs and may contribute to the identified mismatch.

Political leaders sometimes fail to adopt comprehensive reforms even when faced with serious public health problems due to a number of factors including: fragmented political institutions, resistance from concentrated interests, and fiscal constraints (79). Public health and specifically SRH, often clashes with moral values or social norms and therefore there is a need for new policies, practices, and participation beyond the confines of traditional public health agencies and services (80). Efforts to improve the translation of evidence into policy often require the political economy of institutions and partisanship (81).

Williams-Crowe and Aultman in their paper postulate that public health professionals have been comfortable in providing the scientific knowledge

base required in policy development but shied away from playing an active role in leading and shaping the debate over policy (82). They urge public health professionals/officials to form meaningful relationships with legislators and the community to anticipate and formulate legislation (82). They further provide five strategies for public health officials to deal with state legislatures which include: agency organization, staff skills, communications, negotiation, and active ongoing involvement.

Public health professionals who understand the political dimensions of health policy can conduct more realistic research and evaluation, better anticipate opportunities as well as constraints on governmental action, and design more effective policies and programs (79). There is need for more explicit engagement with the political and institutional factors affecting the use of health evidence in decision-making (83). Therefore, SRH practitioners should explore and engage key actors in the political and socio-economic context including political, religious and cultural leaders.

Socio-cultural outlook

Socio-cultural beliefs and practices about women, marriage, contraception and child bearing in many societies have created myths and misconceptions which have derailed SRH gains (84, 85). Governments should therefore strengthen the demand side by ensuring that the population receives knowledge on SRHR to challenge damaging moral and social values and overcome cultural beliefs. The role of engagement and education of men to support women and girls in SRH matters cannot be overstressed (86, 87). It will require a multi-sectoral and multi-stakeholder approach to ensure that cultural, religious and political leaders are engaged at all levels. Moreover, the debate must be informed not only by scientific methodology, but liturgical and dogmatic interpretation. Thus, collaboration with other sectors such as major religions, community leaders, the private sector and sectors beyond health such as education, environment, water and sanitation among others, is crucial.

Consensus is required on SRH indicators and their measurement

As we note in Chapter 2.1 over a review period of 16-years, there was improvement in both SRH outcome and impact indicators alongside growth in donor aid but the SRH impact indicators did not reduce fast enough to meet SDG targets. There is need therefore to have a basket of more focussed indicators to trace the progress towards SDGs.

There is however, general lack of consensus on SRH indicators as the process of selection of the indicators and their measurement is driven by political and stakeholder interest (88,89). The power and interests of key stakeholders influence decisions in global goals and national target-setting (90). The contestation is on what is measured, who finances it, who does the measuring, how data are collected, interpreted and disseminated for decision-making and programme implementation (91, 92). There is therefore need for wider stakeholder involvement and consensus on standardization and prioritization of indicators for the evaluation of SRH to encourage more robust, systematic and transparent practices (93, 94). There is also need to further distinguish outcome and impact indicators to have variables that may have greatest impact and to develop validated tools to measure. Further studies using a refined set of indicators are critical to measure and compare SRH impact (88, 89).

Technological innovation

Efforts are required to continuously research and develop new medicines that meet the needs of the population particularly in underserved areas. Heat stable formulations such as carbetocin used to prevent postpartum haemorrhage would greatly help in places where storage conditions for oxytocin cannot be met (95). Child friendly formulations for some of the medicines studied in this thesis can help overcome many challenges faced by LMICs but would also benefit other countries (96, 97). In chapter **3.4** we studied access to malaria treatment but most globally manufactured treatments are in tablet form tailored for adults and for caregivers to administer to infants and children, there is a need to crush and mix with water or food which gives unpalatable bitter taste thereby requiring dispersible tablets (98).

With a view to the improvement of SRH service delivery there is a need to explore the use of digital technologies such as mobile phones, mobile apps and internet resources. This might also inform the training of health workers and reach underserved populations (99-101). It is also important to continuously explore self-care interventions to give agency and autonomy to users to improve their SRHR (99, 102).

Implications of COVID-19

The COVID-19 pandemic threatens to derail the global SDG targets (103). It has had an unprecedented impact on the social and economic fabric of society and the situation is compounded in many LMICs. The closure of countries'

borders, schools, religious and social institutions and businesses and restriction of movement of citizens, has not only disrupted industrial production, global supply chains and service delivery, but affected the livelihoods of many, particularly women and youth, with the inevitable adverse consequences for SRHR and SRH services.

For example, in March 2020, a looming global shortage of condoms was reported due to the closure of the world's largest condom manufacturer Malaysia Karex Bhd. This one company is responsible for 20% of the world's condom production, and is expected to affect contraceptive programmes worldwide (104).

WHO estimated that even a small decline of 10% in service coverage during pregnancy and for newborns could result in an additional 28,000 maternal and 168,000 newborn deaths globally over a 12 months period (105, 106). The International Planned Parenthood Federation (IPPF) reported in April 2020 that the SRHR of up to 9.5 million vulnerable girls and women would be affected in that year, due to the closure of more than 5000 of their clinics across the world (107). Similarly, UNFPA reported that if lockdown due to COVID-19 continued for six months, major service disruptions would result in an additional 7 million unintended pregnancies (108).

Service disruptions by COVID-19 are expected to impact the lives of many women. The United Nations Population Fund (UNFPA) reported that women were refraining from visiting health facilities due to fears about COVID-19 exposure or due to movement restrictions; supply chain disruptions were limiting availability of commodities and there were anticipated stock-outs in many of lowest-income countries; health facilities in many places were closed or limited in services; that due to health workers' concentration on COVID-19 response or lack personal protective equipment to provide services safely, they may not have time to provide SRH service (103).

 WHO's operational guidance for maintaining essential health services during COVID-19 recommends *community-based health care including outreach and campaigns to* avoid service interruptions (95). Innovative mitigation strategies such as the community distribution of misoprostol in hard-to-reach areas in Nepal and working with community health workers and traditional birth attendants can play a role in reducing the service delivery gap (109).

A concerted effort by stakeholders to work with national governments to ensure that service disruptions are minimised during such pandemics is imperative. Given the demonstrably suboptimal access to many SRH commodities prior to the onset of COVID-19 it now becomes urgent to further research on the impact of the coronavirus on policy development and implementation, SRH service delivery, expenditure of governments and donor response.

CONCLUSION

Global indicators for SRH have improved over the last two decades but do not show sufficient progress to meet SDG targets. Donor aid has been rising and donors have largely lived up to their commitments, but the investments are insufficient for LMICs to meet the SRH needs of their populations. Availability and affordability of SRH commodities in LMICs remains a major challenge. LMIC governments must increase investments for SRHR now in order that their obligations to their citizens are met. The international community must also provide assistance that is more reliable to developing countries and ensure that health is a shared responsibility for all.

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5

SUMMARY, SAMENVATTING

5.1

SUMMARY

The attainment of sexual and reproductive health and rights (SRHR) is still a far cry as is highlighted by an estimated annual death of more than 350,000 women and 5.6 million children worldwide from preventable complications related to pregnancy and childbirth. Sub-Saharan Africa accounts for 66% of global maternal deaths and accounts for 15 times higher under-5 mortality than high income countries. Many SRH challenges could be prevented or mitigated with proper and optimal healthcare and services. For better insight on how to improve access, it is necessary to identify barriers at societal level, national health system level as well as at international level to inform policy makers.

As is shown in the introduction in **Chapter 1**, this thesis assesses the current situation on access to selected SRH commodities in sub-Saharan African countries. We review public policies at national and regional level and how countries and donors responded to SRH need. We also study access by measuring availability and affordability of different SRH commodities at health facility level.

Chapter 2 consists of two sub-chapters on governmental and donor responses to SRH needs at the global and international levels**.**

Chapter 2.1 presents an assessment of donor commitments and disbursements for sexual and reproductive health aid in Kenya, Tanzania, Uganda, and Zambia. The study is a secondary analysis of data from the Organization for Economic Co-operation and Development's Assistance creditor reporting system and SRH indicator data from the Global Health Observatory and country demographic health surveys for a 16-year period (2002-2017). The study compared commitments to disbursements of all donors for population policies, programs, and reproductive health for the four African countries. SRH indicators were stratified into health facility level process/outcome indicators (modern contraceptive prevalence rate, unmet need for family planning, antenatal care coverage and skilled birth attendance) and health impact level indicators (maternal mortality ratio, newborn mortality rate, infant mortality rate and under 5 mortality rate).

The study showed that donor commitments for SRH aid grew on average by 20% while disbursements grew by 21% annually between 2002 and 2017. The overall disbursement rate was 93%. Development Assistance Cooperation (DAC) countries donated the largest proportion (79%) of aid. Kenya took 33% of total

aid, followed by Tanzania (26%), Uganda (23%) and then Zambia (18%). While there was improvement in both SRH outcome and impact indicators alongside growth in donor aid over the 16-year period, the SRH impact indicators are not reducing fast enough to meet Sustainable Development Goals (SDG) targets. The study concluded that unpredictability and insufficiency of aid may be disruptive to recipient country's planning. Donors and low- and middle-income countries (LMICs) should increase funding to meet global SRHR targets.

Chapter 2.2 assessed inter-country comparisons of SRH policies and priorities by presenting a comparative content analysis of policy approaches to adolescent contraception in Uganda and Kenya. Adolescents are particularly a vulnerable group regarding SRH as they face expounded access challenges. Improving access to adolescent contraception information and services is essential to reduce unplanned adolescent pregnancies and maternal mortality to attain the SDGs on health and gender equality.

The research studied to what degree national laws and policies for adolescent contraception in Uganda and Kenya were consistent with WHO standards and human rights law. It used a comparative content analysis of law and policy documents in force between 2010-2018 governing adolescent (age 10-19 years) contraception. Between and within country differences were analysed using WHO's guidelines "Ensuring human rights in the provision of contraceptive information and services".

Of the 93 laws and policies screened, 26 documents were included (13 policies in Uganda, 13 policies in Kenya). Ugandan policies included a median of 1 WHO recommendation for adolescent contraception per policy (range 0-4) that most frequently concerns contraception accessibility. Ugandan policies had 6/9 WHO recommendations (14/24 sub-recommendations) and missed entirely WHO's recommendations for adolescent contraception availability, quality, and accountability. On the other hand, most Kenyan policies consistently addressed multiple WHO recommendations (median 2 recommendations/policy, range 0-6), most frequently for contraception availability and accessibility for adolescents. Kenyan policies covered 8/9 WHO recommendations (16/24 sub-recommendations) except for accountability. The study concluded that current policy landscapes for adolescent contraception in Uganda and Kenya include important references to human rights and evidence-based practice. However, there is still room for improvement. Alignment of national laws and policies

with WHO's recommendations on contraceptive information and services for adolescents may support interventions to improve health outcomes, provided these frameworks are effectively implemented.

Chapter 3 studied access to SRH commodities in sub-Saharan Africa with a focus on availability and affordability.

Chapter 3.1 studied availability, prices and affordability of UN Commission's lifesaving medicines for maternal and reproductive health in Uganda which was one of the seven pilot countries in which the United Nations Commission on Life Saving Commodities (UNCoLSC) initiative was implemented starting from 2013.

The nationwide survey was conducted in 2015 using an adapted version of the standardized methodology co-developed by World Health Organisation (WHO) and Health Action International (HAI). Six maternal and reproductive health commodities, that were part of the UNCoLSC initiative, were studied in the public, private and mission health sectors. Median price ratios were calculated with Management Sciences for Health International Drug Price Indicator prices as reference. Maternal and reproductive health commodity stocks were reviewed from stock cards for their availability for a period of six months preceding the survey. Affordability was measured using wages of the lowest paid government worker.

Overall, none of the six maternal and reproductive commodities was found in all the surveyed health facilities. Public sector had the highest availability (52%), followed by mission sector (36%) and then private sector had the least (30%). Stock outs ranged from 7 to 21 days in public sector: two to 23 days in private sector and three to 27 days in mission sector. During the survey, maternal health commodities were more available and had a smaller number of stock-out days than reproductive health commodities. Median price ratios (MPR) indicated that medicines and commodities were more expensive in Uganda compared to international reference prices. Furthermore, MRH medicines and commodities were more expensive and less affordable in private sector compared to mission sector. The study concluded that access to MRH commodities was inadequate in Uganda. Maternal health commodities were however, more available, cheaper and affordable than reproductive health commodities. Efforts should be undertaken by the Ministry of Health and stakeholders to improve availability, prices and affordability of MRH commodities in Uganda to ensure that SGDs are met.

Chapter 3.2 presents an analysis of access to sexual and reproductive health commodities in East and Southern Africa: a cross-country comparison of availability, affordability and stock-outs in Kenya, Tanzania, Uganda and Zambia. The study was based on the fact that access to SRH services was a public health concern in Kenya, Tanzania, Uganda and Zambia, with low use of modern contraceptives, and high unmet need for family planning and maternal mortality.

The study consisted of an adaptation of the WHO/HAI International methodology, *Measuring Medicine Prices, Availability, Affordability and Price Components* as a follow up of pilot presented in chapter 3.1 Price, availability and stock-out data was collected in July 2019 for over fifty lowest-priced SRHC from public, private and private not-for-profit health (PNFP) facilities in Kenya (n=221), Tanzania (n=373), Uganda (n=146) and Zambia (n=245). Affordability was calculated using the wage of a lowest-paid government worker. Accessibility was illustrated by combining the availability (benchmark ≥ 80%) and affordability (benchmark less than 1 day's wage) measures.

Overall availability of SRHC was low at less than 50% in all sectors, areas and countries, with highest mean availability found in Kenyan public facilities (46.6%). Stock-outs were common; the average number of stock-out days per month ranged from 3 days in Kenya's private and private-not-for-profit (PNFP) sectors, to 12 days in Zambia's public sector. In the public sectors of Kenya, Uganda and Zambia, as well as in Zambia's PNFP sector, all SRHC were free for the patient. In the other sectors unaffordability ranged from 2 to 9 SRHC being unaffordable, with magnesium sulphate being especially unaffordable in the countries. Accessibility was low across the countries, with Kenya's and Zambia's public sectors having six SRHC that met the accessibility threshold, while the private sector of Uganda had only one SRHC meeting the threshold.

The study concluded that accessibility of SRHC remains a challenge. Low availability of SRHC in the public sector was compounded by regular stock-outs, forcing patients to seek care in other sectors where there were availability and affordability challenges. Therefore, health system strengthening is needed to ensure access.

Chapter 3.3 is an assessment of availability, prices and affordability of oxytocin and misoprostol -the two frontline medicines for management of postpartum haemorrhage- in Kenya, Uganda and Zambia. The assessment was undertaken using data from HAI research on sexual and reproductive health commodities based on a cross-sectional design adapted from the standardized WHO/HAI methodology. Data was collected from 376 health facilities in in Kenya, Uganda and Zambia in July and August 2017.

Availability was calculated as mean percentage of sampled medicine outlets where medicine was found on the day of data collection. Medicine prices were compared to international reference prices (IRP) and expressed as median price ratios (MPRs). Affordability was calculated using number of days required to pay for a standard treatment based on the daily income of the lowest-paid government worker.

Availability of either oxytocin or misoprostol at health facilities was high; 81% in Kenya, 82% in Uganda, and 76% in Zambia. Oxytocin was more available than misoprostol, and it was most available in the public sector in the three countries. Availability of misoprostol was highest in the public sector in Uganda (88%). Oxytocin and misoprostol were purchased by patients at prices above IRP, but both medicines costed less than a day's wages and were therefore affordable. Availability of misoprostol was poor in rural settings where it would be more preferred due to lack of trained personnel and cold storage facilities required for oxytocin. The study concluded that although availability and affordability of either oxytocin or misoprostol at health facilities met the WHO benchmark of 80%, countries with limited resources should explore mechanisms to optimize management of PPH by improving access to misoprostol especially in rural areas.

Chapter 3.4 shows trends in access to first line antimalarial treatment and diagnostics in the private sector in Uganda between 2007 and 2018. Malaria is the single largest cause of illness in Uganda and mostly affects pregnant women and children under-five. Following Global Fund's roll out of several funding streams for malaria control in Uganda since the year 2008, the study examined the availability and affordability of first-line malaria treatment and diagnostics in the private sector which is the preferred first point of contact for 61% of households in Uganda.

Cross-sectional surveys were conducted between 2007 and 2018, based on a standardized World Health Organization/Health Action International (WHO/HAI) methodology adapted to assess availability, patient prices, and

affordability of ACT medicines in private retail outlets. A minimum of 30 outlets were surveyed per year as prescribed by the standardized methodology co-developed by the WHO/HAI. Availability, patient prices, and affordability of malaria rapid diagnostic tests (RDTs) was also tracked from 2012 following the rollout of the 'test and treat' policy in 2010. The median patient prices for the artemisinin-based combinations and RDTs was calculated in US dollars (USD). Affordability was assessed by computing the number of days' wages the lowest-paid government worker (LPGW) had to pay to purchase a treatment course for acute malaria.

Availability of artemether/lumefantrine (A/L), the first-line ACT medicine, increased from 85% to 100% in the private sector facilities during the study period. However, there was low availability of diagnostic tests in private sector facilities ranging between 13% (2012) and 37% (2018). There was a large reduction in patient prices for an adult treatment course of A/L from USD 8.8 in 2007 to USD 1.1 in 2018, while the price of diagnostics remained mostly stagnant at USD 0.5. The affordability of ACT medicines and RDTs was below one day's wages for LPGW.

In conclusion, availability of ACT medicines in the private sector medicines retail outlets increased to 100% while the availability of diagnostics remained low. Although malaria treatment was affordable, the price of diagnostics remained stagnant and increased the cumulative cost of malaria management. Malaria stakeholders should consolidate the gains made and consider the inclusion of diagnostic kits in the subsidy program.

Chapter 4 draws lessons from the different studies conducted in the thesis, presents conclusions and policy recommendations and highlights methodological challenges and areas of improvement as well as provides insights into future studies in the area.

The thesis identified opportunities for the international community and national governments to fill the SRH gaps identified in the case studies presented in this thesis. These include:

- **Increased and sustainable SRHR financing from countries and donors.**

- **Use of human rights principles as guide for policy development and implementation.**

- **Health system strengthening.**

- **Ensuring that SRH policy should be a priority for politics.**

- **Strengthening of demand for SRH by addressing myths from socio-cultural beliefs and practices.**

- **The need for consensus on SRH indicators and their measurement.**

- **Technological innovation to continuously research and develop new medicines that meet the needs of the population particularly in underserved areas.**

- **Addressing of implications of COVID-19 on SRH.**

In conclusion availability and affordability of SRH commodities in LMICs remains a challenge. Therefore, LMIC governments must increase investments for SRHR to meet obligations to their citizens and the international community must also provide to developing countries assistance that is more reliable to ensure that health is a shared responsibility for all.

5.2

Jaarlijks sterven er meer dan 350.000 vrouwen en 5,6 miljoen kinderen wereldwijd als gevolg van vermijdbare complicaties van zwangerschap en bevalling. Dit onderstreept dat er nog veel aandacht nodig is voor seksuele- en reproductieve gezondheid en rechten (SRGR) van vrouwen. 66% van de wereldwijde moedersterfte vindt plaats in Sub-Sahara-Afrika en er is een 15 keer hogere sterfte bij kinderen onder de 5 jaar dan in landen met een hoog inkomen. Veel problemen op het gebeid van SRG zouden kunnen worden voorkomen of verminderd door goede en optimale gezondheidszorg en diensten. Het is nodig om barrières te identificeren op het niveau van de gemeenschap, op niveau van het nationale gezondheidssysteem en op internationaal niveau, om beleidsmakers te informeren en zo de toegang tot deze gezondheidszorg en diensten te verbeteren.

Zoals blijkt uit de inleiding in **hoofdstuk 1**, evalueert dit proefschrift de huidige situatie met betrekking tot de toegang tot geselecteerde SRG-goederen in sub-Sahara-Afrika. We beoordelen het overheidsbeleid op nationaal en regionaal niveau en hoe landen en donoren hebben gereageerd op de behoeften die bestaan op het gebied van SRG. We bestuderen ook de toegang door de beschikbaarheid en betaalbaarheid van verschillende SRG-producten op het niveau van de gezondheidsinstelling te meten.

Hoofdstuk 2 bestaat uit twee subhoofdstukken over de respons van regeringen en donoren op de behoeften op het gebied van SRG op mondiaal en internationaal niveau.

Hoofdstuk 2.1 geeft een overzicht van de toezeggingen en betalingen van donoren voor SRG in Kenia, Tanzania, Oeganda en Zambia. De studie is een secundaire analyse van gegevens van het rapportagesysteem voor schuldeisers van de Organisatie voor Economische Samenwerking en Ontwikkeling, en gegevens over SRG-indicatoren van de Global Health Observatory en demografische gezondheidsenquêtes per land voor een periode van 16 jaar (2002-2017). De studie vergeleek de toezeggingen aan betalingen van alle donoren voor beleid, programma's en reproductieve gezondheid voor de vier Afrikaanse landen. SRG-indicatoren werden gestratificeerd in proces-/resultaatindicatoren op het niveau van de gezondheidsinstelling (prevalentie van moderne anticonceptiva, onvoldoende mogelijkheid tot gezinsplanning, dekking van prenatale zorg en geschoolde geboortebegeleiding) en indicatoren

van gezondheidsimpact (moedersterfteratio, sterftecijfer bij pasgeborenen, zuigelingensterfte en het sterftecijfer bij kinderen onder de 5 jaar).

Uit het onderzoek bleek dat de toezeggingen van donoren voor SRG-hulp tussen 2002 en 2017 met gemiddeld 20% stegen, terwijl de uitbetalingen tussen 2002 en 2017 met 21% stegen. Het totale uitbetalingspercentage bedroeg 93%. Landen behorend tot de Development Assistance Cooperation (DAC) schonken het grootste deel (79%) van de hulp. Kenia kreeg 33% van de totale hulp, gevolgd door Tanzania (26%), Oeganda (23%) en vervolgens Zambia (18%). Hoewel er verbetering was in zowel SRG-uitkomst- als impactindicatoren naast de groei van donorhulp over de periode van 16 jaar, nemen de SRH-impactindicatoren niet snel genoeg af om de United Nations (UN) Sustainable Development Goals (SDG) te behalen. Op basis van deze studie concludeerden we dat onvoorspelbaarheid en ontoereikendheid van hulp de planning van het ontvangende land kunnen verstoren. Donoren en lage- en middeninkomenslanden zouden de financiering moeten verhogen om de wereldwijde SRGR-doelstellingen te halen.

In **hoofdstuk 2.2** worden SRG-beleid en prioriteiten vergeleken door een analyse te doen van de inhoud van beleid ten opzicht van anticonceptie voor adolescenten in Oeganda en Kenia. Adolescenten zijn met name een kwetsbare groep met betrekking tot SRG, omdat juist zij worden geconfronteerd met verschillende barrières voor toegang tot deze services. Het verbeteren van de toegang tot informatie over anticonceptie en andere diensten voor adolescenten is essentieel om ongeplande zwangerschappen bij adolescenten en moedersterfte te verminderen om de SDG's op het gebied van gezondheid en gendergelijkheid te bereiken.

Het onderzoek onderzocht in hoeverre de nationale wetten en het beleid voor anticonceptie voor adolescenten in Oeganda en Kenia in overeenstemming waren met de WHO-normen en de mensenrechtenwetgeving. Er werd gebruik gemaakt van een vergelijkende analyse van de inhoud van wetten en beleidsdocumenten die van kracht waren tussen 2010-2018 inzake anticonceptie voor adolescenten (10-19 jaar). Verschillen tussen en binnen landen werden geanalyseerd met behulp van de WHO-richtlijnen " Ensuring human rights in the provision of contraceptive information and services ".

Van de 93 onderzochte wetten en beleidstukken werden 26 documenten opgenomen (13 beleidstukken in Oeganda, 13 beleidsstukken in Kenia).

Het Oegandese beleid bevatte een mediaan van 1 WHO-aanbeveling voor anticonceptie voor adolescenten per beleidsstuk (range 0-4) dat het vaakst betrekking heeft op de toegankelijkheid van anticonceptie. Het Oegandese beleid had 6/9 WHO-aanbevelingen (14/24 subaanbevelingen) en miste volledig de WHO-aanbevelingen voor de beschikbaarheid, kwaliteit en aansprakelijkheid van anticonceptie voor adolescenten. Aan de andere kant richtten de meeste Keniaanse beleidsmaatregelen zich consequent op meerdere WHO-aanbevelingen (mediaan 2 aanbevelingen/beleidsstuk, range 0-6); het meest frequent werden de beschikbaarheid van anticonceptie en toegankelijkheid voor adolescenten genoemd. Het Keniaanse beleid omvatte 8/9 WHO-aanbevelingen (16/24 subaanbevelingen), aansprakelijkheid werd niet genoemd. De studie concludeerde dat in het huidige beleid voor anticonceptie voor adolescenten in Oeganda en Kenia belangrijke verwijzingen zitten naar mensenrechten en evidence-based gezondheidzorg. Er is echter nog ruimte voor verbetering. Afstemming van nationale wetten en beleid met de aanbevelingen van de WHO over anticonceptie-informatie en -diensten voor adolescenten kan interventies ondersteunen om de gezondheid te verbeteren, op voorwaarde dat deze kaders effectief worden geïmplementeerd.

Hoofdstuk 3 bestudeert de toegang tot SRG-producten in sub-Sahara-Afrika met een focus op beschikbaarheid en betaalbaarheid.

Hoofdstuk 3.1 bestudeert de beschikbaarheid, prijzen en betaalbaarheid van levensreddende medicijnen van de UN-commissie voor maternale en reproductieve gezondheid in Oeganda, één van de zeven proeflanden waarin het initiatief van de United Nations Commission on Life Saving Commodities (UNCoLSC) vanaf 2013 werd geïmplementeerd.

Het landelijke onderzoek is in 2015 uitgevoerd met behulp van een aangepaste versie van de gestandaardiseerde methodologie voor het meten van toegang tot geneesmiddelen, die is ontwikkeld door de Wereldgezondheidsorganisatie (WHO) en Health Action International (HAI). Zes producten voor maternale en reproductieve gezondheid, die deel uitmaakten van het UNCoLSC-initiatief, werden bestudeerd in de publieke, private en missiegezondheidssector. Mediane prijsverhoudingen werden berekend met prijzen van de Management Sciences for Health International Drug Price Indicator als referentie. De voorraad producten voor maternale en reproductieve gezondheid werd beoordeeld op hun beschikbaarheid gedurende een periode van zes maanden voorafgaand

aan het onderzoek. De betaalbaarheid werd gemeten aan de hand van de lonen van de laagstbetaalde overheidsmedewerker.

Over het algemeen werd geen van de zes moederlijke en reproductieve goederen gevonden in alle onderzochte gezondheidsinstellingen. De publieke sector had de hoogste beschikbaarheid (52%), gevolgd door de missiesector (36%) en de minste beschikbaarheid werd gevonden in de private sector (30%). Het aantal dagen dat producten niet op voorraad waren varieerde van 7 tot 21 dagen in de publieke sector, 2 tot 23 dagen in de private sector en 3 tot 27 dagen in de missiesector. Tijdens het onderzoek waren maternale gezondheidsproducten meer beschikbaar en waren ze minder dagen niet op voorraad dan producten voor reproductieve gezondheid. Mediane prijsverhoudingen gaven aan dat medicijnen en andere producten duurder waren in Oeganda in vergelijking met internationale referentieprijzen. Bovendien waren medicijnen en producten voor maternale en reproductieve gezondheid duurder en minder betaalbaar in de particuliere sector dan in de missiesector. De studie concludeerde dat de toegang tot deze producten onvoldoende was in Oeganda. Maternale gezondheidsproducten waren echter beter beschikbaar, goedkoper en betaalbaarder dan reproductieve gezondheidsproducten. Het ministerie van Volksgezondheid en andere betrokkenen moeten inspanningen leveren om de beschikbaarheid, prijzen en betaalbaarheid van producten voor maternale en reproductieve gezondheid in Oeganda te verbeteren om ervoor te zorgen dat de SDG's worden gehaald.

Hoofdstuk 3.2 presenteert een analyse van de toegang tot seksuele en reproductieve gezondheidsproducten in Oost- en Zuidelijk Afrika: een vergelijking tussen de beschikbaarheid, betaalbaarheid en ontoereikende voorraad in Kenia, Tanzania, Oeganda en Zambia. Deze studie is gedaan omdat toegang tot SRG-diensten een probleem voor de volksgezondheid was in Kenia, Tanzania, Oeganda en Zambia. Deze landen kampen met een laag gebruik van moderne anticonceptiva en onvoldoende mogelijkheden en ondersteuning voor gezinsplanning en een hoge moedersterfte.

Dit onderzoek is uitgevoerd met behulp van de WHO/HAI-methodologie, *Measuring Medicine Prices, Availability, Affordability and Price Components.* Deze studie was een vervolg op de pilotstudie eerder genoemd in hoofdstuk 3.1 Prijs-, beschikbaarheids- en voorraadgegevens werden in juli 2019 verzameld

voor meer dan vijftig goedkoopste SRG-producten van openbare, particuliere en particuliere non-profit gezondheidsinstellingen in Kenia (n=221), Tanzania (n=373), Oeganda (n=146) en Zambia (n=245). De betaalbaarheid werd berekend aan de hand van het loon van de laagstbetaalde overheidsmedewerker. Een product werd als toegankelijk aangemerkt als zowel de beschikbaarheid (benchmark ≥ 80%) als de betaalbaarheid (benchmark minder dan 1 dagloon) voldoende was.

De algemene beschikbaarheid van SRG-producten was laag, met minder dan 50% in alle sectoren, gebieden en landen, met de hoogste gemiddelde beschikbaarheid in Keniaanse openbare voorzieningen (46,6%). Producten waren vaak niet op voorraad; het gemiddelde aantal dagen dat een product niet op voorraad was per maand varieerde van 3 dagen in de private en particuliere non-profit sectoren van Kenia tot 12 dagen in de publieke sector van Zambia. In de publieke sectoren van Kenia, Oeganda en Zambia, evenals in de particuliere non-profit sector van Zambia, waren alle SRG-producten gratis voor de patiënt. In de andere sectoren varieerde de onbetaalbaarheid van 2 tot 9 SRG-producten die als onbetaalbaar werden aangemerkt, met name magnesiumsulfaat was onbetaalbaar in de landen. De toegankelijkheid was laag in alle landen, waarbij de publieke sector in Kenia en Zambia zes SRG-producten had die voldeden aan de definitie van toegankelijkheid, terwijl de private sector van Oeganda slechts één SRG-product had die aan die definitie voldeed.

De studie concludeerde dat de toegankelijkheid van SRG-producten een uitdaging blijft. De lage beschikbaarheid van SRG-producten in de publieke sector werd verergerd door het feit dat producten regelmatig niet op voorraad waren, waardoor patiënten gedwongen werden zorg te zoeken in andere sectoren waar er uitdagingen waren op het gebied van beschikbaarheid en betaalbaarheid. Daarom is versterking van het gezondheidsstelsel nodig om de toegang te waarborgen.

Hoofdstuk 3.3 is een beoordeling van de beschikbaarheid, prijzen en betaalbaarheid van oxytocine en misoprostol - de twee eerstelijnsgeneesmiddelen voor de behandeling van postpartumbloedingen - in Kenia, Oeganda en Zambia. De beoordeling werd uitgevoerd met behulp van gegevens van een eerder cross-sectioneel HAI-onderzoek. In juli en augustus 2017 zijn gegevens verzameld bij 376 gezondheidsinstellingen in Kenia, Oeganda en Zambia.

De beschikbaarheid werd berekend als het gemiddelde percentage van de geselecteerde apotheken waar het medicijn werd gevonden op de dag van datacollectie. Medicijnprijzen werden vergeleken met internationale referentieprijzen en uitgedrukt als mediane prijsratio's. De betaalbaarheid is berekend aan de hand van het aantal dagen dat nodig is om een standaardbehandeling te betalen op basis van het daginkomen van de laagstbetaalde overheidsmedewerker.

De beschikbaarheid van oxytocine of misoprostol in gezondheidsinstellingen was hoog; 81% in Kenia, 82% in Oeganda en 76% in Zambia. Oxytocine was meer beschikbaar dan misoprostol en het was het meest beschikbaar in de publieke sector in de drie landen. De beschikbaarheid van misoprostol was het hoogst in de publieke sector in Oeganda (88%). Oxytocine en misoprostol werden door patiënten gekocht tegen prijzen boven de internationale referentieprijs, maar beide medicijnen kostten minder dan een dagloon en waren dus betaalbaar. De beschikbaarheid van misoprostol was slecht in landelijke omgevingen, waar het meer de voorkeur zou hebben vanwege een gebrek aan opgeleid personeel en koude opslagfaciliteiten die nodig zijn voor oxytocine. De studie concludeerde dat hoewel de beschikbaarheid en betaalbaarheid van oxytocine of misoprostol in gezondheidsinstellingen de WHO-benchmark van 80% haalden, landen met beperkte middelen mechanismen zouden moeten onderzoeken om de behandeling van postpartumbloedingen te optimaliseren door de toegang tot misoprostol te verbeteren, vooral in landelijke gebieden.

Hoofdstuk 3.4 toont trends in de toegang tot eerstelijns antimalariabehandeling en diagnostiek in de particuliere sector in Oeganda tussen 2007 en 2018. Malaria is de grootste oorzaak van ziekte in Oeganda en treft vooral zwangere vrouwen en kinderen onder de vijf jaar. Nadat het Global Fund sinds 2008 verschillende financieringsstromen voor malariabestrijding in Oeganda had uitgerold, onderzocht de studie de beschikbaarheid en betaalbaarheid van eerstelijnsbehandeling en diagnostiek van malaria in de particuliere sector, die het eerste aanspreekpunt is voor 61% van de huishoudens in Oeganda.

Tussen 2007 en 2018 zijn cross-sectionele onderzoeken uitgevoerd op basis van de gestandaardiseerde WHO/HAI-methodologie die is aangepast om de beschikbaarheid, patiëntenprijzen en betaalbaarheid van ACT-medicijnen op particuliere verkooppunten te beoordelen. Er werden minimaal 30 verkooppunten per jaar onderzocht, zoals voorgeschreven door de gestandaardiseerde methodologie. Beschikbaarheid, patiëntprijzen en betaalbaarheid van diagnostische sneltesten voor malaria werd ook onderzocht vanaf 2012 na de introductie van het 'test and treat'-beleid in 2010. De mediane patiëntenprijzen voor de op artemisinine gebaseerde combinaties en sneltesten werden berekend in US dollar (USD). De betaalbaarheid werd beoordeeld door het aantal daglonen te berekenen dat de laagstbetaalde overheidsmedewerker moest betalen om een behandeling voor acute malaria aan te schaffen.

De beschikbaarheid van artemether/lumefantrine (A/L), het eerstelijns ACT-medicijn, steeg tijdens de onderzoeksperiode van 85% naar 100% in de instellingen van de particuliere sector. Er was echter een lage beschikbaarheid van diagnostische tests in instellingen in de particuliere sector, variërend tussen 13% (2012) en 37% (2018). Er was een grote daling van de patiëntenprijzen voor een behandelingskuur van A/L voor volwassenen van 8,8 dollar in 2007 tot 1,1 dollar in 2018, terwijl de prijs van diagnostische sneltests grotendeels stagneerde op 0,5 dollar. De betaalbaarheid van ACT-geneesmiddelen en diagnostische sneltests lag voor de laagstbetaalde overheidsmedewerker onder het dagloon.

Concluderend kan worden gesteld dat de beschikbaarheid van ACT-geneesmiddelen in de apotheken in de particuliere sector is toegenomen tot 100%, terwijl de beschikbaarheid van diagnostische testen laag bleef. Hoewel de malariabehandeling betaalbaar was, bleef de prijs van diagnostische testen stagneren en namen de cumulatieve kosten van malariabehandeling toe. In de toekomst is het daarom te overwegen om diagnostische kits in het subsidieprogramma op te nemen om de malariabehandeling nog betaalbaarder te maken.

Hoofdstuk 4 trekt lessen uit de verschillende onderzoeken die in het proefschrift zijn uitgevoerd, presenteert conclusies en beleidsaanbevelingen en belicht methodologische uitdagingen en verbeterpunten, evenals adviezen voor toekomstige studies op dit gebied.

Dit proefschrift biedt kansen voor de internationale gemeenschap en nationale regeringen om de hiaten op het gebied van SRG, geïdentificeerd in de casestudies van dit proefschrift, aan te pakken. Deze omvatten:

- **Verhoogde en duurzame financiering van SRGR door landen en donoren.**

- **Gebruik van mensenrechtenprincipes als leidraad voor beleidsontwikkeling en -implementatie.**

- **Versterking van het gezondheidssysteem.**

- **Zorgen dat het SRG-beleid een prioriteit voor de politiek wordt.**

- **Versterking van de vraag naar SRG door mythes uit sociaal-culturele overtuigingen en praktijken aan te pakken.**

- **De noodzaak tot consensus over SRG-indicatoren en de manier waarop ze gemeten worden.**

- **Technologische innovatie om voortdurend nieuwe geneesmiddelen te onderzoeken en te ontwikkelen die aan de behoeften van de bevolking voldoen, met name in achtergestelde gebieden.**

- **Aanpak van de gevolgen van COVID-19 op SRG.**

Concluderend blijft de beschikbaarheid en betaalbaarheid van SRG-producten in laag- en middeninkomens landen een uitdaging. Daarom moeten regeringen de investeringen voor SRGR verhogen om te voldoen aan de verplichtingen jegens hun burgers. De internationale gemeenschap moet ook ontwikkelingslanden hulp bieden die betrouwbaarder is om ervoor te zorgen dat gezondheid een gedeelde verantwoordelijkheid is voor iedereen.

6

ADDENDUM

6.1

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6.2

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6.3

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Denis Kibira started his PhD journey at the Utrecht WHO Collaborating Centre for Pharmaceutical Policy and Regulation, Division of Pharmacoepidemiology and Clinical Pharmacology, Utrecht Institute for Pharmaceutical Sciences (UIPS), Utrecht University, Utrecht, The Netherlands for Pharmaceutical Policy and Regulation at Utrecht University in 2016. He is a graduate (with honour) of Advanced Health Management Program co-delivered by the Yale School of Public Health and the Foundation for Professional Development in South Africa. He has a Master's in business administration degree (with distinction) from the Uganda Martyrs' University, Nkozi, Uganda and holds a Bachelor of Pharmacy degree (First Class) from the Rajiv Gandhi University of Technology in India. Additional qualifications include Post Graduate Diplomas in Total Quality Management and Public Health Management, a Diploma in United Nations and International Understanding and several short courses in Pharmaceutical Policy Analysis, Access to medicines and Intellectual Property, Medicines and Insurance coverage from institutions such as Harvard School of Public Health and WHO Collaborating Centre on Pharmaceutical Policy (Boston). Denis topped the central region in the Primary Leaving Education exams in Uganda in 1991 and was 37th in the Uganda Certificate of Education exams in 1995.

He is currently the Executive Director at the Coalition for Health Promotion and Social Development (HEPS Uganda) and was Regional Coordinator for the *Health Systems Advocacy Partnership* at Health Action International between 2016 and 2020. He is also the national coordinator of the Medicines Transparency Alliance (MeTA) in Uganda.

Denis is a pharmacist; a researcher with experience of over 100 health facility and household surveys and a health rights activist with extensive experience in public health systems, pharmaceutical policy, research and advocacy including at regional and global level. He has experience in multi-stakeholder working and collaborations. He has served as Board Chairman for the Initiative for Social and Economic Rights from 2012. He has represented civil society organizations at various taskforces and technical working groups for the Ministry of Health in Uganda and in 2018/19 was a member of the WHO Guideline Development Group for the consolidated guidelines for selfcare interventions for sexual and reproductive health and rights. Denis is a member of Pharmaceutical Society of Uganda and the South African Institute of Healthcare Managers.