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Health Facility Challenges to Nurse and Midwife-Led PMTCT and Pediatric HIV Services in Eastern and Southern Africa

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ABSTRACT

Health Facility Challenges to Nurse and Midwife-Led PMTCT and Pediatric HIV Services in Eastern and Southern Africa

By Rebecca MacKay

Background: In eastern and southern Africa, almost 20 million people are living with HIV/AIDS; of these, about 40% are not receiving antiretroviral therapy (ART).[1] In response to challenges involving access to HIV services, one promising solution is to train and authorize nurses and midwives to routinely provide this care. Nurse-initiated and managed antiretroviral therapy (NIMART) is a form of task sharing in which nurses and midwives provide first-line ART and other HIV services. Little is known about the extent to which NIMART is being utilized, its effectiveness, and what challenges and opportunities it is presenting in health facilities. The purpose of this study was to identify perceived barriers to and facilitators of NIMART services in high volume, high-HIV burden health facilities – in relation to pregnant and breastfeeding women, HIV-exposed infants, and pediatric populations.

Methods: Questionnaires with health providers and in-depth interviews (IDIs) with clinical supervisors were conducted in select health facilities across 11 countries in eastern and southern Africa. Questionnaires were analyzed with descriptive statistics and qualitative methods were used to evaluate the IDIs. Results were then triangulated to elicit a more comprehensive understanding of perceptions about NIMART practice.

Results: In this study, 211 providers and 62 clinical supervisors participated across 30 health facilities. On average, providers had 10.33% higher positive responses for in-service training than pre-service training, supervisors in 9 countries identified strengthening in-service training as a desired facilitator. Supervisors in 6 countries identified supportive supervision and clinical mentorship as a challenge, supervisors in 8 countries wanted to improve it, and it received the highest percentage of negative responses by providers (PBFW=33.8%; HEI=35.8%; Peds= 41.7%). Pediatric HIV services consistently received more negative responses as compared to PBFW or HEI.

Discussion: Findings are consistent with other studies concluding that supportive supervision and clinical mentorship are barriers to NIMART services. Limited pre-service training and continuing professional development impact the effectiveness of care provision. The lack of competence in pediatric HIV care provision is likely due to lack of pre-service training or continuing professional development for midwives and nurse-midwives. A standardized NIMART training is recommended for PMTCT and pediatric HIV service providers.

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CHAPTER 1: Introduction

BACKGROUND OF THE PROBLEM

HIV/AIDS has been one of the most talked about diseases of the last three decades and still remains one of the world's most significant public health challenges.[2] While substantial efforts have been made towards treatment and prevention methods, at the end of 2016, around 40 million people globally were living with HIV.[3] The highest prevalence of HIV infection is in sub-Saharan Africa, but this region has also shown the fastest progress in reducing the number of new adult infections and the sharpest decline in AIDS-related deaths.[1,4] In 2016, UNAIDS announced the Fast-Track Strategy, targets set to be achieved by 2020 and 2030. The 2020 targets consist of the 90-90-90 targets, for there to be fewer than 500,000 new infections annually, and zero discrimination.[5] In the 2017 Global AIDS Update, UNAIDS acknowledged that while new HIV infections are steadily declining, it is far from the pace needed to reach the 2020 targets.[1] Even if the 90-90-90 targets are acheived by 2020, 27% of people living with HIV/AIDS (PLWH) would still have unsupressed viral loads.[5] The UNAIDS' overall goal is to end the AIDS epidemic by 2030, meaning it will no longer be seen as a global health threat.[5] To accomplish this there needs to be universal access to antiretroviral therapies (ART).

The UNAIDS most current statistics show that on average 57% of PLWH globally are receving ART, eastern and southern Africa is doing slightly better than average, with 60% of PLWH in that region receiving ART.[1,3] However, nearly 8 million PLWH in eastern and southern Africa are not receiving treatment.[3] In eastern and southern Africa, women have a higher ART coverage rate than men, yet young women still have higher rates of new HIV infection than young men; in 2016, young women ages 15-24 only made up 10% of the population but accounted for 26% of new HIV infections.[1] Children can be infected during

childbirth or breastfeeding which is why it is so important that pregnant and breastfeeding women (PBFW) are virally suppressed. Because greater emphasis has only been put on prevention of mother-to-child transmission (PMTCT) and pediatric HIV services in recent years, there are still many older children living with HIV that were infected at birth. These populations must be receiving ART and become virally suppressed in order to achieve the 2030 goal of ending the AIDS epidemic.

AFRICAN HEALTH PROFESSIONALS REGIONAL COLLABORATIVE

This thesis project was completed in collaboration with African Health Professionals Regional Collaborative (ARC), an initiative supported by the President's Emergency Plan for AIDS Relief (PEPFAR) through the U.S. Centers for Disease Control and Prevention (CDC) and implemented by Emory University Nell Hodgson Woodruff School of Nursing, in partnership with the Commonwealth Nurses and Midwives Federation, and the East, Central and Southern Africa Health Community (ECSA). ARC was established in 2011 and worked across 17 countries in sub-Saharan Africa, with objectives aimed to ensure the quality standards of nursing and midwifery align with global standards, to advance nursing and midwifery regulatory frameworks, and to strengthen organizational capacity and nursing leadership.[6] Before ending in 2017, ARC awarded approximately 10 grants each year to address key barriers to the quality of nursing and midwifery practice at the facility level.[7] In 2016, ARC conducted facility assessments in 14 countries to better understand implementation and quality of PMTCT and pediatric HIV services provided by nurses and midwives.

My involvement in ARC included data management and analysis of the base-line and end-line facility assessment data submitted to Emory University from ARC country teams. This included completing the data analysis forms that county teams failed to submit or completed

incorrectly and entering the data from questionnaires into Microsoft Excel, to calculate descriptive statistics. Three countries, Cameroon, Cote d'Ivoire, and the Democratic Republic of the Congo were not included in my thesis analysis because ARC categorized them as West African countries and I only focused on eastern and southern African countries in this thesis.

I had the opportunity to travel to Lusaka, Zambia in July 2017 to participate in the ARC East Summative Congress. At the congress I presented on data management and how end-line results should be cleaned and submitted to Emory University. As a result, much of the end-line data was submitted to us much cleaner than the base-line. Each of the 2016 ARC grantees chose to implement a quality improvement project in at least one facility to address what they considered the greatest need e.g. projects involving clinical mentorship, health information systems, and continuing professional development. Originally, it was expected that end-line data collection would occur at least a year after base-line to see the impact the projects had at the facility level. But because ARC funding was not renewed, the projects were cut short and end-line data had to be collected after only six months. My thesis focuses on health facility challenges to nurse and midwife-led PMTCT and pediatric HIV services, therefore I did not compare and contrast base-line to end-line data because not much change occurred in the six months between data collection.

STATEMENT OF THE PROBLEM

Barriers to accessing treatment exist at individual, community, facility, and national levels. The Ministries of Health in eastern and southern Africa support the World Health Organization's (WHO) "Treat All" approach, in which, regardless of CD4 count or age, everyone with HIV should have access to ART.[1] Some reasons why ART coverage falls short include high-HIV prevalence, insufficient economic resources (particularly foreign aid),

household income level and costs of treatment, and shortage of providers authorized to provide HIV care.[1,8] There is an extreme shortage of physicians in sub-Saharan Africa, therefore non-physician health providers such as nurses and midwives need to be authorized to initiate and manage ART.[9] Task-sharing is being practiced across different cadres and more nurses and midwives are the primary healthcare providers of ART services, but many challenges still exist.[10] Some of the challenges include, a knowledge gap between training on nurse-initiated and managed ART (NIMART) and provision of NIMART services, maintaining quality and safety, overcoming professional and institutional resistance, and managing job dissatisfaction due to increased workload and poor salaries.[11] These challenges notwithstanding, NIMART appears to be an essential part of any strategy to increase access to HIV care and improve ART coverage. What is critical at this point is to better understand to what extent NIMART is being implemented in high-HIV burden health facilities, and what conditions support and do not support the successful implementation of this model of care – both at the facility level and within the broader healthcare system.

PURPOSE OF THE STUDY

The purpose of this study was to identify perceived barriers to and facilitators for NIMART services in high volume, high-HIV burden health facilities across 11 countries in eastern and southern Africa – specifically in relation to PBFW, HIV-exposed infants (HEI), and children and adolescents. The specific goals of this study were to: 1) evaluate perceptions of nurses, midwives, and nurse-midwives regarding selected facilitators of NIMART; 2) assess barriers to and facilitators for NIMART from the perspective of clinical supervisors; and 3) triangulate the findings from health providers and clinical supervisors to elicit a more comprehensive understanding of conditions affecting current NIMART practice.

SIGNIFICANCE STATEMENT

To adequately address the challenges faced by health providers on the provision of NIMART services in high volume, high-HIV burden health facilities, there needs to not only be change at the facility level, but in all levels of the health system. This study can be used to inform local and regional Ministries of Health and Health Bureaus of these challenges and help design interventions to address them.

DEFINITION OF TERMS

ACT	the Accelerating Children's HIV/AIDS Treatment Initiative
ARC	African Health Professionals Regional Collaborative
ART	Anti-retroviral therapies
ARV	Antiretroviral drugs
CDC	Centers for Disease Control and Prevention
CHW	Community health worker
DREAMS	Determined, Resilient, Empowered, AIDS-free, Mentored, and Safe women
Global Plan	the Global Plan towards the elimination of new HIV infections among children and keeping their mothers alive
HEI	HIV-exposed infants
HIV/AIDS	Human immunodeficiency virus/acquired immune deficiency syndrome
IDI	In-depth interview
LMICs	Low- and middle-income countries
MDGs	Millennium Development Goals
MTCT	Mother-to-child transmission
NIMART	Nurse-initiated and managed antiretroviral therapy
PBFW	Pregnant and breastfeeding women
Peds	Ages 1 to 19 years (Used in paper short for children and adolescents)
PEPFAR	President's Emergency Plan for AIDS Relief
PLWH	People living with HIV/AIDS
PMTCT	Prevention of mother-to-child transmission
PrEP	Pre-exposure prophylaxis
SDGs	Sustainable Development Goals
Three Frees	Start Free, Stay Free, AIDS Free
UNAIDS	Join United Nations Programme on HIV
WHO	World Health Organization

CHAPTER 2: Review of the Literature

INTRODUCTION

The first of December is World AIDS Day, which serves as a reminder for people worldwide to unite in the fight against HIV, support those living with HIV, and remember those who have died from AIDS or an AIDS-related illness.[12] Around this same time each year, UNAIDS publishes its annual "Global AIDS Update," a comprehensive report that provides the most recent information towards the global progress of ending the HIV epidemic. According to UNAIDS, in 2016 there were 36.7 million [30.8 million - 42.9 million] people globally living with HIV.[3] Of these 36.7 million, 20.9 million people living with HIV/AIDS (PLWH) were receiving antiretroviral therapy (ART) in 2017.[2] Overall, the number of new HIV infections is steadily decreasing worldwide; since 2010, infections have declined by about 16% annually.[1] While the pace of this decline appears to vary by age, gender, and geography, the association between ART use in pregnant women and decline of new infections in children is apparent; since 2010 the world has seen ART coverage increase from 47% [38-55%] to 76% [60-88%], and in the same period, a decline of 47% in new infections among children.[1]

Sub-Saharan Africa is the region most affected by HIV; over 50% of the PLWH and a majority of the world's new infections are in sub-Saharan Africa.[8] Even though this region accounts for the most number of new infections annually, it also has shown the fastest progress in reducing the number of new adult infections and the sharpest decline in AIDS-related deaths.[1,4] Outside of sub-Saharan Africa, key populations, including people who inject drugs, sex workers, transgender people, prisoners, and men who have sex with men, account for a majority of new HIV infections, but in sub-Saharan Africa, young women ages 15 to 24 are disproportionately affected.[1] In 2015, the global distribution of new HIV infections among adults

was 47% among females and 53% among males; in sub-Saharan Africa, however, this distribution was 56% among females and 43% among males.[4] To achieve the goal of ending the global HIV/AIDS epidemic, women in this part of the world need increased attention and improved HIV care.

This literature review will describe the global targets for HIV reduction, progress towards these targets, and challenges that still need to be overcome to meet them. Next, it will provide an in-depth look at the status of HIV in eastern and southern Africa, with specific emphasis on preventing mother-to-child transmission (PMTCT) and pediatric HIV care. In relation to these populations, the review will then consider the topics of coverage and access to ART in this region, including gaps in the provision of HIV care and treatment and the important role that nurse and midwife-led HIV care can play in closing these gaps.

GLOBAL TARGETS FOR HIV REDUCTION

Since 2000, numerous initiatives have been established that, either in whole or in part, seek to put an end to HIV/AIDS. The Millennium Development Goals (MDGs) and Sustainable Development Goals (SDGs) address many broad issues related to health and development, including gender inequality, lack of education, extreme poverty and diseases such as HIV/AIDS, malaria, and tuberculosis. The MDGs spanned 15 years from 2000 to 2015 and were replaced by the SDGS, which will last until 2030. In 2014, UNAIDS launched its HIV-specific "Fast-Track Targets," which include specific targets for 2020 en route to eradicating the HIV/AIDS epidemic by 2030.[5] In recent years, UNAIDS has launched additional initiatives with a more specific geographical focus on the highest HIV burden regions, and a population focus of women and children. These initiatives receive the majority of their funding from the President's Emergency

Plan for AIDS Relief (PEPFAR), The Global Fund to Fight AIDS, Tuberculosis and Malaria (The Global Fund), and the Bill and Melinda Gates Foundation.

From the MDGs to the SDGs

HIV/AIDS fell under MDG Goal 6, “Combat HIV/AIDS, malaria and other diseases." Under Goal 6 existed three targets, two of which related to HIV/AIDS and are presented in Table 1. Targets 6A and 6B were not met in most regions of the world but there was enormous progress made towards achieving each goal. The final Millennium Development Goals Report of 2015 summarized the status of each goal. Under Goal 6, new HIV infections fell by approximately 40% between 2000 and 2013 and 13.6 million PLWH were receiving ART by June 2014, compared to only 800,000 people in 2003, a 1600% increase.[13] Sub-Saharan Africa continued to be the region with the highest percentage of new infections (more than 75% in 2013), but did show progress towards the decrease of new infections. South Africa, the country with the highest number of PLWH, also had the largest decline in the absolute number of new infections.[13,14] Even though progress has been made in decreasing the number of new infections in sub-Saharan Africa, there were still challenges that hindered the success of MDG 6. For example, only 30% of young women and 37% of young men, ages 15 to 24 had a comprehensive and correct knowledge of HIV in 2014.[13] The MDGs were the first attempt to create a global plan to fight poverty. After valuable lessons learned, the eight goals of the MDGs have been adapted and added to, to create the SDGs.

Table 1: Select Targets of MDG 6 [15]

Target 6A	Have halted by 2015 and begun to reverse the spread of HIV/AIDS.
Target 6B	Achieve, by 2010, universal access to treatment for HIV/AIDS for all those who need it.
Target 6C	Have halted by 2015 and begun to reverse the incidence of malaria and other major diseases.

After the MDGs were not met in most areas of the world it seemed unrealistic to have a higher number of SDGS, and while still unlikely that all goals will be completed, it is the hope that more of the targets under the goals will be met. To be achieved by the year 2030, the SDGs are much more interdependent and take a bottom-up approach in contrast to the top-down approach of the MDGs.[16] The MDGs were created by wealthy actors to help the world's poor, which emphasizes the divide of a Global North and Global South. The SDGs' bottom-up approach is inclusive of all stakeholders and the goals are universal, not specific to less-developed nations. As a result of this change, halting and reversing the spread of HIV is no longer its own goal but rather relies on the progress and success of other, broader goals. For example, HIV is specifically mentioned under target 3.3 of Goal 3, "Good Health and Well-Being," which aims to end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases (p. 2)."[16] Table 2 highlights the interdependence of the SDGs by describing how factors other than improved health impact HIV; this demonstrates why success in each goal is important to combating HIV/AIDS.

Table 2: SDGs and their impact on HIV [16-18]

Goal	Impact	Example
Goal 1: No Poverty	Poverty can make people more vulnerable to HIV infection	People may turn to risky behaviors such as prostitution to pay for their basic needs, putting them at higher risk for HIV
Goal 2: Zero hunger	Not taking medication consistently, one is less likely to benefit fully and suppress the virus	People are less likely to adhere to their treatment if they cannot eat; often due to a lack of a consistent food source
Goal 5: Gender equality	Due to gender inequality women and girls are disproportionately vulnerable to and affected by, HIV infection	Child marriage, transactional sex between young women and older men, and lack of access to sexual and reproductive health services
Goal 9: Industry, innovation and infrastructure	Researchers and scientists continue to improve the efficacy of ART and pursue a cure for HIV	Treatment for HIV and infrastructure for more efficient and widespread distribution need to be improved for ART to be universally accessible
Goal 10: Reduce Inequalities	Income inequality, stigma, and discrimination is a major contributor to higher HIV prevalence in key populations such as young people, sex workers, men who have sex with men, injection drug users, transgender people and prisoners, as well as migrants	There is a need for a combination of preventative services and for these populations to be empowered to protect themselves from HIV
Goal 16: Peace, Justice and Strong Institutions	There are still laws that block the effectiveness of responses to HIV	These punitive laws, policies, practices, stigma and discrimination must be removed
Goal 17: Partnerships for the Goals	A global collective action is needed to improve access and affordability of HIV commodities	Strengthening partnerships will increase the awareness and knowledge, and help gain the power and support needed to influence policy-makers and stakeholders to take action

The UN Fast-Track Strategy

Far more specific to HIV than to broader economic and health development efforts, the UNAIDS Fast-Track Strategy was developed to end the AIDS epidemic by 2030. Under this strategy there are two sets of targets to be achieved, the first by 2020 and the second by 2030. The first of Fast-Track targets which began in 2016, are the 90-90-90 targets, to reduce both the annual number of people newly infected with HIV and people dying from AIDS-related causes to 500,000, and to achieve zero discrimination.[5,18] The 90-90-90 targets are monitored using

three indicators: 1) 90% of all people living with HIV will know their HIV status, 2) 90% of all people diagnosed with HIV infection will receive sustained ART, and 3) 90% of all people receiving ART will have viral suppression. After only two years, in 2016, 163 countries were reporting on at least one of the indicators of the 90-90-90 targets.[19] Data show that in 2016, 70% [51-84%] of PLWH new their status, 77% [57%-89%] of those who knew their status accessed ART, and 82% [60%-89%] of those on ART demonstrated suppressed viral loads.[1]

UNAIDS has identified specific actions that need to be taken to achieve the 90-90-90 target. First, because knowledge of HIV status showed the least progress, it is necessary to devote more effort to strategies that promote HIV testing. A rapid roll-out and promotion of self-testing is one of several strategies being made to increase testing. Self-testing moves the locus of testing from health facilities to the community setting, which can decrease stigmatization and other factors that keep individuals from seeking care.[1] To achieve the second 90 target, it is critical that a “treat all” approach, where everyone is afforded treatment regardless of their CD4 count and same-day ART initiation are adopted.[1] These strategies will require increased investment in community engagement to decrease the time it takes for newly diagnosed individuals to be provided with.[1] Lastly, even though the third 90 target exhibits the highest degree of success, it is critical that treatment programs systematically support patient adherence and reduce the number of patients lost to follow-up.[1]

It is important to recognize is that even if all three of the 90-90-90 targets are reached by 2020, 27% of PLWH will still have unsuppressed viral loads.[5] Great progress is being made towards reaching these goals, and even though some countries remain far behind others, attainment is possible. In the 2017 UNAIDS Global AIDS Update, it is stated that, "Global attainment of all three 90s by 2020 is both feasible and reachable if gaps across the HIV testing

and treatment cascade are aggressively addressed (p. 30)."[1] If the 2020 targets are met, only then is it possible to achieve the 2030 Fast-Track targets: the 95-95-95 targets, with the same indicators as 90-90-90 but to be achieved in the 95th percentile, to have fewer than 200,000 new infections among adults, and zero discrimination by 2030.[5,20] To accomplish these highly ambitious targets, interventions other than testing to know HIV status need to be increased in all areas of the world. Suggested interventions include, but are not limited to, use of condoms, voluntary medical male circumcision, pre-exposure prophylaxis (PrEP), and efforts to protect human rights and establishing an enabling environment for service delivery.[1] With an effort to make the largest impact as possible by 2020 and position the global community to reach the 2030 goal, a recognized need is to focus on children, adolescents and women.

Additional Initiatives and Targets

A number of additional initiatives focus on more specific populations disproportionately affected by HIV, such as women, infants, and adolescents. For example, the Global Plan towards the elimination of new HIV infections among children and keeping their mothers alive (Global Plan) was implemented in the 22 low- and middle-income countries (LMICs) (21 in sub-Saharan Africa) with the highest estimated numbers of pregnant women living with HIV.[21,22] This global initiative was led by UNAIDS in partnership with PEPFAR, and was launched in 2011 with a goal of completion by the end of 2015. The Global Plan had two global targets: 1) to reduce the number of new HIV infections among children by 90%, and 2) to reduce the number of AIDS-related maternal deaths by 50%.[21]

Monitoring of these broad targets was accomplished by using a set of 10 sub-targets that include efforts to increase ART coverage, increase availability of family planning resources, and decrease the number of HIV infections in women of reproductive age.[22] India was removed from

the list of 22 priority countries in 2014, when the UNAIDS compiled a progress report and at the time of preparation India's data was not available.[22] By the end of 2014, there was 170,000 new infections among children in the Global Plan priority countries, this was a 48% decrease from the number of children with new infections in 2009.[21] This showed a steady decline, but as predicted in the UNAIDS 2015 Progress Report, the targets were not met by the end of 2015. Target 1 showed that by the end of 2015 there was a collective decrease of 60% of new infections among children.[22] Target 2 was close to being accomplished in the 21 target countries as the number of AIDS-related deaths decreased by 46% between 2009 and 2015.[23] Since the launch in 2011, there has been great global progress in preventing mother-to-child transmission of HIV. In an effort to continue this progress the Start Free, Stay Free, AIDS Free, or the "Three Frees", initiative began in 2016.[24,25]

The Three Frees is UNAIDS and PEPFAR's current framework that aims to end the AIDS epidemic in children, adolescents and women by 2020.[25] This framework was specifically created to build on the progress of the Global Plan, and includes additional partners such as the DREAMS partnership, the Accelerating Children's HIV/AIDS Treatment (ACT) Initiative, All-In, and others.[25] The Three Frees initiative shared the 22 priority countries of the Global Plan, Angola, Botswana, Burundi, Cameroon, Chad, Cóte d'Ivoire, Democratic Republic of the Congo, Ethiopia, Ghana, India, Kenya, Lesotho, Malawi, Mozambique, Namibia, Nigeria, South Africa, Swaziland, Uganda, Tanzania, Zambia, and Zimbabwe, and also included Indonesia.[1] Eighty-eight percent of pregnant women with HIV live in the Three Frees priority countries.[1] Table 3 defines the six targets of Start Free, Stay Free, AIDS Free initiative, each corresponds to a particular aspect of HIV or AIDS prevention. Success of these targets would demonstrate potential to achieve the target of ending the AIDS epidemic by 2030.

Table 3: Start Free, Stay Free, AIDS Free Targets [25]

Start Free	▪ Eliminate new HIV infections among children (aged 0-14) by reducing the number of children newly infected annually to less than 40,000 by 2018 and 20,000 by 2020. ▪ Reach and sustain 95% of pregnancy women living with HIV with lifelong HIV treatment by 2018.
Stay Free	▪ Reduce the number of new HIV infections among adolescents and young women (aged 10-24) to less than 100,000 by 2020. ▪ Provide voluntary medical circumcision for HIV prevention to 25 million additional men by 2020, with a focus on young men (aged 10-29).
AIDS Free	▪ Provide 1.6 million children (aged 0-14) and 1.2 million adolescents (aged 15-19) living with HIV with antiretroviral therapy by 2018 ▪ Provide 1.4 million children (aged 014) and 1 million adolescents (aged 15-19) with HIV treatment by 2020.

Launched on World AIDS Day 2014, DREAMS is public-private partnership between PEPFAR, Johnson & Johnson, the Bill & Melinda Gates Foundation, Girl Effect, Gilead Sciences, and ViiV Healthcare.[26,27] DREAMS' goal is in its name, to help girls develop into **D**etermined, **R**esilient, **E**mpowered, **A**IDS-free, **M**entored, and **S**afe women, its overall goal was to reduce HIV incidence in females ages 15 to 24 by 40% in 2015.[26,28] DREAMS is currently working in the 10 highest-HIV burden countries and all 10 are part of the 23 Three Frees priority countries.[27] DREAMS has implemented programing in four key areas: empowering girls and young women, reducing risk of sex partners, strengthening families, and mobilizing communities for change.[26,28] To further progress towards its goal, DREAMS launched the Innovation Challenge by asking organizations in the 10 focus countries to submit ideas for innovative solutions to further DREAMS' commitment. Over 800 ideas were submitted in 684 organizations spanning across all 10 countries.[28] PEPFAR, Johnson & Johnson, and ViiV Healthcare each contributed a portion of an 85$ million investment to the DREAMS Innovation Challenge; 55 winners were selected and received funding ranging from $100,000 to $40 million.[29,30] The winners focused on one of DREAMS six focus areas: strengthening capacity of

communities to deliver services, keeping girls in secondary school, linking men to services, supporting PrEP, providing a bridge to employment, and applying data to increase impact.[30] The focus area, to keep girls in secondary schools received $40 million of the $85 million investment.[29]

Finally, in recent years, more focus has been put on reducing HIV in children and adolescents. In 2015, both the ACT Initiative and All In campaign began. The ACT Initiative is simply an allocated amount of money, provided by the partnership of PEPFAR and the Children's Investment Fund Foundation (CIFF), to be used to provide ART to children over two years.[31] It was predicted that the allotted $200 million would enable treatment for 300,000 children in nine of the 23 priority countries: Cameroon, Democratic Republic of Congo, Kenya, Lesotho, Malawi, Mozambique, Tanzania, Zambia, and Zimbabwe.[31] This goal was exceeded and by the end of the ACT initiative in 2016, 561,610 children living with HIV had access to ART.[32] All In, also referred to as All In to #EndAdolescentAIDS, is defined as, "a platform for action and collaboration to inspire a social movement to drive better results with and for adolescents through critical changes in programmes and policy (p.1)."[33] Instead of setting precise goals, All In is considered a Fast-Track target for adolescents, that builds upon the UNAIDS overall Fast-Track initiative for attaining the 90-90-90 targets.[33] The three goals All In set to achieve between 2015 to 2020 are to reduce new HIV infections among adolescents by at least 75%, reduce AIDS-related deaths among adolescents by at least 65%, and zero discrimination.[33]

HIV IN EASTERN AND SOUTHERN AFRICA: PROGRESS, CHALLENGES, AND STRATEGIES FOR ACHIEVING HIV TARGETS

Countries that UNAIDS consider the region of eastern and southern Africa are, Angola, Botswana, Comoros, Eritrea, Ethiopia, Kenya, Lesotho, Madagascar, Malawi, Mauritius, Mozambique, Namibia, Rwanda, Seychelles, South Africa, South Sudan, Swaziland, Tanzania,

Uganda, Zambia, and Zimbabwe. Although this region only makes up 6.2% of the global population, it accounts for over 50% of the world's HIV infections.[8] In 2016, in eastern and southern Africa there were 19.4 million [17.8 million – 21.1 million] PLWH.[12] Even though this region has made tremendous progress towards reaching the UNAIDS goals, for example, eastern and southern Africa has had the sharpest decline of AIDS related deaths since 2000 than any other region in the world, it still accounted for 43% of the global total of new infections in 2016.[1,12]

Progress and Challenges

In July 2015, UNAIDS published a press released stating that MDG 6 had been achieved and exceeded.[34] It provided the facts that new infections had fallen by 35% and AIDS-related deaths by 41% since the MDGs began.[34] Since target 6.A is to "halt and reverse the spread of HIV/AIDS", MDG 6 was not been achieved because there continues to be new infections. In 2016, eastern and southern Africa had 400,000 [310,000-500,000] new infections.[1] There are a variety of reasons why HIV persists in this region. For example, in 2014, less than 40% of youth ages 15 to 24 had a comprehensive and correct knowledge of HIV.[13] Men are less likely to have ever been tested for HIV and therefore are not in a position to know, or share, their HIV status.[35] Additionally, as of 2011, the rate of early infant diagnosis was very low, only 35% [29-41%] of infants born to HIV positive mothers received a HIV test in the first two months of life.[35] In five of the Global Plan priority countries, coverage was only as high as 10% for early infant diagnosis.[35]

In 2017, UNAIDS conducted a midterm progress analysis on the 90-90-90 targets and learned that eastern and southern Africa had made huge strides towards meeting them. While varying by country, by the end of 2016, 76% [61-86%] of PLWH in this region knew their status,

79% [64-89%] of those who knew their status were on treatment, and 85% [67-89%] of those on treatment had achieved a suppressed viral load.[1] When the percentage of those who are virally suppressed is measured against the amount of PLWH it translates into only 50% [40-57%] of PLWH in eastern and southern Africa are virally suppressed.[1] In the 2017 Global AIDS Update UNAIDS states that, "The amount of financial resources available to AIDS responses in the region is close to the level required to achieve the Fast-Track Targets by 2020 (p. 100)."[1] This means with continued financial support over the next couple years the 90-90-90 targets can be reached, making it very likely that the 95-95-95 targets will also be met by 2030.

It is important to note that in eastern and southern Africa women are disproportionately affected by HIV, and as a result, so are children. The UNAIDS 2014 Gap Report listed the four top reasons pregnant women and children are being left behind in the movement to end AIDS: limited access to sexual and reproductive health, limited access to HIV services, failure to prioritize children, and poorly integrated health-care services.[36] Young women (aged 15 to 24) only make up 10% of the population in eastern and southern Africa, but they also accounted for 26% of new HIV infections in 2016.[1] Therefore, as mentioned earlier, UNAIDS has increased the focus on reducing HIV in these populations through initiatives such as the Global Plan and the Three Frees. Since the launch of the Global Plan the decline of new infections in children has quadrupled and mother-to-child HIV transmission rates have declined greatly.[22] From 2009 to 2012, mother-to-child transmission rates declined from an estimated 26% [23-28%] to 17% [15-18%].[35] In 2014, the Global Plan's 21 priority countries had an overall transmission rate of 14% [12-16%] and in South Africa and Botswana it was as low as 4%, meeting the goal to reduce transmission in breastfeeding populations to 5%.[22] Despite this progress, there is a lack of treatment programs for children who do acquire infection. According to the 2015 Global Plan

progress report, by the end of 2014 only 31% [29-33%] of children living with HIV were receiving treatment, while this is a 21% increase from the start of the Global Plan, children are still half as likely to receive treatment than pregnant women.[22] To close this coverage gap there needs to be increased services for infants and children. Services include simple diagnostic services, training providers at all levels of the health system, and aligning clinic visits for the children with the mothers in order to support treatment retention.[22]

Now that the Global Plan has come to an end, the Three Frees initiative has maintained the same focus in this region. There has yet to be a progress report published on the Three Frees, but the 2017 UNAIDS Global AIDS Update does provide some information on its progress. As of 2016, the goal to diagnose and provide lifelong ART to at least 95% of pregnant and breastfeeding women (PBFW) living with HIV has been accomplished in five priority countries: Botswana, Namibia, South Africa, Swaziland, and Uganda.[1] Progress towards the goal of reaching 25 million voluntary medical male circumcisions by 2020 has started off slow. In 2015 and 2016 there were only about 2.6 million circumcisions per year across 14 of the priority countries, a decrease from the 3.2 million annual circumcisions that occurred from 2008 to 2014.[1] The goal to reduce new HIV infections among children to 40,000 by 2018 and 20,000 by 2020 is well on its way to being achieved.[25] In 2015, the number of new infections among children was 110,000 [78,000- 150,000] in the Global Plan countries.[25] In eastern and southern Africa, from 2010 to 2016, new infections in children dropped 56%, from 170,000 [140,000-210,000] to 77,000 [52,000-110,000].[1] This significant drop can be attributed to wider ART coverage.

ART Coverage and Access

The World Health Organization (WHO) "Guidelines for the use of ART among adults and adolescents" were originally published in 2002, but the most inclusive and comprehensive guidelines were published in 2013, titled the "consolidated guidelines on the use of antiretroviral (ARV) drugs for treating and preventing HIV infection", or the 2013 "WHO consolidated ARV guidelines", for short.[37,38] These were the first set of guidelines that addressed the use of ARV drugs for treatment and preventions across all age groups and populations, including adults, PBFW, adolescents, children and other key populations.[37,39] Full implementation of the 2013 WHO Guidelines could reduce the total number of annual AIDS-related deaths from 1.7 million in 2011 to about 800,000 in 2025.[35] While this target is not as ambitious as the Fast-Track Target of reducing the number of AIDS-related deaths to 500,000 by 2020, it is on track to being achieved; at the end of 2014 deaths had been reduced to 1.2 million, to 1.1 million at the end of 2015, and finally to 1 million in 2016.[19,35,40]

The scale up of ART averted an estimated 4.2 million deaths in LMICs from 2002-2012.[12,35] In 2013, UNAIDS launched the initiative Treatment 2015 alongside the WHO consolidated ARV guidelines, the goal was to provide HIV treatment to 15 million people by 2015; the target was not only met but exceeded by 2 million.[4,41,42] In 2015, WHO added an additional guideline that recommended ART initiation for all PLWH regardless of their CD4 count.[43,44] In 2016, the most recent version of the consolidated guidelines was published and this was the first time the WHO recommended that all PLWH be provided with ART.[45] ART coverage continues to climb, and in mid-2017 the WHO estimated that 20.9 million PLWH were receiving ART.[2] As stated earlier, at the end of 2016, 79% of PLWH in eastern and southern Africa knew their HIV status and are receiving ART coverage. This translates to 60% [48-68%]

of all PLWH in this region were receiving ART coverage by the end of 2016, or 11.7 million [10.3-12.1 million] of the 19.4 million PLWH.[1,12] UNAIDS most recent update reported that in June 2017, 12.5 million [11.0 million-13.0 million] PLWH in eastern and southern Africa were accessing ART.[12] With a little less than 40% of PLWH not receiving treatment, there is still a lot of work that needs to be done to accomplish universal coverage.

An analysis conducted on National AIDS Spending Assessment data in 38 LMICs demonstrated a positive correlation between average spending on HIV care and treatment and ART coverage, between 2009 and 2013.[43] The total spending of Nigeria and Swaziland were analyzed more in-depth and compared to the number of AIDS-related deaths. Very different results were seen in the two countries. As spending increased, the estimated number of AIDS-related deaths in Nigeria increase from 2009 to 2012, it was not until 2013 that they declined, while in Swaziland, the number of AIDS-related deaths continued decreasing from 2009 to 2013.[43] One reason why these countries may have had such different outcomes is because of how they chose to allocate funds for HIV care. Of the 38 LMICs analyzed in this study, only 15 allocated more than 50% of their funding towards HIV care and treatment.[43] There were few to no health facilities that focus on children and adolescent HIV care and treatment, and children living with HIV were one third less likely to receive ART compared to adults.[36] As of 2016, in eastern and southern Africa, the percentage of children (aged 0 to 14) accessing ART was 51% [37-65%], compared to 89% [71-95%] of pregnant women accessing ART for PMTCT.[12,46] Some of the reasons why ART coverage is still falling short include high-HIV prevalence, amount of economic resources (particularly foreign aid), household income level and expense of treatment, and shortage of providers authorized to provide HIV care.[1,8]

The Role of Nurses and Midwives in ART Coverage and Access

The shortage of healthcare providers who provide HIV care in eastern and southern Africa could affect the chances of the UNAIDS Fast-Track strategy being accomplished by 2030. Doctor may only visit rural health facilities a couple times a year, so it is far more likely that nurses, midwives and community health workers staff these facilities. Table 4 shows the WHO's most recent estimates of nurse and midwifery personnel and physicians per 1000 population in the 11 eastern and southern African countries surveyed in the following study. The ratio of nurses and midwifes ranges from 0.25 to 1.58 per 1000 population and the ratio of physicians ranges from 0.02 to 0.20 per 1000 population. [47] To increase access to HIV care, nurses and midwives must have a more definitive role in providing ART. An organized effort to make this happen began in 2008, when WHO published global recommendations and guidelines on task shifting.[14] In sum, these guidelines "propose the adoption or expansion of a task shifting approach as one method of strengthening and expanding the health workforce to rapidly increase access to HIV and other health services (p.8)."[14] According to these guidelines, nurses are allowed to execute almost every task a medical doctor or non-physician clinician would provide to a PLWH as long as they have the appropriate training and supervision for the task they are performing.[14] The only things nurses are not allowed to do are to supervise other health professionals, perform surgeries, manage complex complications, or prescribe second- or third-line ART regimens.[14]

Table 4. Ratio of health providers per 1,000 population in surveyed countries (n=11)[47]

Country	Ratio of Nurse and midwifery personnel to 1,000 population	Ratio of Physicians to 1,000 population
Ethiopia	0.252	0.025
Lesotho	0.591	0.047
Kenya	1.582	0.204
Malawi	0.336	0.018
Mozambique	0.401	0.055
Rwanda	0.832	0.064
Swaziland	1.386	0.147
Tanzania	0.416	0.022
Uganda	0.648	0.093
Zambia	0.886	0.091
Zimbabwe	1.167	0.077

Task shifting refers to the transferring of tasks from one professional cadre to others that would not normally complete those tasks within their scope of practice.[14,48] Tasks are typically transferred from highly qualified health workers to those who are considered to be less qualified, to make more efficient use of available resources.[49] When referring to task-shifting in the context of HIV, four levels of task shifting have been identified after medical doctors: from non-physician clinicians, to nurses and midwives, to lay health workers or community health workers and then to people living with HIV to self-manage aspects of their care.[14,48] Self-testing kits and drug regimens continue to become easier and more affordable, allowing PLWH to have more control over their treatment, but their overall care should still be managed by health professionals.

Use of the term "task sharing" may be preferred over "task shifting" because it implies a team approach rather than a supervisorial approach.[49] Nurse-initiated and managed antiretroviral therapy (NIMART) reflects the important role that nurses and midwives play in providing HIV services. Specifically, NIMART is a form of task sharing in which nurses provide more

advanced services, such as diagnosis and clinical staging of HIV, prescribing of ART, and clinical management of treatment-related conditions and opportunistic infections and referring patients to physicians when needed.[14,50,51] NIMART is an important strategy to increase ART coverage and access in LMICs with a major shortage of physician providers.[50]

A systematic review conducted on task-sharing from nurses to physicians in HIV settings in Africa analyzed 11 studies in 6 countries and found that task-sharing was associated with improved reported morale and confidence among nurses, higher levels of retention and loss-to-follow up among patients (compared to physician-managed ART), and was preferred by most patients.[10] While NIMART has many advantages, such as health-system efficacy, enhancing the role of the community, and cost advantages, it also has challenges, including maintaining quality and safety, professional and institutional resistance, and job dissatisfaction due to poor salaries.[11] A challenge identified in numerous African countries was that nurses and midwives usually only received a maximum of a few weeks of training on NIMART.[52] In 2014, after receiving NIMART training, nurses and midwives were not recognized for having this specialization, no license or recognizable credentials existed and the training was not even accredited or approved by national nursing and midwifery councils.[52] But the next year, another article on the trends of task shifting in HIV treatment in Africa stated that WHO does recommend "accreditation and certification programmes for newly trained health workers in order to provide career paths, as well as recognition of prior learning (p.5)."[48] However, many countries are not following WHO recommendation, and even when nurses and midwifes receive training on NIMART and have the authority to prescribe ART according to their Ministry of Health guidelines, this training it is not always officially recognized and nurses and midwives are still not receiving a license or specialized credentials.[48] This lack of official recognition can lead to confusion in scope of

practice and task sharing, diluting potential advances in access to care and ART coverage, especially when often there is no legal protection for health workers if they act outside of their scope of practice.[48,53]

SUMMARY OF MAIN PROBLEM AND STUDY RELEVANCE

Six out of 10 PLWH in eastern and southern Africa are receiving ART, despite this progress there are still 7.7 million PLWH in this region not receiving treatment.[3,5] In order to achieve the Fast-Track 2020 targets in eastern and southern Africa, 5.3 million more PLWH need to know their status, 5.2 million will need to initiate ART, and 5.3 million will need to achieve viral suppression.[8] If an individual does not know their status they will not seek treatment and the AIDS epidemic will persist. As mentioned earlier, young women and girls are most affected by HIV/AIDS in this region, but they can directly affect change by utilizing PMTCT services when pregnant and/or breastfeeding. It is also important to consider populations that cannot seek treatment on their own, for example HIV-exposed infants (HEI) must have their mothers advocate for their care. Additionally, children and adolescents who were infected at birth would not know to seek treatment unless their parents were to first tell them there is a possibility they are infected. While everyone has the right to treatment, it is not provided by just anyone; PLWH must work with medical doctors, non-physician clinicians, nurses and midwives, or community health workers to initiate and manage the use of ART.

Due to the extreme shortage of physicians in eastern and southern Africa, it is extremely important that nurses and midwives have the authority to provide HIV care. Previous research has demonstrated NIMART's success in various areas in sub-Saharan Africa, and although NIMART is now being implemented widely across most levels of the health system in this region, it is not without its flaws. [52] In order to move forward with continued progress, a

standardized set of NIMART training procedures that are universally recognized are needed. Currently, there is no incentive for nurses and midwives to participate in additional training. An accredited training course that health providers could leverage in their future career could prove invaluable.

The African Health Professions Regional Collaborative (ARC) is supported by the President's Emergency Plan for AIDS Relief (PEPFAR) through the Centers for Disease Control and Prevention (CDC) and implemented by Emory University Nell Hodgson Woodruff School of Nursing in partnership with the Lillian Carter Center for Global Health and Social Responsibility at Emory University, the Commonwealth Nurses and Midwives Federation, and the East, Central and Southern Africa Health Community.[51] The overall mission of ARC is to advance the nursing and midwifery regulation and standards in 17 sub-Saharan African countries.[7,52] In 2016 and 2017 the ARC country teams conducted facility assessments in up to three high volume, high-HIV burden facilities of their choice. Designed by ARC faculty at Emory University the facility assessment had three purposes, to 1) understand clinical supervisors' opinions on implementation and quality of NIMART services, 2) to assess the nurses' and midwives' attitudes and competence on implementation and quality of NIMART services, and 3) to conduct a facility audit of programs and materials that support NIMART services. In the following study, only parts of the facility assessment were analyzed for 11 of the 17 ARC countries.

What follows in this thesis is a descriptive assessment of the barriers to and facilitators for NIMART in high volume, high-HIV burden health facilities across 11 eastern and southern African countries. The study focuses on barriers to and facilitators for HIV care of 3 patient populations: PBFW, HIV-exposed infants, and children and adolescents. The analysis aims to understand the perspectives of clinical supervisors on facility level barriers to and facilitators for

NIMART services, to describe health providers' attitudes towards effective HIV care provision, and to compare perspectives between the supervisors and providers. Finally, this thesis will identify limitations to the study, make recommendations if the study were repeated or expanded, and call for further research.

CHAPTER 3: Manuscript

Health Facility Challenges to Nurse and Midwife-Led PMTCT and Pediatric HIV Services in Eastern and Southern Africa

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CONTRIBUTION OF STUDENT (For use at Emory University only)

For this manuscript, the student conducted all data analyses (quantitative and qualitative) and writing, with content and editorial assistance from the thesis advisor, Sydney Spangler.

ABSTRACT

Background: In eastern and southern Africa, almost 20 million people are living with HIV/AIDS; of these, about 40% are not receiving antiretroviral therapy (ART).[1] In response to challenges involving access to HIV services, one promising solution is to train and authorize nurses and midwives to routinely provide this care. Nurse-initiated and managed antiretroviral therapy (NIMART) is a form of task sharing in which nurses and midwives provide first-line ART and other HIV services. Little is known about the extent to which NIMART is being utilized, its effectiveness, and what challenges and opportunities it is presenting in health facilities. The purpose of this study was to identify perceived barriers to and facilitators of NIMART services in high volume, high-HIV burden health facilities – in relation to pregnant and breastfeeding women, HIV-exposed infants, and pediatric populations.

Methods: Questionnaires with health providers and in-depth interviews (IDIs) with clinical supervisors were conducted in select health facilities across 11 countries in eastern and southern Africa. Questionnaires were analyzed with descriptive statistics and qualitative methods were used to evaluate the IDIs. Results were then triangulated to elicit a more comprehensive understanding of perceptions about NIMART practice.

Results: In this study, 211 providers and 62 clinical supervisors participated across 30 health facilities. On average, providers had 10.33% higher positive responses for in-service training than pre-service training, supervisors in 9 countries identified strengthening in-service training as a desired facilitator. Supervisors in 6 countries identified supportive supervision and clinical

mentorship as a challenge, supervisors in 8 countries wanted to improve it, and it received the highest percentage of negative responses by providers (PBFW=33.8%; HEI=35.8%; Peds= 41.7%). Pediatric HIV services consistently received more negative responses as compared to PBFW or HEI.

Discussion: Findings are consistent with other studies concluding that supportive supervision and clinical mentorship are barriers to NIMART services. Limited pre-service training and continuing professional development impact the effectiveness of care provision. The lack of competence in pediatric HIV care provision is likely due to lack of pre-service training or continuing professional development for midwives and nurse-midwives. A standardized NIMART training is recommended for PMTCT and pediatric HIV service providers.

INTRODUCTION

At the end of 2016, 36.7 million people globally were living with HIV/AIDS, and 20.9 were receiving treatment.[2] Over the last decade, the number of new HIV infections has steadily decreased, as more people have had access to HIV care and antiretroviral therapy (ART). To build on this success, UNAIDS recently initiated its Fast-Track Strategy, which aims to end the HIV/AIDS epidemic by 2030. The global benchmarks to be achieved by 2020 are for 30 million HIV-infected people to be receiving treatment, new HIV infections to be fewer than 500,000 annually, and accomplishment of the 90-90-90 targets: 1) 90% of all people living with HIV (PLWH) know their HIV status, 2) 90% of all people diagnosed with HIV infection are receiving sustained ART, and 3) 90% of all people receiving ART are virally suppressed.[3] The second set of global benchmarks is for these same indicators to be achieved at 95 percent by 2030.[3] In 2017, UNAIDS reported that financial resources to meet the Fast-Track targets are close to sufficient, but they also warned that more progress must be made in combatting viral transmission.[1,4]

Encouragingly, the region that has shown the most progress towards the Fast-Track targets is eastern and southern Africa – which is also where over half the global population of PLWH reside.[1] From 2010 to 2016, this region saw the number of new HIV infections decrease by 29%, as compared to a decline of about 16% globally.[1] Similar to other regions, this drop has been greater among children than adults. Unlike other regions, however, women and girls are disproportionately affected by HIV/AIDS, accounting for 59% of the total number of PLWH in eastern and southern Africa as compared to 48% of PLWH globally.[4] Young women ages 15 to 24 are especially vulnerable; although they only consist of about 10% of the region's population, they account for 26% of new infections.[1] Reasons for this disparity stem from the complex workings of gender inequity, including child marriage, transactional sex between young women and older men, and lack of access to sexual and reproductive health services.[5] Access-related problems affect children living with HIV as well – particularly in terms of poor integration of maternal-newborn services and gaps in the continuum of HIV care and treatment. However, new HIV infections among children ages 0-14 are now decreasing due to improved maternal access to prevention of mother-to-child transmission (PMTCT) services.[5,6]

To support the global UNAIDS Fast-Track Strategy, additional strategies that specifically address deficiencies in HIV care for women and children are being implemented across sub-Saharan Africa. The Global Plan towards the elimination of new HIV infections among children and keeping their mothers alive (Global Plan) was the first of these narrowed initiatives. Launched in 2011, the Global Plan worked in 22 priority countries (21 in sub-Saharan Africa) to reduce the number of new infections from mother-to-child transmission (MTCT) and to reduce the number of AIDS-related maternal deaths. When the Global Plan ended in 2015, MTCT had dropped by 60%; the pace of decline of new infections in children quadrupled from a rate of 13%

between 2000 and 2008, to a rate of 48% from baseline in 2009 to the end of the Global Plan in 2015.[6,7] UNAIDS has continued this work with their new initiative, Start Free, Stay Free, AIDS Free or the "Three Frees."[8] The Three Frees initiative focuses on 23 priority countries, the same 22 as the Global Plan with the addition of Indonesia.[1] The Three Frees targets expand on those of the Global Plan and complement the 90-90-90 targets; for example, one of its goals is to provide lifelong ART to at least 95% of pregnant and breastfeeding women (PBFW) in the 23 priority countries. By 2016, this target had already been met in 5 of these countries.[1] Additional strategic efforts to improve the lives and health of HIV-infected young women and children in Africa include DREAMS, the Accelerating Children's HIV/AIDS Treatment Initiative (ACT), and the All In campaign.[9-11]

The aforementioned initiatives vary in a number of ways, but what they all share is a commitment to increasing access to HIV care and treatment among women, children, and adolescents. Even though access does not always translate to sustained care and treatment, ART initiation for all PLWH regardless of their CD4 count is a critical first step to eliminating this epidemic.[12,13] According to UNAIDS, around 53% of all PLWH had access to ART in 2016.[4] In eastern and southern Africa, this percentage was even higher at 60%; 67% of adult women and 51% of adult men.[4] However, despite the rapid progress that has been achieved over the last decade, the fact remains that 19.4 million people in eastern and southern Africa are living with HIV/AIDS and only about 11.7 million (60%) are receiving treatment.[4] This means that almost 8 million PLWH in this region are not receiving treatment, which is the largest number of PLWH not receiving treatment than in any other region of the world.[3,4] In order to reach the Fast-Track 2020 targets in eastern and southern Africa, over 5 million more PLWH need to know their status, initiate ART, and achieve viral suppression.[14] Some of the reasons ART coverage is still

falling short include high-HIV prevalence, insufficient economic resources (particularly foreign aid), household income level and costs of treatment, and shortage of providers authorized to provide HIV care.[1,14]

Currently sub-Saharan Africa is experiencing an extreme shortage of physicians, which means that rural health facilities are often staffed by providers such as nurses and clinical officers, with physicians providing care on a more limited basis (if at all).[15] When non-physician providers are not authorized to initiate and manage ART, access to this critical intervention is drastically limited. A recent study of 15 eastern and southern African countries demonstrates the ratio of healthcare providers to 1000 population, with physicians ranging from 0.01 to 1.06, and nurses from 0.24 to 3.20.[16,17] Because there are far more nurses and midwives than physicians in this region, it is imperative that these providers have a more definitive role in the provision of ART. Such expansion of scope of practice for clinical tasks across different healthcare cadres is often referred to as "task-shifting" or "task-sharing;" throughout this article, we use the term task sharing because it implies a team-based (versus hierarchical) approach that may result in more efficient and higher quality care.[18] According to the WHO recommendations for task shifting, the only tasks nurses are not authorized to perform include supervising other health professionals, performing surgeries, managing complex complications, and prescribing second- or third-line ART regimens.[19]

To reflect the important role nurses and midwives play in providing HIV services, the term NIMART is being used in reference to nurse-initiated and managed antiretroviral therapy. Specifically, NIMART is a form of task sharing in which nurses provide advanced HIV services, such as diagnosis and clinical staging of HIV, ART prescribing, and management of treatment-related conditions and opportunistic infections.[20] Although nurses and midwives often receive

training on NIMART and can prescribe ART according to Ministry of Health guidelines, this training it is not always officially recognized; i.e., nurses do not become licensed or receive specialized credentials.[21] This lack of official recognition can often lead to confusion in scope of practice and task sharing, diluting potential advances in access to care and ART coverage – a problem that is augmented when there is no legal protection for health workers if they act outside of their scope of practice.[21,22]

In addition to improved access to care, NIMART offers advantages in cost effectiveness, community relations, and overall health system efficacy.[23] A systematic review that included 11 studies in 6 African countries found that HIV task-sharing between physicians and nurses was associated with improved morale and confidence among nurses, higher levels of retention and lower levels of loss-to-follow up among patients (compared to physician-managed ART), and higher levels of patient satisfaction.[24] However, most sites in this study implemented NIMART in different ways and to different extents, highlighting the problem of standardization of care. Other challenges to NIMART include maintaining quality and safety, overcoming professional and institutional resistance, and managing job dissatisfaction due to increased workload and poor salaries.[23] These challenges notwithstanding, NIMART appears to be an essential part of any strategy to increase access to HIV care and improve ART coverage. What is critical at this point is to better understand to what extent NIMART is being implemented in high-HIV burden health facilities, and what conditions support and do not support the successful implementation of this model of care – both at the facility level and within the broader healthcare system.

To begin to address this gap in the knowledge base, the purpose of this study was to identify perceived barriers to and facilitators for NIMART services in high volume, high-HIV burden health facilities across eastern and southern Africa – specifically in relation to PBFW,

HIV-exposed infants (HEI), and children and adolescents (further referred to in this article as Peds). The specific goals of this study were to: 1) evaluate perceptions of nurses, midwives, and nurse-midwives regarding selected facilitators of NIMART; 2) assess barriers to and facilitators for NIMART from the perspective of clinical supervisors; and 3) triangulate the findings from health providers and clinical supervisors to elicit a more comprehensive understanding of conditions affecting current NIMART practice.

METHODS

This study was conducted as part of a broader needs assessment that aimed to improve quality of NIMART in participating health facilities in 11 eastern and southern African countries: Ethiopia, Kenya, Lesotho, Malawi, Mozambique, Rwanda, Swaziland, Tanzania, Uganda, Zambia and Zimbabwe. These countries were part of the 17 countries of the African Health Professionals Regional Collaborative (ARC), an initiative supported by the President's Emergency Plan for AIDS Relief (PEPFAR) through the U.S. Centers for Disease Control and Prevention (CDC) and implemented by Emory University Nell Hodgson Woodruff School of Nursing, in partnership with the Commonwealth Nurses and Midwives Federation, and the East, Central and Southern Africa Health Community (ECSA). The overarching purpose of ARC (2011-2017) was to build capacity among national nurse and midwife leaders (Ministry of Health Chief Nursing Officers, Registrars of the Nursing/Midwifery Council, heads of nursing/midwifery professional associations, and academic representatives) for professional regulation and quality improvement – particularly with respect to HIV services for women and children.[20,25] In this sense, ARC's work lends itself to the mission of the current Three Frees Initiative and the overall goal to end the HIV/AIDS epidemic by 2030.

Data were collected by ARC country teams with supervision from the ARC faculty at Emory University and the CDC (INITIALS OF AUTHORS). Facilities were purposely selected in consultation with CDC country offices based on overall volume and burden of HIV patients. Three modules were conducted to understand implementation and quality of NIMART services for PMTCT and pediatric HIV care; these modules included in-depth qualitative interviews (IDIs) with clinical supervisors (Module 1), questionnaires with health providers (nurses, midwives, and nurse-midwives) (Module 2), and a facility audit based on a capability maturity model for NIMART developed by ARC faculty (Module 3). Data from Modules 1 and 2 were used for the current analysis, which is explained in more detail below. Ethical approval was granted by the CDC and Emory University IRB; this study was exempt from full IRB review because it was categorized as program evaluation. No personal identifiers were collected from participants at any stage of the research process.

Quantitative Methods

Quantitative data were collected through administration of a closed-ended questionnaire to a convenience sample of nurses, midwives, and nurse-midwives. We aimed to include roughly 10-15 participants in hospital settings and 5-10 participants in primary care settings. Potential participants were identified by clinic supervisors in a manner that minimized disruption to facility services. After providing informed consent, participants were given 2 hours to complete the questionnaire, which was self-administered. A trained member of the assessment team facilitated this process, providing initial instructions and remaining present for the duration of administration to answer any questions and collect the questionnaires. Questionnaires contained background information and questions regarding self-confidence and competence in providing HIV services, perceptions of respectful care, a knowledge assessment, and a series of questions about specific facilitators for NIMART with respect to PMTCT and pediatric HIV services (see

Table 1). Items for this final category (the focus of the current analysis) derived from accepted task-sharing standards relative to HIV services.[24]

Prior to data analysis, standard data cleaning procedures were performed in Microsoft Excel, which included separating the data by each of the 3 HIV service types (PMTCT for PBFW, HEI, Peds) and dropping participants in each category who answered less than 50% of the questions on NIMART facilitators. Data analysis was accomplished by calculating descriptive statistics for the total sample; i.e., frequency counts and percentages for categorical variables. After examining the results for each category of service, we also analyzed participants' responses by facility, by country, and by provider type (nurse, midwife and nurse-midwife).

Qualitative Methods

Qualitative data were collected through a purposeful sample of clinical managers or supervisors of nurses and midwives who provide PMTCT or pediatric HIV services in the health facility. We anticipated conducting 2-3 IDIs per facility, with the understanding that this range may be wider depending on facility size. After providing informed consent, participants were asked open-ended questions regarding facility characteristics, and provision of HIV services by nurses, midwives, and nurse-midwives in the facility. Specifically, the interview guide contained questions regarding task-sharing practices, competence and motivation among providers, and barriers to and facilitators for NIMART services. Interviews were conducted by trained members of the assessment team, who recorded participants' responses by hand (digital audio-recordings were not used due to limited resources within ARC country teams). Hard copy responses recorded on the interview guide were transcribed into electronic data forms (Microsoft Word) that were provided to the ARC country teams.

Initial qualitative analyses occurred in the field, where ARC country teams, with support from ARC faculty, completed a series of worksheets to define key barriers and facilitators to

NIMART in each facility and to prioritize problems of focus for quality improvement projects. First, an interview summary form was used to derive themes from individual interviews. Next, a facility summary form was completed that compared and contrasted themes from the interview summaries to understand significant impediments to NIMART from the combined perspectives of supervisors interviewed at each facility. The facility summary form also assisted teams to synthesize the interview findings for multiple facilities in one country and develop a refined list of priority barriers across all participating facilities in each country that could be addressed with a quality improvement project. A finalized data analysis was conducted by Emory ARC team members (RM and SAS) by extracting key concepts and themes from the Module 1 data forms and summary forms across the 11 countries. Because the data were already partially analyzed and because there were no audio-recordings or direct transcriptions, it was not necessary to use a qualitative data analysis software program for this analysis.

Triangulation of Findings

The results of the quantitative and qualitative findings were compared and contrasted to identify commonalities and distinctions between supervisors' responses and those of the health providers. The themes produced from the Module 1 IDIs and country summaries were compared to results for the 8 survey items examined in Module 2. If a particular qualitative theme was identified across multiple countries, it was then compared to the responses of the item that most closely corresponded to it in the Module 2 data (for each clinical service type and across all of the countries). Finally, descriptions of similarities and differences in the responses between supervisors and providers were written.

RESULTS

As seen in Table 2, a total of 30 health facilities were assessed (1-4 facility per country); 11 district/referral hospitals, 15 health centers, and 4 other types of primary care facilities. A total of 62 clinical supervisors participated in the Module 1 IDIs, with the number of supervisors per facility ranging from one to 6, but with 2-3 being typical. The total number of Module 2 participants was 211, ranging from 2 to 16 per facility with the majority having 6-12 (except for one facility in Mozambique, which only had a single participant). Module 2 participants who responded to less than 50% of the 8 items assessed for each service type were dropped from the analysis (n=X). The final number of Module 2 participants per service type was 204 for HIV services for PBFW, 201 for HEI, and 204 for Peds. These providers self-identified according to only one of 3 professional titles: nurse (n=83), midwife (n=19), or nurse-midwife (n=106), and 3 participants declined to indicate their title. It is important to note that titles (and certification) for midwives vary somewhat from country to country. For example, 14 of the 19 participants who identified as midwives (vs. nurse-midwives) were from Uganda.

Quantitative Results

Although pre-service training is not directly associated with the participating facilities, providers' perceptions of their previous training served as a useful point of comparison to their perceptions of facility-based in-service training. For each of the 3 HIV service types, over half of providers responded "strongly agree" or "agree" on the pre-service questionnaire item, indicating that their pre-service training had effectively prepared them to provide this kind of HIV care (see Figures 1-3). In comparison, more providers believed in-service training at their current facility has prepared them with the knowledge and skills needed to provide effective care. Providers' positive responses (combining "strongly agree" and "agree") for in-service training were 11%

higher than pre-service training with respect to provision of HIV services for PBFW. These responses were also 13% higher for HEI services and 7% higher for Peds services.

The areas that the providers perceived most negatively were related to supportive supervision and clinical mentorship (items #3 and #4 in Table 1). For each of the 3 service types, having supportive supervision and receiving feedback on HIV services provided received the highest number of negative responses among all items analyzed in Module 2. Overall, negative responses (combining "disagree" and "strongly disagree" responses) for supportive supervision were 33.8% with respect to HIV services for PBFW, 35.8% for HEI services, and 41.7% for Peds services. Service feedback received even higher proportions of negative responses, which were 36.3% (PBFW), 37.3% (HEI), and 42.6% (Peds).

Despite the perceived lack of supportive supervision and clinical mentorship in ability to provide effective care, the majority of participants reported that they had sufficient authority to provide this care. Providers had very positive responses regarding their authority to provide each type of service: 83.8% of providers responded that they had the authority to provide HIV care for PBFW, 76.6% for HEI, and 70.6% for Peds. The only items that ranked more positively than authority to provide care were positive staff relations and patient relations (see Figures 1-3). The last item analyzed involved having adequate time to provide effective care. Across all service types, providers' responses did not vary much: 65.2% positive and 36.5% negatives responses for adequate time for provision of services for PBFW, 65.7% positive and 33.3% negative for HEI, and 61.3% positive and 37.3% negative for Peds.

The item for supervisorial feedback on provided HIV services had a trend unlike the other items, responses averaged around 30% for the first three rankings and responses were close to 10% for "strongly disagree", regardless of service type. This was the highest amount of

strongly disagree responses, second to pre-service training. But of all items examined, pre-service training had the most even distribution across all four responses. Though providers' responses followed the same trend across all service types, providers had the least positive responses for Peds HIV services compared to PBFW and HEI HIV services. Participants' responses were also analyzed by provider type, but no discernable patterns were found other than the expected results of pre- and in-service training and authority for provision of services to specific patient populations (i.e. nurses responded more positively across most items in relation to Peds services as compared to midwives and nurse-midwives.

In Figures 1-3, it is clear that cumulative negative responses never outweigh positive responses for any of the items examined. However, when the providers' responses were analyzed at the country level, more variation was observed. Figure 4 shows that, in Rwanda, providers' negatives responses outnumbered their positive responses for all 8 items. "Authority to practice" received the highest percentage of positive responses (47%), which follows the broader trend that providers felt they had the authority to provide care, even though they lacked facility-based supports to do so effectively in all other respects. In contrast to Rwanda, Zambia had highly positive responses across all items (see Figure 5). Here, the providers' responses follow the same trends seen in the figures presenting the results for the total sample, except that pre-service training was perceived slightly more favorably (82%) than in-service training (78%).

Qualitative Results

From the Module 1 data, we identified 13 barriers, 4 current facilitators, and 9 desired facilitators (see Table 3). The most significant barriers that emerged in the IDIs of clinical supervisors in 10 of the 11 countries included deficiencies related to training and service provision and providers' lack of knowledge in provision of pediatric services. Additionally, barriers that were identified in facilities in 5 or more countries related to staff shortages,

inadequate space and supplies, facility capacity for pediatric services, lacking supportive supervision and clinical mentorship, and poor attitudes/low motivation. Two barriers related to staff shortages included high workload (mentioned by supervisors in 8 countries) and staff turnover (mentioned by supervisors in 3 countries). The lack of incentive was a barrier mentioned by supervisors in one facility in Malawi and one facility in Uganda. Four other barriers, each only identified in one country, include lack of feedback, poor relationships among facility staff, sufficient time to provide care, and lack of community trust. A clinical supervisor at a district hospital in Tanzania said, "that they are stigmatized and not supposed to prescribe," we assume this refers to poor relationships across health cadres and that untrained nurses and midwives are not allowed to, or supposed to, prescribe drugs.

Not unexpectedly, many findings from the barriers section translated into facilitators for improved NIMART services. In response to deficiencies related to training and service provision, supervisors in Mozambique mentioned current in-service trainings, while supervisors in 9 other countries identified strengthening of in-service trainings for health providers as a desired facilitator. Continuous or improved supportive supervision and clinical mentorship was a desired facilitator in 8 countries. Supervisors also noticed that pediatric services were lacking and suggested actions that would be helpful in improving these services, such as increasing the dates and time pediatric services are offered to make sure kids who attend school have an opportunity to come to the facility and developing areas in the health facility dedicated as an "adolescent corner" with movies and food as an incentive for children and adolescents to come to the health facility. Other facilitators that frequently appeared in the narratives that were directly linked to a barrier include increasing staff, adequate space and supplies, and positive attitudes/increased motivation. In Ethiopia, attitude and motivation varied across all three referral

hospitals surveyed. At one facility supervisors described providers as motivated, in another facility supervisors said that "poor attitudes and hopelessness" were barriers, and in the third facility supervisors had differing opinions, one responded that providers had good attitudes and were motivated, while another mentioned low motivation.

There were also a few facilitators mentioned that related to the barriers around incentives and relationships between staff. Supervisors in one of the referral hospitals in Ethiopia mentioned that incentives would likely lead to improved job performance of providers, as well as positive relationships with different stakeholders. Similarly, "better connections between departments" was a desired facilitator in a community hospital in Malawi. The only facilitator not linked to any barriers was regular meetings, a current facilitator in 3 countries and a desired facilitator in 1 country.

Triangulation of Findings

The themes derived from IDIs with the clinical supervisors in Module 1 overlapped with items analyzed in Module 2. Supportive supervision and clinical mentorship was perceived as a large barrier to NIMART, over 33% of health providers had negative responses in each service type, clinical supervisors in 7 countries acknowledged it was lacking, and supervisors in 8 countries mentioned improving it as a desired facilitator. Mozambique was the only country with a clinical mentoring initiative taking place in one of its surveyed facilities. Sixteen facilities were identified as lacking capacity to provide pediatric services and supervisors in 20 facilities said that providers lack knowledge in provision of pediatric services. This information is consistent with health providers' lower percentage of positive responses regarding provision of care to children and adolescents. A few other Module 2 items were reflected in the identified themes from Module 1. In Rwanda, supervisors in one facility reported poor relationships among staff

and providers' negatives responses outnumbered their positive responses on staff relations (see Figure 4). In Ethiopia, lack of community trust was reported at one referral hospital and distrust by infant's parents was reported at a separate referral hospital, yet the Module 2 data showed a very high percentage of positive responses for staff-patient relations.

DISCUSSION

The findings from this study demonstrate that, across all countries and types of services, the most pronounced barriers to NIMART were related to supportive supervision and clinical mentorship. These results are consistent with other studies that describe substantial lack of clinical mentorship and supervision of NIMART services in eastern and southern African countries.[26-28] The quantitative results also demonstrated that, while the health providers clearly felt they had the authority to provide care, their responses for pre- and in-service training varied by country and provider type. From a previous analysis of all 17 ARC countries, some nurses and midwives reported poor attitudes and low motivation when engaging in task-sharing, often due to a lack of financial incentive or nonremuneration.[24,26] This response is understandable, especially when considering that these providers often take on additional tasks even when they lack accreditation or approval by professional regulatory bodies.[21] Although efforts to incorporate NIMART have been modestly successful in some settings, its long-term success will likely depend on the empowerment of providers through measures such as official recognition after completion of standardized training, salary increases, higher levels of trust and support from physicians, or some combination of incentive and upward job mobility.[27,28]

Limitations

The primary limitation of this study is that, due to the study design only including high volume, high-HIV burden facilities, the results are not generalizable beyond the facilities in

which data were collected. However, findings may be translated to other contexts with similar facility and health system characteristics. For example, it might be inferred that the general trends from all 3 facilities in Rwanda (versus the 3 facilities in Zambia) likely stem from higher-level health system factors that influence these facilities in a similar manner. But further study would be needed verify this conclusion. A secondary limitation concerns data quality. Because this project was committed to capacity-building among ARC country teams, the primary goal was to provide team members with experience in needs assessment, quality improvement processes, and other skills related to implementation science. ARC faculty were thus not present on the ground at each step of data collection in conjunction with individual country teams. Every effort was made to minimize any potential problems related to data quality, including the provision of highly detailed training materials and training sessions (both remote and face-to-face) prior to and during data collection. Overall, we estimate that the impact was modest and largely consisted of missing data from some countries.

Recommendations

A much more comprehensive understanding is needed regarding current practices and processes for supportive supervision and clinical mentorship in high volume, high-HIV burden facilities. In particular, we need more information about the training clinical supervisors receive and whether it qualifies them to provide support to nurses, midwives and nurse-midwives. We then need to understand how mentorship and supervision could be improved upon to best support health providers offering NIMART services. When clinical supervisors are adequately trained, more efforts can be made to strengthen in-service training. In clinical settings where midwives and nurse-midwives are expected to provide care to children and adolescents, they need to be provided with adequate training, supervision, and mentorship. One solution in facilities with severely limited resources might be to have qualified and experienced nurses serve as mentors to

midwives and nurse-midwives. Designing and testing interventions such as this will help inform future programmatic efforts and allow decision makers to focus their efforts in the most effective direction.

Further research is also needed to understand bottlenecks at various levels of the health system. Challenges such as staff shortages and infrastructure deficits greatly impact the facility level facilitators and barriers found in this study, yet they cannot be resolved here. First, it needs to be understood why there are not more health providers assigned to high volume, high-HIV burden facilities. Then there should be an investigation into the allocation of financial resources for HIV services per facility or district. After learning about these areas, a recommendation should be made to district or regional Ministries of Health on what changes to make to have the most positive impact. If these challenges are resolved higher up in the health system, future studies may address the impact an increase of space and/or number of staff have on NIMART services. Finally, there is a need to better understand the lack of children and adolescent HIV services in high volume, high-HIV burden facilities where the issue is not with the competency of providers but lacking facility infrastructure.

The findings from this descriptive study can be used to inform facility level programs that address the need for in-service training and clinical mentorship in relation to NIMART, and perhaps argue for establishing a national NIMART certification program. Nurses, midwives, and nurse-midwives who provide PMTCT and pediatric HIV services would likely benefit greatly from receiving more support in these respects, as would their clinical supervisors and patients. Better understanding these challenges and designing interventions to address them will bring us closer to meeting the Fast Track Strategy of ending the AIDS epidemic by 2030.

REFERENCES

1. UNAIDS. Ending AIDS: Progress Towards the 90-90-90 Targets. 2017.

2. World Health Organization. 10 facts on HIV/AIDS. World Health Organization [Web]. 2017; http://www.who.int/features/factfiles/hiv/en/. Accessed December 20, 2017.

3. UNAIDS. Fast Track: Ending the AIDS Epidemic by 2030. 2014.

4. UNAIDS. Fact Sheet - World AIDS Day 2017. 2017.

5. UNAIDS. The Gap Report. 2014.

6. UNAIDS. On the Fast-Track to an AIDS-Free Generation. 2016.

7. UNAIDS. 2015 Progress Report on the Global Plan. 2015.

8. United Nations in Swaziland. Government launches “Start Free, Stay Free, AIDS Free” Initiative. 2017; http://sz.one.un.org/content/unct/swaziland/en/home/news-centre/news/government-launches-start-free--stay-free--aids-free-initiative-.html.

9. DREAMS. DREAMS Core Package of Interventions Summary. n.d.

10. The United States President's Emergency Plan for AIDS Relief (PEPFAR), Children's Investment Fund Foundation (CIFF). Accelerating Children's HIV/AIDS Treatment: Promising Practices and Lessons Learned From Implementation of the ACT Initiative. April 2017.

11. UNAIDS. All In #End Adolescent AIDS. February 5, 2015 2015.

12. Granich R, Gupta S, Montaner J, Williams B, Zuniga JM. Pattern, Determinants, and Impact of HIV Spending on Care and Treatment in 38 High-Burden Low- and Middle-Income Countries. Journal of the International Association of Providers of AIDS. 2016;15(2):91-100.

13. World Health Organization. Guideline on when to start antiretroviral therapy and on pre-exposure prophylaxis for HIV. 2015.

14. UNAIDS. Prevention Gap Report. 2016.

15. World Health Organization. Task shifting to tackle health worker shortages. 2007.

16. Zuber A, McCarthy CF, Verani AR, Msidi E, Johnson C. A Survey of Nurse-Initiated and -Managed Antitretroviral Therapy (NIMART) in Practice, Education, Policy, and Regulation in East, Central, and Southern Africa. J Assoc Nurses AIDS Care. 2014;25(6):520-531.

17. World Health Organization. Density per 1000 Data by country. Global Health Observatory data repository [Web]. 2018; http://apps.who.int/gho/data/node.main.A1444?lang=en. Accessed March 31, 2018.

18. Olson DJ. Task Sharing, Not Task Shifting: Team Approach Is Best Bet for HIV Care. Nurse Models of HIV Care and Treatment: Addressing Health Workforce Shortages for Long-Term Sustainability, [Web]. 2012; https://www.intrahealth.org/vital/task-sharing-not-task-shifting-team-approach-best-bet-hiv-care. Accessed December 24, 2017.

19. World Health Organization. Task Shifting: Global recommendations and guidelines. 2008.

20. Gross JM, Kelley M, McCarthy C. A Model for Advancing Professional Nursing Regulation: The African Health Profession Regulatory Collaborative. Journal of Nursing Regulation. 2015;6(3):29-33.

21. Crowley T, Mayers P. Trends in task shifting in HIV treatment in Africa: Effectiveness, challenges and acceptability to the health professions. Afr J Prm Health Care Farm Med. 2015;7(1). doi: http://dx.doi.org/10.4102/phcfm.v7i1.807.

22. African Medical and Research Foundation. Amref Health Africa's Position Statement on Task Shifting. 2017; http://amref.org/position-statements/amref-health-africas-position-statement-on-task-shifting-3/. Accessed March 30, 2018.

23. Zachariah R, Ford N, Philips M, et al. Task shifting in HIV/AIDS: opportunities, challenges and proposed actions for sub-Saharan Africa. Trans R Soc Trop Med Hyg. 2008;2009(103):549-558.

24. Ngozi Iwu E, Holzemer WL. Task shifting of HIV management from doctors to nurses in Africa: Clinical outcomes and evidence on nurse self-efficacy and job satisfaction. AIDS Care. 2014;26(1):42-52. doi: http://dx.doi.org/10.1080/09540121.2013.793278.

25. Gross JM, McCarthy C, Kelley M. Strengthening nursing and midwifery regulations and standards in Africa. African Journal of Midwifery and Women's Health. 2011;5(4):185-188.

26. Smith J, Odera DN, Chege D, et al. Identify the Gaps: An assessment of Nurses' Training, Competency, and Practice in HIV Care and Treatment in Kenya. J Assoc Nurses AIDS Care. 2016;27(3):322-330. doi: https://doi.org/10.1016/j.jana.2016.01.005.

27. Mabelane T, Marincowitz G, Ogunbanjo G, Governder I. Factors affecting the implementation of nurse-initiated antiretroviral treatment in primary health care clinics of Limpopo Province, South Africa. South African Family Practice. 2016;58(1):9-12. doi:10.1080/20786190.2015.1114704.

28. Green A, de Azevedo V, Patten G, Davies M-A, Ibeto M, Cox V. Clinical Mentorship of Nurse Initiated Antiretroviral Therapy in Khayelitsha, South Africa: A Quality of Care Assessment. PLoS One. 2014;9(6). doi:10.1371/journal.pone.0098389.

TABLES AND FIGURES

Table 1. Selected facilitators for nurse initiated and managed ART (NIMART); each item was assessed in relation to HIV services for a) pregnant and breastfeeding women (PBFW), b) HIV-exposed infants (HEI), and c) children and adolescents

	Questionnaire Item
1	My pre-service education prepared me with the knowledge and skills needed to provide this care effectively
2	My training at this facility has prepared me with the knowledge and skills needed to provide this care effectively
3	At this facility, I have access to clinical supervision and support (e.g. clinical mentor) to provide this care effectively
4	At this facility, I receive feedback on the HIV services I provide based on chart reviews or other assessments
5	At this facility, I have the authority (and am supported by the facility policy) to provide this care effectively
6	At this facility, I have the time that is needed to provide this care effectively
7	Relations between the different types of health workers at this facility are good and facilitate the collaboration needed to provide this care effectively
8	In general, patients and community members trust the health workers at this facility to provide this care effectively

Table 2. Health facilities and participants by country

Country	Health Facilities, n	Facility Type, n				Module 1 Participants (supervisors), n	Module 2 Participants (providers), n	Provider Type, n			
		District/ referral hospital	Health center	Clinic	Other			Nurse	Midwife	Nurse-Midwife	Other
Ethiopia	3	3				3	22	18	3	1	
Kenya	2	1	1			4	19	4		15	
Lesotho	3	1	1		1	7	16			16	
Malawi	3		2		1	8	23	1		22	
Mozambique	3	2	1			6	13			12	1
Rwanda	3		3			5	12	12			
Swaziland	1			1		2	5	3		2	
Tanzania	2	1	1			11	31	14		17	
Uganda	3	2	1			8	30	7	14	7	2
Zambia	3	1	2			3	26	16	2	8	
Zimbabwe	4		3		1	5	14	8		6	
Total	30	11	15	1	3	62	211	83	19	106	3

Figure 1. Perceptions of HIV services for pregnant and breastfeeding women (PBFW) among providers (nurses, midwives, and nurse-midwives)

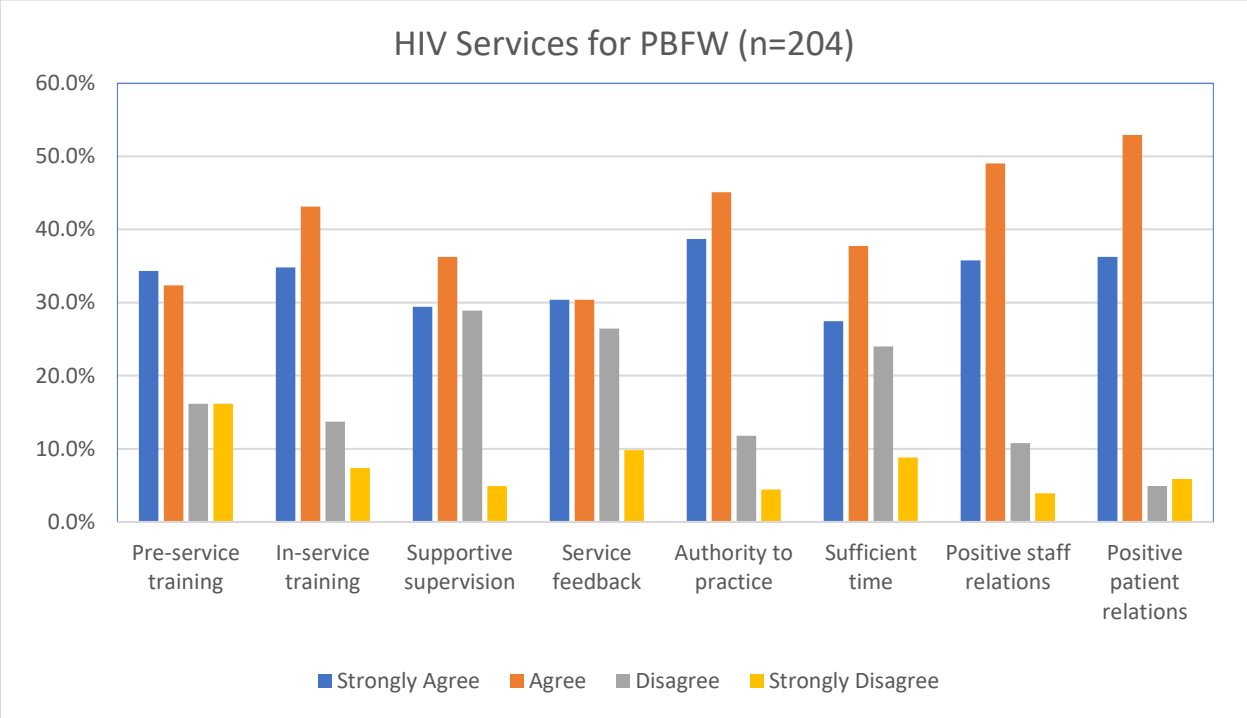

Figure 2. Perceptions of HIV services for HIV-exposed infants (HEI) among providers (nurses, midwives, and nurse-midwives)

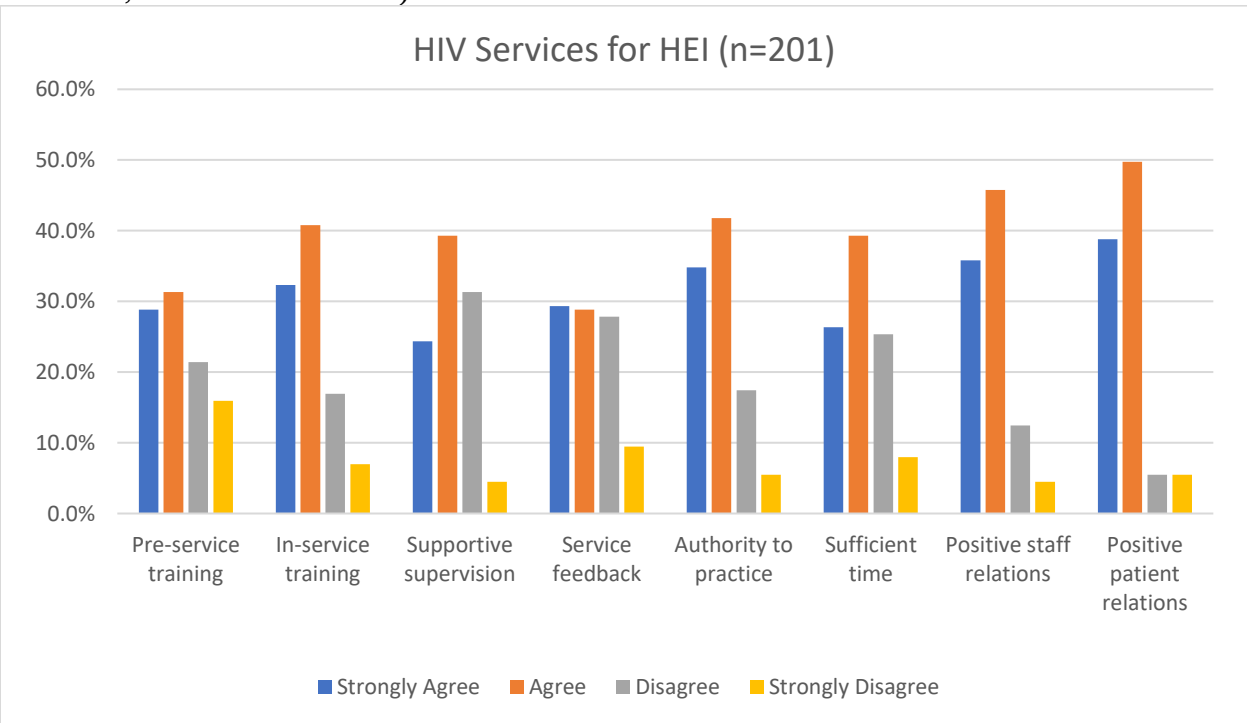

Figure 3. Perceptions of pediatric HIV services among providers (nurses, midwives, and nurse-midwives)

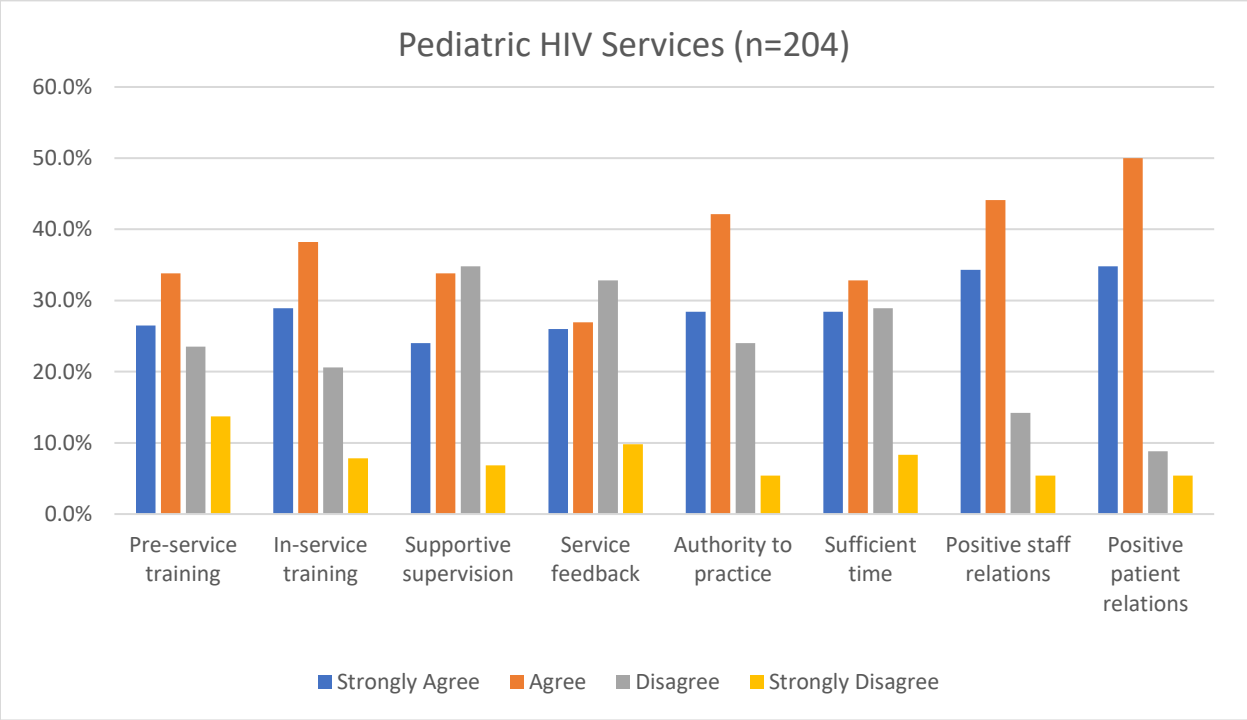

Figure 4. Perceptions of NIMART services in Rwandan health facilities among providers (nurses, midwives, and nurse-midwives) for all service types

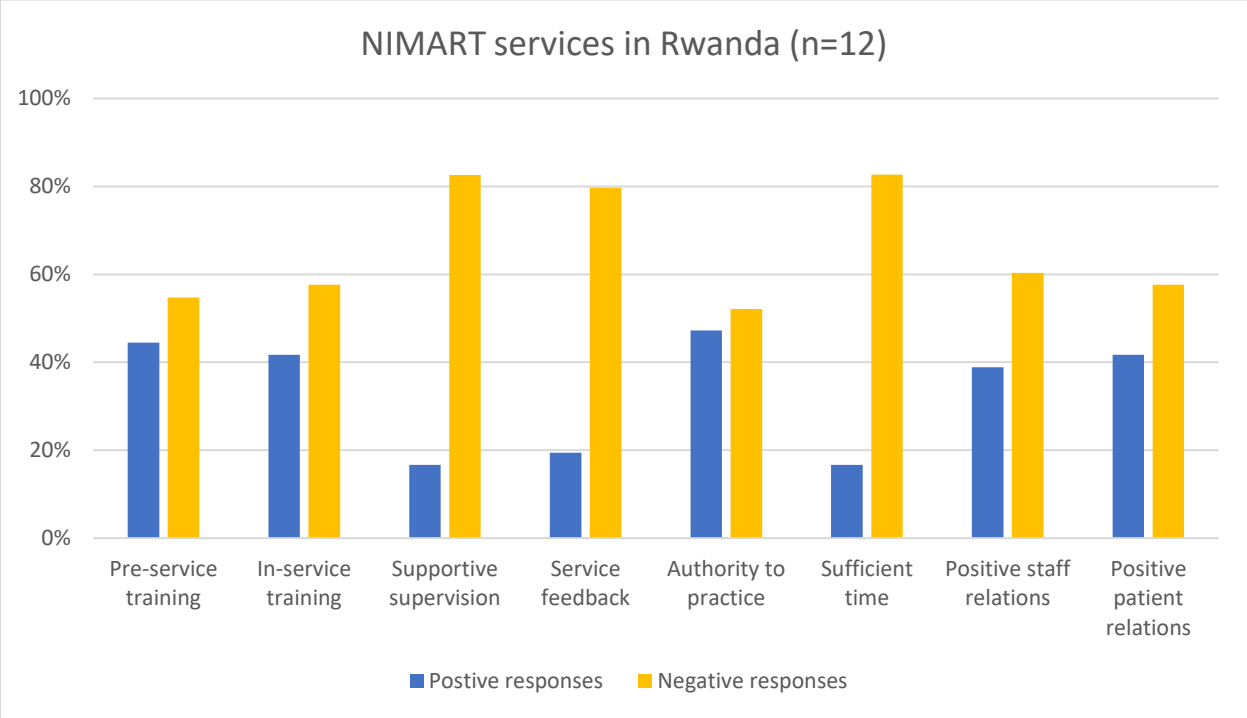

Figure 5. Perceptions of NIMART services in Zambian health facilities among providers (nurses, midwives, and nurse-midwives) for all service types

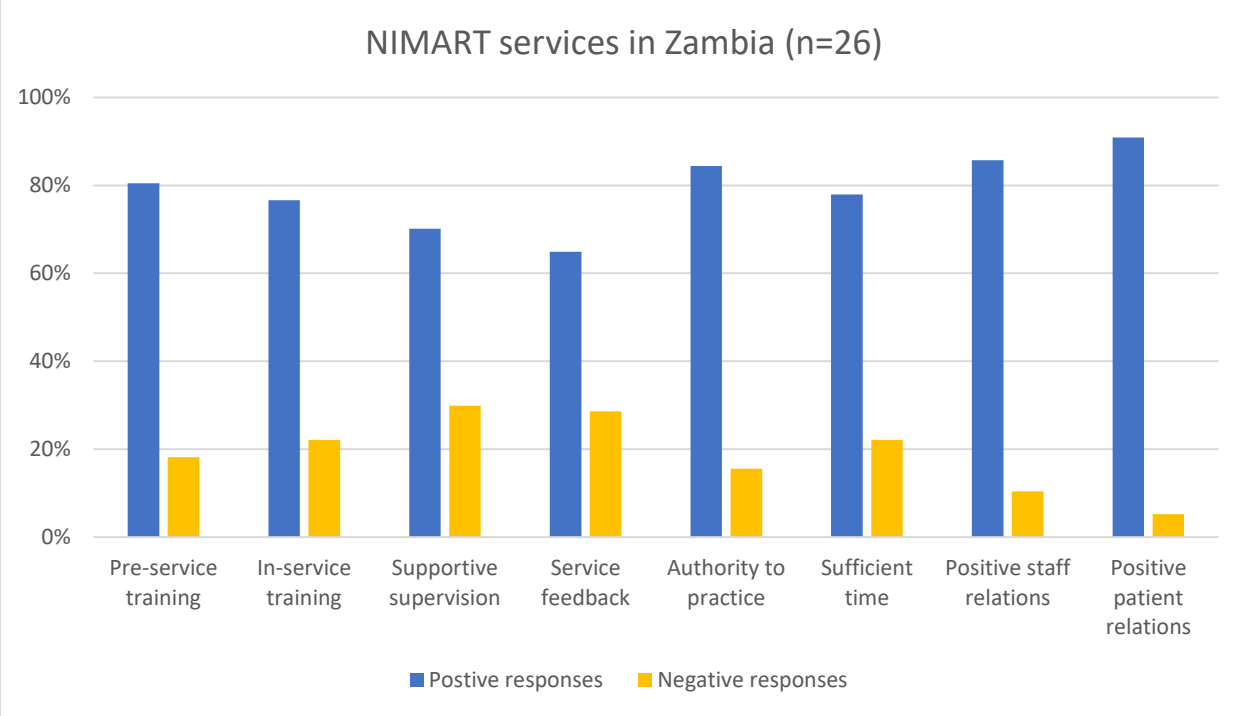

Table 3. Summary of perceived barriers of and facilitators to NIMART services among clinical supervisors

Qualitative Themes Identified	Ethiopia	Kenya	Lesotho	Malawi	Mozambique	Rwanda	Swaziland	Tanzania	Uganda	Zambia	Zimbabwe
Barriers											
Knowledge gap (pre-/in-service training)	X	X	X	X	X		X	X	X	X	X
Providers lack knowledge in provision of peds services	X	X	X	X		X	X	X	X	X	X
Facility capacity for peds services is lacking	X		X	X	X		X	X	X	X	X
Lacking supportive supervision clinical mentorship		X	X	X	X	X				X	X
Shortage of staff	X	X	X	X		X	X	X	X	X	
Inadequate space and supplies	X	X	X		X		X	X	X	X	X
High workload	X	X		X	X	X	X		X		X
Poor attitudes/low motivation	X	X	X	X					X		
Staff turnover	X		X	X							
Lack of incentives				X					X		
Poor relationships among facility staff						X					
Sufficient time to provide care											X
Lack of community trust	X										
Current Facilitators											
Good attitudes/motivation	X				X		X				
Regular meetings					X	X	X				
In-service training					X						
Clinical mentoring initiative					X						
Desired Facilitators											
Strengthen in-service training	X	X	X	X		X		X	X	X	X
Strengthen pediatric services			X	X	X	X		X		X	X
Continuous supportive supervision and clinical mentorship	X	X	X	X		X		X		X	X
Increase amount of staff	X	X	X				X	X	X		X
Adequate space and supplies	X		X		X		X	X		X	X
Better connections between departments				X							
Regular meetings		X									
Incentive	X										
Good relationships with different stakeholders	X										

CHAPTER 4: Conclusion

This chapter expands on the discussion of findings and recommendations from the manuscript presented in Chapter 3. It also includes information on the findings that were either too detailed or too speculative to include in the manuscript. While this study focused on common trends in facilities across 11 different countries, clinical supervisors also described barriers and facilitators at other levels of the health system. These additional barriers to and facilitators for NIMART services are included in the following discussion. Finally, I conclude with recommendations for future research and programmatic efforts.

DISCUSSION

The quantitative data was divided by provider type, but in-depth results were not included in the analysis for two reasons. First, we decided we would have needed standardized descriptions of the three provider types' roles and responsibilities at the beginning of the study before the participants indicated what type of provider they were, nurse, midwife, or nurse-midwife. Second, the distribution of provider type was not even across the 11 countries, and even though the results were analyzed as percentages, if a majority of one provider type was in one country we cannot generalize their responses across facilities or countries. For example, of the 19 midwives that participated in the study, 14 of 19 were from Uganda.

Though the exact numbers varied from clinical supervisors of the same facility, supervisors often reported that more health providers were providing NIMART services than were trained to provide them. This supports the finding that many providers had positive responses about authority to provide care, because they were providing care regardless of their pre-service training. Therefore, this also supports the supervisors' responses that a knowledge gap exists, because many of the providers were not trained. Following the same trend as the other

7 items in the quantitative data, of the 3 service types, providers felt like they had the least amount of authority to provide HIV care to children and adolescents. The knowledge gap surrounding HIV services for children and adolescents stems from a lack of pediatric services in many of the facilities. If facilities do not provide the space or allocate time for provision of care for children and adolescents, it clearly would impact the providers' experience and competence in treating that population. Clinical supervisors made suggestions such as, increasing the dates and time pediatric services are offered to make sure kids who attend school have an opportunity to come to the facility. They also suggested developing areas in the health facility dedicated as the "adolescent corner" with movies and food as an incentive to come to the health facility.

While this study focused on the barriers to and facilitators for NIMART services at the facility level, the clinical supervisors' IDI responses included barriers at the individual level, community level, and higher levels of the health system. An individual level barrier identified was when mothers leave their HIV-exposed infants at home when they come for their own treatment. Additionally, if mothers are lost to follow-up, so are their infants. It was also seen that adolescents were not adhering to treatment, the two reasons provided were that, 1) they are of a rebellious age or, 2) they are malnourished and do not have food to take with their medicine. Another individual barrier was that mothers failed to disclose their HIV status to partners and/or children, this impacted whether their adolescent children knew they should seek treatment. Multiple countries reported no HIV-related community outreach activities aimed at the patient populations. It is unlikely that supervisors or providers would be the ones performing community outreach activities and that is why it is important to have community health workers (CHW) involved. Supervisors in Rwanda identified a lack of collaboration with CHWs as a barrier. In order to expand access and coverage of ART it is very important that task-sharing extends

beyond the health cadres of health facilities and into the community, this is best done through CHWs. Community barriers for accessing HIV services include, religion, culture, and geographical inaccessibility. But in this study, supervisors noted that some mothers preferred traveling longer distances to avoid stigmatization. If further research were to be conducted in this region it would be interesting to expand on these barriers and learn how the health facility staff believe they can help patients overcome individual and community level barriers.

There were also other facilitators mentioned in the IDIs that were not included in the analysis because they were very specific to patients' attitudes and treatment adherence. At a general hospital in Lesotho, supervisors mentioned that a local NGO supplies cell phones to mothers to improve follow-up for infants. In Malawi, mothers often leave their infants at home even if they were enrolled in treatment at birth, therefore supervisors at a community hospital want to increase the involvement of CHWs at their facility, so they can work with these families and make sure infants are not left at home. One facility in Uganda and one facility in Zimbabwe mentioned that the lack of food impacts patients' treatment adherence and an initiative to start nutritional gardens was suggested to help provide patients with a food source. Supervisors in Swaziland and Mozambique shared a desired facilitator, to have patient support groups for women so patients better understood and accepted the importance of treatment adherence and felt more comfortable making their own decisions and not deferring to a male partner.

This study is characterized by several limitations. First, though providers differentiated themselves as nurse, midwife, or nurse-midwife, midwives by definition do not provide care to children and adolescents, yet they still responded to the pediatric HIV services portion of the questionnaire. Because convenience samples were used, the facility data may have been misrepresented if one provider type made up the majority of participants but was not the majority

provider type in the facility itself. Another limitation to this study was the quality and management of the data. Misunderstandings of the questions and prompts in the facility assessment tools affected the data quality. This was seen when supervisors responded about barriers and facilitators at levels other than the facility level and when providers' responses to the questionnaire greatly varied from other participants of the same provider type, at the same facility. These data quality issues may have occurred because the ARC country team members, or hired consultants, conducting the facility assessments did not provide clarification, or because the instructions were not clear. While the instructions indicated to send all data forms as Microsoft Word and Excel files, this step was often skipped, and forms were sometimes sent unlabeled and as individual JPEGs or combined PDFs. Whole questionnaires were removed from initial analysis if a large amount of the questions were unanswered, there were missing pages, or if they were labeled improperly in a combined PDF. Now aware of these challenges, changes could be made to the tools and standard operating procedures with better instructions on how to complete and submit the forms if used in future studies.

RECOMMENDATIONS

If this study were to be repeated we would recommended the ARC faculty provide more supervision and training to the ARC country teams, and that the ARC country teams require any consultants they hire to participate in the trainings as well. The ARC country team members were involved in ARC in addition to their full-time work in their respective areas. Because of their limited time and resources to perform data collection the quality was lacking, as previously mentioned. In a future study they would need team members who had more time to dedicate to the project. Possible solutions to this would be to either expand the country teams to include members who can dedicate more time to ARC tasks or provide a larger stipend in order for the

teams to contract the work out, under the premise that the consultants have completed the necessary training.

At many of the same facilities analyzed in this study, ARC country teams used the facility assessments to inform the design and implementation of quality improvement projects to address what they thought were the greatest needs. The projects were cut short due to lack of funding, but if this study could be repeated we would want to conduct an end-line assessment after the projects had been in place for a full year. This would allow us to identify changes related to barriers to and facilitators for NIMART services. The facility assessments were designed specifically for ARC but could easily be adapted for future use in other regions with high volume, high-HIV burden facilities.

The results of this study helped us understand some of the facility level challenges faced by nurses, midwives, and nurse-midwives providing PMTCT and pediatric HIV services. This information was used by the ARC country teams to strategize what changes needed to be made in participating facilities to make positive changes regarding NIMART services. These facilities can then be examples for other facilities to make similar changes. If efforts are made to increase NIMART, it would greatly impact the number of health providers providing care, therefore leading to an expansion of ART access and coverage.

While NIMART appears to be an essential part of any strategy to expand and improve HIV services at a facility level, further research is still needed to understand how bottlenecks at other levels of the health system impact NIMART. From our study we know that some of the challenges include allocation of staff and resources, as well as a lack of standardized NIMART training. We recommend that district health leaders work with their Ministries of Health in order to allocate staff and resources to the areas with the most need and where they will make the

strongest impact. Even though NIMART is a form of task-sharing and the WHO's global recommendations and guidelines on task-shifting are internationally recognized, there is no internationally recognized NIMART certification. Though it may vary by country, we recommend a nationally standardized NIMART training be implemented and any health provider expected to provide NIMART services should be certified. It would then be expected that providers who complete the standardized training and provide NIMART services receive official recognition through salary increases, higher levels of trust and support, or some combination of incentive and upward job mobility. Future studies could evaluate the effectiveness of nationally standardized NIMART certification programs on the quality, access, and coverage of services. If shown to be successful, eventually these programs could inform a standardized set of NIMART training procedures that are universally recognized. In conclusion, the more widely NIMART services are both offered and accepted, the faster those living with HIV/AIDS can receive treatment and achieve viral suppression, and the closer we get to ending the AIDS epidemic.

THESIS REFERENCES

1. UNAIDS. *Ending AIDS: Progress Towards the 90-90-90 Targets.* 2017.

2. World Health Organization. 10 facts on HIV/AIDS. *World Health Organization* [Web]. 2017; http://www.who.int/features/factfiles/hiv/en/. Accessed December 20, 2017.

3. UNAIDS. Fact Sheet - World AIDS Day 2017. 2017.

4. UNAIDS. Global AIDS Update 2016. 2016.

5. UNAIDS. *Fast Track: Ending the AIDS Epidemic by 2030.* 2014.

6. Gross JM, McCarthy C, Kelley M. Strengthening nursing and midwifery regulations and standards in Africa. *African Journal of Midwifery and Women's Health.* 2011;5(4):185-188.

7. Collaborative AR. ABOUT ARC. *African Health Professions Regional Collaborative* [Web]. 2017; http://africanregulatorycollaborative.com/ARC-About.html. Accessed December 22, 2017.

8. UNAIDS. *Prevention Gap Report.* 2016.

9. World Health Organization. *Task shifting to tackle health worker shortages.* 2007.

10. Ngozi Iwu E, Holzemer WL. Task shifting of HIV management from doctors to nurses in Africa: Clinical outcomes and evidence on nurse self-efficacy and job satisfaction. *AIDS Care.* 2014;26(1):42-52. doi: http://dx.doi.org/10.1080/09540121.2013.793278.

11. Zachariah R, Ford N, Philips M, et al. Task shifting in HIV/AIDS: opportunities, challenges and proposed actions for sub-Saharan Africa. *Trans R Soc Trop Med Hyg.* 2008;2009(103):549-558.

12. National AIDS Trust. About World AIDS Day. *World AIDS Day* [Web]. 2016; https://www.worldaidsday.org/about. Accessed December 14, 2017.

13. United Nations. *The Millennium Development Goals Report 2015.* 2015.

14. World Health Organization. *Task Shifting: Global recommendations and guidelines.* 2008.

15. United Nations. Goal 6: Combat HIV/AIDS, Malaria and Other Diseases *We Can End Poverty: Millenium Development Goals and Beyond 2015* http://www.un.org/millenniumgoals/aids.shtml. Accessed December 14, 2017.

16. Interagency Coalition on AIDS and Development. *The Sustainable Development Goals and the UNAIDS Strategy.* 2017.

17. UNAIDS. *The Sustainable Development Goals and the HIV Response.* 2017.

18. UNAIDS. UNAIDS Strategy 2016-2021. [Web]. 2016; http://www.unaids.org/en/goals/unaidsstrategy. Accessed December 25, 2017.

19. UNAIDS. *UNAIDS Data 2017.* 2017.

20. McMahon R. UNAIDS Issues New Fast-Track Strategy to End AIDS by 2030. *Elizabeth Glaser Pediatric AIDS Foundation* [Web]. 2014; http://www.pedaids.org/blog/entry/unaids-issues-new-fast-track-strategy-to-end-aids-by-2030. Accessed January 2, 2018.

21. UNAIDS. *Countdown to Zero: Global Plan towards the Elimination of New HIV Infections among Children by 2015 and Keeping Their Mothers Alive.* 2011.

22. UNAIDS. *2015 Progress Report on the Global Plan.* 2015.

23. UNAIDS. *On the Fast-Track to an AIDS-Free Generation.* 2016.

24. United Nations in Swaziland. Government launches "Start Free, Stay Free, AIDS Free" Initiative. 2017; http://sz.one.un.org/content/unct/swaziland/en/home/news-centre/news/government-launches-start-free--stay-free--aids-free-initiative-.html.

25. UNAIDS. Start Free Stay Free AIDS Free. 2016; https://free.unaids.org/. Accessed December 14, 2017.

26. DREAMS. DREAMS Core Package of Interventions Summary. n.d.

27. Center for Health and Gender Equity (CHANGE). *The DREAMS Initaitive.* 2015.

28. DREAMS. *DREAMS Innovation Challenge.* n.d.

29. PEPFAR. PEPFAR and DREAMS Partners Announce Winners of the $85 Million DREAMS Innovation Challenge. 2016.

30. DREAMS. Innovation Challenge: Innovating for an AIDS-free future for girls and women *DREAMS Partnership* [Web]. 2016; http://www.dreamspartnership.org/innovation-challenge/#focusareas. Accessed January 8, 2018.

31. The United States President's Emergency Plan for AIDS Relief (PEPFAR). Accelerating Children's HIV/AIDS Treatment (ACT) Initiative. [Web]. 2014; https://www.pepfar.gov/partnerships/ppp/234538.htm. Accessed January 8, 2018.

32. The United States President's Emergency Plan for AIDS Relief (PEPFAR), Children's Investment Fund Foundation (CIFF). *Accelerating Children's HIV/AIDS Treatment: Promising Practices and Lessons Learned From Implementation of the ACT Initiative.* April 2017 2017.

33. UNAIDS. *All In #End Adolescent AIDS.* February 5, 2015 2015.

34. UNAIDS. UNAIDS announce that the goal of 15 million people on life-saving HIV treatment by 2015 has been met nine months ahead of schedule. 2015.

35. World Health Organizations. *Global Update on HIV Treatment 2013: Results, Impact and Opportunities.* June 2013 2013.

36. UNAIDS. The Gap Report. 2014.

37. World Health Organization. Introduction. *Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection*2013:36-39.

38. Easterbrook PJ, Irvine CJ, Marco V, et al. Developing the 2013 WHO consolidated antiretroviral guidelines. *AIDS.* 2014;28(2):93-100.

39. World Health Organization. Organization of the guidelines. *Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection*2013:54-62.

40. World Health Organization. World AIDS Day 2016. [Web]. 2016; http://www.who.int/campaigns/aids-day/2016/en/. Accessed January 6, 2017.

41. UNAIDS. UNAIDS announces 2 million more people living with HIV on treatment in 2015, bringing new total to 17 million. Geneva, Switzerland & Nairobi, Kenta2016.

42. UNAIDS. *Treatment 2015.* July 12, 2013 2015.

43. Granich R, Gupta S, Montaner J, Williams B, Zuniga JM. Pattern, Determinants, and Impact of HIV Spending on Care and Treatment in 38 High-Burden Low- and Middle-Income Countries. *Journal of the International Association of Providers of AIDS.* 2016;15(2):91-100.

44. World Health Organization. *Guideline on when to start antiretroviral therapy and on pre-exposure prophylaxis for HIV.* 2015.

45. World Health Organization. Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection: recommendations for a public health approach. 2016.

46. UNAIDS. AIDSinfo. [Web]. 2017; http://aidsinfo.unaids.org/. Accessed January 3, 2018.

47. World Health Organization. Density per 1000 Data by country. *Global Health Observatory data repository* [Web]. 2018; http://apps.who.int/gho/data/node.main.A1444?lang=en. Accessed March 31, 2018.

48. Crowley T, Mayers P. Trends in task shifting in HIV treatment in Africa: Effectiveness, challenges and acceptability to the health professions. *Afr J Prm Health Care Farm Med.* 2015;7(1). doi: http://dx.doi.org/10.4102/phcfm.v7i1.807.

49. Olson DJ. Task Sharing, Not Task Shifting: Team Approach Is Best Bet for HIV Care. *Nurse Models of HIV Care and Treatment: Addressing Health Workforce Shortages for Long-Term Sustainability,* [Web]. 2012; https://www.intrahealth.org/vital/task-sharing-not-task-shifting-team-approach-best-bet-hiv-care. Accessed December 24, 2017.

50. Georgeu D, Colvin CJ, Lewin S, et al. Implementing nurse-initated and managed antiretroviral treatment (NIMART) in South Africa: a qualitative process evaluation of the STRETCH trial. *Implementation Science.* 2012;7(66).

51. Gross JM, Kelley M, McCarthy C. A Model for Advancing Professional Nursing Regulation: The African Health Profession Regulatory Collaborative. *Journal of Nursing Regulation.* 2015;6(3):29-33.

52. Zuber A, McCarthy CF, Verani AR, Msidi E, Johnson C. A Survey of Nurse-Initiated and -Managed Antitretroviral Therapy (NIMART) in Practice, Education, Policy, and Regulation in East, Central, and Southern Africa. *J Assoc Nurses AIDS Care.* 2014;25(6):520-531.

53. Foundation AMaR. Amref Health Africa's Position Statement on Task Shifting. 2017; http://amref.org/position-statements/amref-health-africas-position-statement-on-task-shifting-3/. Accessed March 30, 2018.