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Adapting "MOVE" to Accelerate VMMC Coverage for HIV Prevention in Priority Populations: Implementation Experiences from Uganda's Military Settings

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Authors' contributions

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ABSTRACT

This paper describes the WHO's Model of Optimizing Volumes and Efficiencies (MOVE), adapted by the University Research Council (URC) - Department of Defense HIV/AIDS Prevention Program (DHAPP) to rapidly scale up Voluntary Medical Male Circumcision (VMMC) within Uganda's military health facilities. First, we examine the MOVE model and then present the URC-DHAPP adapted intervention package comprising of: a) a Command-driven approach, b) Mobile theatres c) Quality assurance d) Data strengthening and reflection. To expand VMMC, URC-DHAPP worked with army commanders to create awareness, mobilize their troops and surgeons were assigned daily targets. The mobile theatre involved regular visits to hard-to-reach outposts and placing several mobile camps at health facilities close to deployment sites. All stakeholders were briefed on performance trends of previous medical camps and the program was monitored through VMMC camp reports. URC-DHAPP registered an exponential increase in VMMC coverage from 13% performance at Q2 to over 140% in Q4. The integrated approach led to circumcision of over 22,000 men (15-49 years) in a record four months. Our approach also contributed to health system strengthening and national HIV prevention targets. We conclude that the MOVE is cost-effective and can be successfully scaled up in resource-limited settings with a high HIV burden when implemented with cognizance of contextual specificities.

Keywords: MOVE; VMMC; MMC; SMC; military; HIV prevention; priority populations.

1. INTRODUCTION

Globally, 38 million people are living with HIV and of these, around 1.7 million were newly infected in 2019 [1]. In the absence of a cure, prevention remains the most effective way to reduce HIV/AIDS-related morbidity and mortality. VMMC's effectiveness in preventing HIV infection widely acknowledged [2-10]. For every circumcision there is a reduction of male to female sexual transmission of HIV by approximately 60% [9-11]. A one lifetime intervention, VMMC provides males with partial protection against sexually transmitted diseases and HIV majorly. The evidence shows that VMMC coverage in males 15-49 by 80% can avert 3.4 million new HIV infections [12].

The promotion of VMMC as an important strategy for the prevention of heterosexually acquired HIV infection in men in 2006 followed the success of United States of America National Institutes of Health trials that assessed the impact of MMC on HIV risk carried out in Kenya, and Uganda [2,9,10]. Although not an ultimate cure, VMMC is a highly recommended preventive intervention for HIV alongside other methods like vaginal microbicides, pre-exposure prophylaxis with antiretroviral medication, herpes suppressive therapy, cervical barrier methods and HIV vaccines [9,10]. It is also an essential component of the Sustainable Development Goal three (3) on ensuring healthy lives and well-being for all, and particularly 3.3 that emphasises ending the HIV/ AIDS epidemic by 2030.

We define VMMC as the surgical removal of the foreskin of the penis/prepuce from the penis [13]. Some religions (such as Muslims) and cultures have traditionally conducted circumcision as a custom to mark faith and the transition to adulthood respectively [14]. However, most of these procedures have been discouraged because they use out-dated methods associated with several problems (such as pain, bleeding, infections at the site of the circumcision and injury to the penis) and are found to escalate HIV prevalence among men [15,16]. It is therefore recommended that VMMC is conducted by a trained operator with a local anaesthetic [17,8]. VMMC is associated with several health benefits such as reducing the risk of contracting genital ulcers, syphilis, penile cancer, human papillomavirus (HPV), herpes simplex virus (HSV) and cancroid [17,18]. It also indirectly protects men's female sexual partners from HIV and lowers the prevalence of other STIs [9,10].

Given that the Southern and Eastern African countries have been severely affected by the HIV epidemic, prevention and treatment services remain significant public health priorities [19]. For instance, approximately 19 million people (52%) of the population in these countries were reported to be living with HIV in 2015 [18].

Uganda is a priority country for VMMC scale-up, as it has a national HIV prevalence of 1.4 million adults and children, with approximately 52,000 new HIV infections and 28,000 HIV-related deaths (Uganda Bureau of Statistics [20,21]. The Uganda government has been at the forefront of addressing the HIV/AIDS epidemic through its National HIV and AIDS Strategic Plan (NSP) developed in 2015. This provides a framework for developing and implementing HIV programs harmonized with the UNAIDS 90-90-90 targets [20,21]. For instance, it was also among the initial countries in sub-Saharan Africa to develop and implement public health measures (such as Option B+, Test-and-Start) that address the HIV/AIDS epidemic. With support from development partners, national HIV programs have focused on HIV prevention, knowledge, and behavioural interventions [20,21]. A number of methods are used to reduce HIV/AIDS incidence such as vaginal microbicides, pre-exposure prophylaxis with antiretroviral medication, herpes suppressive therapy, cervical barrier methods and HIV vaccines [9,10]. The common interventions in sub-Saharan Africa comprise antiretroviral therapy (ART) and voluntary medical male circumcision, provision of HIV testing and behavioral interventions such as counselling and promotion of condom use [22,23]. The Ugandan government has used a combination of strategies to prevent HIV in the general population including prevention of mother-to-child-transmission (PMTCT) of HIV, voluntary testing and awareness of HIV status, care and treatment of opportunistic infections, and behavioral interventions (Ministry of Health [24]. For instance, in the early 1990s, the country embraced the strategy of sexual abstinence, being faithful with one partner and correctly and consistently use condoms (*ABC* strategy) to prevent HIV [25,26]. The effectiveness of these strategies in mitigating HIV infections remains unclear due to poor coverage and lack of accurate HIV- incidence impact evaluations [23].

The percentage of circumcised men (15-49 years) in Uganda increased from 24% in 2006 to 27% in 2011 and 46% in 2016 [20,21]. Of these, 18% are circumcised by traditional practitioners or family friends and 22% by a health professional [20,21]. This reveals a need to scale up VMMC [17]. To reduce new infections, the Government and implementing partners must respond to this lack of VMMC coverage by intensifying introducing innovative strategies that increase demand for the same among men. Examples of these are reaching previously unreached populations or hard-to-reach people [2]. Further, to achieve a great impact on the HIV epidemic, VMMC must be affordable, efficient and integrated with other HIV preventive interventions [13,27]. The WHO recommends a minimum package comprising HIV testing and counselling, exclusion of symptomatic sexually transmitted infections (STIs); syndromic treatment where required, provision and promotion of male and female condoms, counselling on risk reduction and safer sex and male circumcision surgical procedures performed in line with the Manual for male circumcision under local anesthesia [13]. Besides, VMMC must be based on personal preference and evidence-based information provided by a health care worker [28,29]. Some studies (for example Atkins et al, 2020 2) recommend strategic examination of the individual and structural influences such as acceptability, values and preferences, costs, and feasibility of service delivery interventions. However, elements of the minimum package for VMMC (such as counselling and HIV testing) have, in some contexts, discouraged potential clients from accessing the service [15,16]. This indicates the importance of sociocultural contexts as an efficient measure in promoting VMMC programs. Strategies must be in place to attract men to embrace the service; depends on the setting, equipment and expertise of operators [9,10].

In pursuit of HIV epidemic control, global and national targets have been set across the prevention, treatment and care (PCT) continuum. For example, a new VMMC target was set in the *United Nations' 2016 Political Declaration on HIV and AIDS* to reach 25 million young men in priority countries with VMMC by 2020 [30]. A subsequent WHO/UNAIDS VMMC strategic framework set the goal of reaching 90% of 10-29 year olds in priority countries with VMMC by 2021 [31]. To reach this coverage level, 5 million young men in the priority countries will need to undertake voluntary circumcision every year [32]; and innovative methods are required to achieve this accelerated scale up of VMMC.

Health systems in developing countries (Uganda inclusive) are fragile and faced with multiple bottlenecks which constrain their ability to provide optimum quality VMMC services or their scale up. These include gaps in manpower, logistics and demand creation. Some countries also experienced a decline in VMMC due to major biomedical complications such as necrosis

of the glans, penile amputation, urethral fistulas and preputial fusion [33].

To cover the unmet need and cognizant of LMIC health system challenges the WHO, in 2010, recommended the model of optimizing volume and efficiency (MOVE) of male circumcision services [13,18]. The MOVE model advocates for a task shifting and task sharing approach; whereby Task-shifting refers to the use of non-physician providers to complete all steps of male circumcision surgery. Task-sharing refers to the use of non-physician or lower cadres of healthcare providers to complete specific steps of male circumcision surgery. This allows the operator (or surgeon) to focus on the most technically complex components of the surgery. In task-shifting and task-sharing models, surgical activities are reassigned, where appropriate, from those providers qualified for such interventions, e.g. physicians, to other appropriately trained and competent health-care providers, e.g. clinical officers and nurses [13,18,30,31].

Globally the MOVE model has gained traction and the evidence points to remarkable success. However, there is a paucity of data regarding the challenges of implementing conventional VMMC service delivery models among mobile priority populations such as the military in the prevention of HIV transmission. In addition, little is known about implementation experiences for adaptations of this MOVE model in different populations and contexts.

This paper describes the strategies and processes used to achieve program success in scaling up VMMC using an adaptation of the MOVE model within mobile catchment populations served by Uganda's 28 military health facilities. The Uganda military was targeted for VMMC scale-up utilizing the MOVE model because they are characterized as a key population due to the mobile nature of their work. Although the exact HIV prevalence rate for the military is unknown, it is estimated that key populations have a high prevalence between 15% - 37%, much higher than that of the general population (6.2%) [24]. It examines the original MOVE and presents the adapted URC-DHAPP integrated intervention package including i) a command-driven approach; ii) mobile theatres; iii) quality assurance; iv) data strengthening and reflection. First, we explain the concept of voluntary male medical examination (VMMC). Second, we describe the original MOVE model to give a foundation upon which the URC-DHAP program packages were based. This leads to a discussion of intersecting points, variations and conclusions.

1.1 Voluntary Male Medical Circumcision (VMMC)

World Health Organization (WHO) and Joint United Nations Programme on HIV/AIDS (UNAIDS) recommend that regions with high prevalence rates must implement voluntary medical male circumcision (VMMC) to scale down the transmission of HIV [9,10,18]. This involves most men in these contexts embracing VMMC. It is estimated that over 20 million men must volunteer to be circumcised to reach and maintain an AIDS-free generation in the most affected countries [17]. Research shows that coverage in males 15-49 by 80% would avert HIV 3.4 million new infections [18]. VMMC for HIV prevention is aligned with the Joint Strategic Action Framework 2012–2016, the UNAIDS Fast-Track strategy to end the AIDS epidemic by 2030 and WHO's Global Health Sector Strategy on HIV, 2016–2021. A holistic framework for action "VMMC2021" introduced by the WHO and UNAIDS is an important strategy to accelerate HIV prevention and improve uptake of tailored approaches for various age groups and locations [19]. It is designed along with four strategic directions including 1) focused action for scale-up, 2) policies and services for greatest impact, 3) innovation for acceleration and the future, and 4) accountability for quality and results [19]. The VMMC service package must comprise, male circumcision, HIV testing services and referral to care and treatment for HIV and STIs, HIV risk reduction education and provision of preventive measures such as condoms [18].

In 2012, VMMC was launched in 14 African countries in Eastern and Southern Africa including Kenya, Uganda, Rwanda, Tanzania, Ethiopia, Namibia, Lesotho, Malawi, Botswana, South Africa, Swaziland, Zambia and Zimbabwe to reduce the numbers of males contracting the disease. Between 2007 and 2017 a cumulative total of 18.6million circumcisions have been done and this averted an estimated 230,000 new infections [31]. In Uganda, VMMC has been implemented since 2010, with support from the US President's Emergency Plan for AIDS Relief (PEPFAR), and it managed to reach a total of 4 million people between the years

2010-2017. In Uganda URC-DHAPP, a total of 24,203 men have been circumcised over the same period with a huge number yet to be reached by 2030.

2. METHODS

This paper is based on the University Research Council (URC)-Department of Defence HIV/AIDS Prevention Program (DHAPP) implemented in military populations between March and June 2019. URC is providing technical assistance and direct support to the Uganda People's Defence Forces (UPDF) to scale-up the military ART program and achieve the UNAIDS 90-90-90 goals (90% of people with HIV diagnosed, 90% of those diagnosed on antiretroviral treatment (ART), and 90% of those on ART virally suppressed by 2020). The program involves HIV testing, treatment and care services to reduce the HIV burden and ensure a healthy Ugandan military. The program adapted the MOVE model in its implementation of interventions to scale up VMMC services among soldiers, their families and neighboring communities. The target was to reach 20,200 males within the catchment populations. The Uganda Peoples Defence Forces (UPDF) were selected because they are mobile populations with higher HIV prevalence; also with less likelihood to be linked and adhere to antiretroviral therapy (ART) [34].

The Program took place in 28 military health facilities in all regions of Uganda. These sites were selected for the scale-up because they met the minimum standards for providing safe VMMC including that appropriate VMMC outreach/mobile sites must be co-located or close to a health facility; have sufficient space for comprehensive VMMC services; water, electricity, and sewerage; the unmet need for HIV prevention and interest of the population in VMMC; geographically distributed and accessible, normal transit patterns; on a public transportation route, within 45 minutes of health care team accommodations and have reasonable security [35]. The leaders and VMMC teams systematically targeted areas previously without VMMC services, including locations of recently recruited personnel. The military men were identified systematically through assistance from military commanders who mobilized their teams. Military men or clients eligible for VMMC were then mobilized by commanders and voluntary participated in the circumcisions.

In this paper we describe strategies and processes used to achieve program success in rapidly scaling up VMMC. This "thick description" first describes the original MOVE model and then demonstrates intersecting points, variations and tailored approaches used by the program. Additionally, we reviewed [program] data and extracted critical information to demonstrate relationships with VMMC uptake – details of which have been discussed in another paper. We utilize the program impact pathways (PIP) to provide a clear chain of events and outcomes linking program outputs to the original goal of rapidly scaling up VMMC coverage.

3. RESULTS

3.1 The MOVE Model

In 2007 the WHO recommended scaling-up access to safe VMMC services in regions with high HIV prevalence and low levels of circumcision among men through the MOVE [33]. This was to rapidly increase the coverage of voluntary medical circumcision among all eligible males to reduce the risk of HIV transmission. This model has 5 core components including clinical considerations, staff considerations, client considerations, supply chain management, quality assurance. It enhances VMMC efficiency by coordinating client flow, using multiple surgical beds to one surgical team, task shifting of some surgical procedures to non-physicians and use of pre-packed consumables [17]. To increase efficiency and volume the model suggests three methods of male circumcision, which are, forceps-guided, dorsal slit and sleeve resection [13]. Efficiency can be optimized through surgical techniques that save time such as diathermy for haemostasis [13]. This technique uses an electric current to coagulate the ends of blood vessels to stop bleeding during surgery [13]. The process reduces haemostasis and procedure times which enables surgical staff to attend to several clients. However, it is reported that sometimes operators fail to entirely examine and screen patients which limits their judgment on alternative surgical options when faced with complications [33]. There are also considerations for optimizing staff efficiency including task-shifting and task-sharing. These maximize the use and time of trained and experienced health-care personnel. In both, non-physician providers are used to completing all or some steps of male circumcision surgery which enables experienced surgeons to focus on the complex components of

the surgery [13]. This addresses human resource challenges, the cost of acquiring the services and increases the output of VMMC. The use of non-physician providers to perform complex clinical and surgical procedures (such as caesarean sections, mini-laparotomies, non-scalpel vasectomy, repair of simple obstetric fistula, and manual vacuum aspiration) to achieve high volumes of circumcision has been reported in many countries including Kenya and South Africa [33]

Client considerations which input client flow in the form of surgery set up to ensure that a surgeon handles more than one client at a given time on different tables are vital. With task shifting and sharing, teams ensure a continuous stream of work [13]. For instance, a client may be given local anaesthesia, draped and prepared for a surgeon who does the marking, removes the prepuce and achieves haemostasis. The assistant then stitches as the surgeon moves on to the next table. This is possible with increased skill and experience and allows for working on several clients. To avoid queues, a scheduling system that allows for a few clients to be booked at a specific surgical period, and get worked on must be in place. This improves the quality of services with little or short waiting times (Weiss et al., 2015). Furthermore, this must be planned and operationalized together with an effective supply chain management system that ensures forecasting for the required items, procuring and later distributing them at the required sites [28,29]. Disposable or reusable items must be purchased in kits and modules for the specific technique to be used. In pursuit of these, quality must be assured at all times to avoid the occurrence of adverse events among the post VMMC clients. Some studies report adverse events during mass circumcision [33,3]. These are due to non-sterile conditions and a lack of equipment which leads to poor quality of services. For instance, [33] assert that the rapid scale-up of VMMC services in South Africa led to a decline in the quality of surgical technique services and a rise in medical liability litigation [33]. Strict observance of rules prevents adverse events like amputation or partial amputation of the glans. For example,[33] propose that children should not be circumcised in the afternoon since operators could be fatigued, 15-minute breaks (at least every 1–2 hrs) for operators, setting a maximum daily cap on the number of men per a surgeon, proper examination of genitals before commencing procedures, use of open surgical techniques (dorsal slit) to ensure visualization of the glans before surgery, continuous training and retraining of providers and recommend more secure programs such as neonatal circumcision.

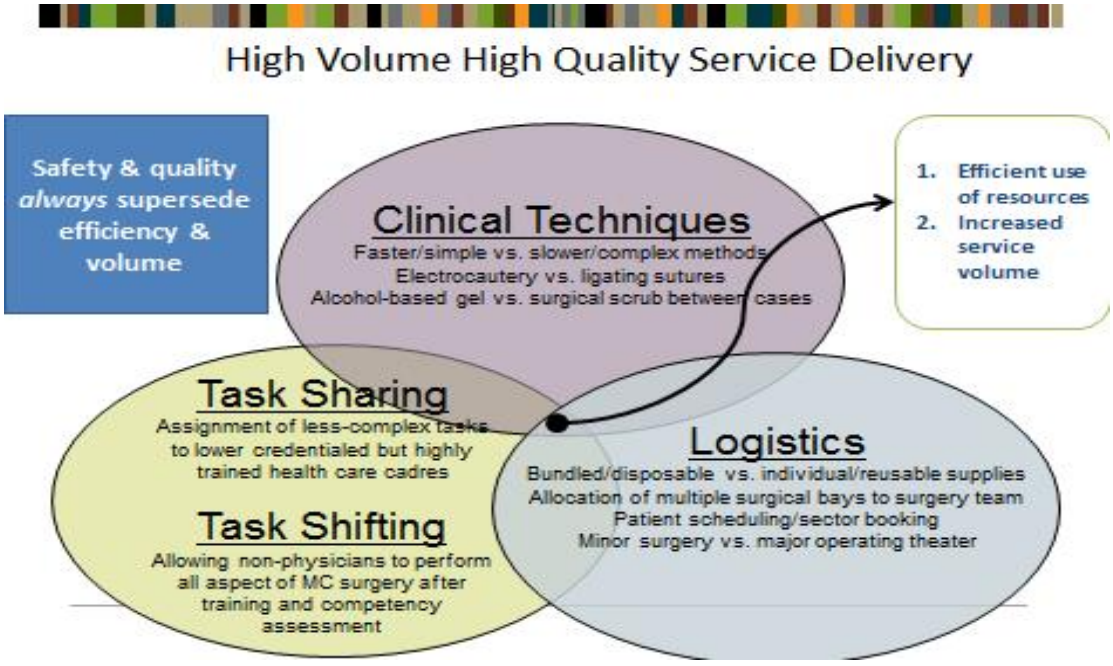

Figure. 1. Key features of the MOVE model (Hatzgold/PSI), 2020

3.2 The URC- DHAPP Package of Interventions

Cognizant of low VMMC coverage at inception and the unique context of a military setting, we hypothesized that a tailored hybrid package of interventions would address identified bottlenecks and significantly improve VMMC uptake. We sought to understand how contextual factors in the military influence program implementation. Our strategies involved a combination of evidence-based and military-specific, making them locally relevant and effective. The package of interventions included a) command-driven approach; b) mobile theatres; c) quality assurance; d) data strengthening and reflection as illustrated in Figure 2 below:

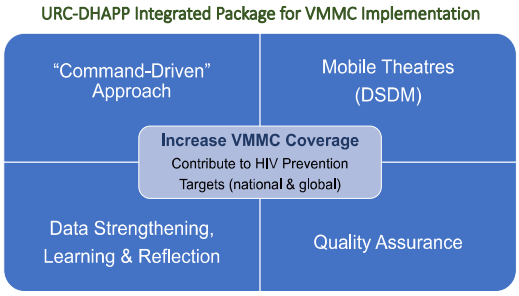

Figure 2: DHAPP's adaptation of MOVE for VMMC in military populations

3.2.1 The "Command-driven" Approach

This involved creation of demand for VMMC by invoking and leveraging the military leadership through the Command-Driven Approach (CDA). In a military context, the chain of command is the line of authority and responsibility along which orders are passed within a military unit and between different units. Orders are transmitted down the chain of command, from a responsible superior, such as a commissioned officer, to lower-ranked subordinate(s) who either execute the order personally or transmit it down the chain as appropriate, until it is received by those expected to execute it. The command is exercised by the office and the special assignment of members of the Armed Forces holding military rank who are eligible to exercise the chain of command can be defined as a line of authority that extends from the top level of the organization to its lowest level. The chain of command defines that a commander must be accountable for the health of his troops, and their tasks. Further, it explains who to be contacted when critical situations or problems occur in the line of command. Commanders apply the chain of command when assigning tasks to the soldiers. In the process of creating demand for VMMC, the military leadership must be convinced that MC is important for their staff. They should also be informed of soldiers' rights including the rights to life and health. This awareness trickles down when the leadership sensitizes their troops for instance through repeated command messages and continuous health education.

Leveraging this approach alongside other interventions, we increased demand for VMMC among men in uniform. To expand VMMC, surgeons were assigned daily targets of at least 40 males; and they worked with commanders to mobilise their troops for VMMC. Military leadership created awareness through repeated command messages to troops and continuous health education. In the process of creating demand for VMMC the military leadership ensured that services add value to the health of soldiers while at the same time being mindful of soldiers' right to health and respect for human rights. Implementing the CDA proved successful across all DHAPP sites and VMMC performance improved from 31% to 62% with over 2,931 males circumcised within the first month.

3.2.2 Mobile Theatres

Planned outreach activities are proven ways to increase HIV preventive health services among mobile populations (such as the military) whose operational movements or deployments are unpredictable. Mobile units can also be used to provide VMMC services in settings with little or no existing health care facilities and infrastructure [2,11]. In the DHAPP, the mobile theatre package was implemented to align to the Differentiated Service Delivery for Military (DSDM) with focus on 'reaching the last troop". Regular visits to outposts worked to increase VMMC coverage, condom distribution, health education and HIV testing with subsequent treatment for the positives in the priority population. VMMC services were provided by placing several mobile camps at health facilities close to sites where troops are deployed. This allowed for colossal numbers to access similar services even in remote deployments. UPDF commanders requested for the services through their medical leadership which in turn also requested VMMC programs from URC. In the end, several soldiers accessed preventive

services without needing them to move from their operation sites except during recovery periods. The mobile nature of the VMMC program also increases coverage in line with universal health coverage goals that cater for equity through the availability of service to those who are in need irrespective of the population or geographical location [35,36].

3.2.3 Quality Assurance

Although volumes were important to DHAPP, emphasis was on the appreciation that volumes must not be achieved at the expense of quality. Quality was achieved though appropriate management of the VMMC service. Quality assurance refers to the systematic process for closing the gap between actual performance and desirable outcomes" [28,29]. Provision of a quality service within the confines of the deployment or the working conditions of the troops was a priority. The overall VMMC team members included a team leader, counsellor, laboratory technician, vaccinator, two surgeons, and four surgical assistants. Before surgery, URC provided client health education and preparation to ensure that eligible adults from the military areas and surrounding communities are circumcised. This was done with a clear division of roles. For instance, the provider team comprised of a resident clinician and nurse who mobilised clients and ensured that post wound care is done after departure of the mobile teams. Daily VMMC camp reports were shared with the UPDF (Uganda People's Defence Forces (UPDF) Directorate of HIV (DHIV) and URC which was important for monitoring of program performance coupled with routine supervision

Figure 3. (Above) A UPDF commander sensitizes his troops about VMMC; and (below) surgeons performing VMMC procedures in a military post

Figure 4. Reaching soldiers in hard-to-reach outposts and Figure 5: Performing VMMC at a mobile theatre

spot checks. Routine supervision and spot checks are undertaken by URC-DHAPP/UPDF-DHIV to ensure that quality service delivery is maintained at all times. Bailey et al [27] advise that all adverse events related to the VMMCintervention must be resolved urgently. Any adverse events reported to the facility post 48 hours were managed and documented. Further, follow up was conducted through continued contact and information sharing between the mobile and resident teams through telecommunication. Adverse Events (AE)were reported and the teams worked hand in hand depending on the severity[1]. All the data about procedures and follow up activities was confidentially stored.

3.2.4 Data Strengthening and Reflection

A critical component of URC-DHAPP's package, data strengthening was used to optimize the volumes and efficiency of VMMC among military troops. It involved briefing all stakeholders (URC-UPDF program staff and senior leadership) on the performance trends of completed VMMC camps, challenges encountered and proposed mitigation strategies. Training sessions were facilitated by URC leadership to prepare mobile teams before field visits. It involved real-time presentations of performance data analysed over time that presented circumcised numbers, team participation, the costs, challenges, and best practices. Each team was encouraged to brainstorm solutions. During these interactions, potential barriers were also raised and addressed to decrease eventualities during field engagements. The learned skills were put to use immediately after these sessions [11]. The reflection on previous field activities enabled teams to come up with realistic and achievable targets to which they were held accountable. The process increased team performance by learn from, and avoiding, previous mistakes. The preparation also ensured an efficient flow of client [11].

3.2.5 Outcome of the Intervention

This robust integrated approach led to an exponential increase in VMMC coverage and uptake from 3% to 140% within 9 months, reaching 22,000 males aged 15-49 in military populations.

4. DISCUSSION

To achieve the target of Zero new infections by 2030, VMMC coverage needs to be increased to ensure that majority of the males are circumcised. For resource-constrained countries with a high burden of HIV and faced with multiple health system challenges, the MOVE is cost-effective model to increase coverage and improvement in the quality of VMMC. However; contextual adaption is necessary for priority and key populations whose access is restricted by multiple factors. The DHAPP integrated approach implemented in a Ugandan military setting provides insight into implementation experiences and showcases good practice in

[1] *A complementary paper (Lugada et al, 2021) provides insight into AE reporting and management in DHAPP's VMMC programming.*

mobilization demand creation within unique populations and contexts. The URC DHAPP program was able to set up a mobile VMMC clinic within four months. In this period, VMMC services were extended to 22000 males in the age groups 15-49 indicating an increase from 13% performance at Q2 to over 140% in Q4.

Demand generation is key because as more men get circumcised, fewer will become infected with HIV [11]. This necessitates that all the eligible males are empowered to undergo VMMC. Hines assert that demand for VMMC can be achieved through 1) awareness, 2) linking VMMC with prevention activities for women (such as, perinatal HIV testing services and HIV prevention programs that target adolescent girls and young women), 3) engaging community leaders such as traditional and religious leaders, celebrities, and satisfied VMMC clients, 4) compensation and 5) universal service provision regardless of HIV status [18]. In a military setting, this is an achievable task with the involvement of commanders and the command- led form of leadership. Given its voluntary nature, commanders must empower their troops for them to appreciate the medical value of circumcising. This is achievable through adequate mobilization, health education, and communication of unit data to headquarters. This is also important to ascertain the demand for MMC at specific units. Besides, it is important to work with all levels of the health system and leadership [35].

Our paper adds to the growing body of research from sub-Saharan Africa on VMMC demand creation among hard-to-reach men [4,3]. As illustrated, the army unit commander is the starting point in demand creation and mobilisation for the troops to undergo VMMC. At the strategic level of command, the top leadership determines the threats and anticipates the vulnerable troops and whether or not they can access the service without disruption of their work. Coordination of information is important because it allows for planning and scheduling so that different soldiers access the service at different times. In line with a study by [2] mobile services, facility based-based HIV testing, active referral follow-up and comprehensive provision of information/sensitization increased VMMC uptake among the military settings. Our strategy provides an alternative or complementary approach to other VMMC demand generation strategies like economic incentives, targeted messaging, compensation, use of media and celebrities used in other sub-Saharan countries like Kenya, Tanzania, South Africa and Botswana [3-6,16,7,8]. For instance, in Tanzania, the demand creation package included enhanced public address messages, peer promotion by recently circumcised men, facility setup to increase privacy, and engagement of female partners in demand creation to increase uptake of VMMC in men 20–34 years [5].

VMMC can also be scaled by improving the distribution of services to the target population. Hines described this as the supply side of VMMC [18]. According to [18] the supply of VMMC can be improved by 1) offering the service on appropriate days and time 2) use of mobile outreach, 3) ensuring quality services and client safety, 4) combining VMMC services with other health care services such as pre-exposure prophylaxis, HIV care and treatment, and general medical care; and 5) introducing other medical innovations. Due to the mobile nature of their work, soldiers require medical services at their deployment sites. Such sites are usually isolated which indicates that they also lack time of attending the normal routine medical health systems. The model of VMMC provided through mobile camps is therefore critical to avert the high risk of HIV transmission [4]. Compliance to quality issues is critical. Standard VMMC services must comprise an effective management system, the minimum VMMC package, availability of necessary medicines, supplies, equipment and environment, competent providers, health information and education on HIV prevention and MMC, medical assessments for clients, infection prevention and control measures, continuity of care and monitoring system [28,29].

VMMC programs are done in observance of strict rules including regular monitoring and training of operators to ensure quality surgical techniques such as cleanness [33]. Besides, an examination of the scope of practice health professionals at all ranks, the reliability of electricity, the available healthcare facilities, demand and political considerations [13]. Other studies also recommend the use of onsite coaching and mentors to maintain the accepted standards [11]. For instance, a randomized controlled trial to reduce provider workload in Zimbabwe's VMMC program employed an experienced Medic Mobile trainer from Nairobi to closely work with the local study coordinator and team members which greatly improved adaptation and modification of standard operating procedures before implementation [3]. The biomedical prevention

VMMC model is well packaged so that the troops get a quality service, with a highly qualified mobile team that caters to the whole cascade of VMMC service from demand creation, health education, surgery, post-op care and follow up. It is also important to combine VMMC with behavioural techniques such as the reduction in risky behaviour and this is handled during post-management care and counselling as it only provides partial protection and is not a magic bullet in HIV prevention.

Although we did not ascertain the cost of previous methods, MOVE is cost-effective in many ways. For instance, it targets a larger number of men who, in most African societies, are the heads of households and wield power for managing critical resources for HIV prevention and care [26]. VMMC does not only benefit the circumcised individual, for instance, women substantially gain from the reduced spread of HIV and STIs. As mentioned earlier, it reduces the risk of HIV acquisition among adult males by 60% and other medical benefits such as penile cancer. According to Kiggundu [11], projecting that model at levels of 80% circumcision coverage can lead to a proportionate number of HIV infections averted in women as in men after 15 years. The military - as migrant workers - are a key population with a high incidence of HIV and remain relatively underserved by HIV prevention and treatment services [22]. The mix of previous methods is at times expensive. For instance, follow-up could be difficult due to out-migration and transfers [22]. With about 73,000 new HIV infections occurring annually in Uganda [24], this shows a deficit in the effective implementation of strategies to stop transmission and prevent the occurrence of new HIV infections. Our MOVE adapted approaches could be significant in reducing HIV incidence in high burden areas due to scale up in VMMC and can complement current HIV treatment and prevention interventions. Combined, they can rapidly expand and have a substantial population-level impact on HIV incidence. Our research shows that the MOVE is safe, highly acceptable and can scale up VMMC within a limited period. The MOVE model as adapted in the Uganda military can be extrapolated to other key populations not only in Uganda but also in the other WHO and UNAIDS determined 13 VMMC priority countries (Botswana, Ethiopia, Kenya, Lesotho, Malawi, Mozambique, Namibia, Rwanda, South Africa, Swaziland, Tanzania, Zambia, and Zimbabwe) with a high HIV burden and low male circumcision prevalence [9,10].

The potential challenges of the MOVE are related to the quality of services. This concern is not about the possibility of VMMC to reduce the chances of contracting HIV but rather about the consistency in observation of clinical procedures by the health workers. Given the desire to achieve volumes through task shifting and sharing, it is possible that operators get fatigued and commit irremediable mistakes. In our study, we ensured that appropriate facilities were available to avoid harming patients. Further, the MOVE could be associated with problems of balancing demand and supply as well as inadequate counselling and communications. We countered this through clear communication between providers and the authorities in the military service.

5. CONCLUSION

This paper outlines the interventions for organizing adult VMMC services to improve efficiency and service volume. We have shown the adaptation of MOVE to develop innovative strategies to scale up VMMC in HIV high-risk settings or population while guaranteeing a safe service of high quality. Overall, our innovative methods (command-driven approaches, mobile camps data strengthening and quality assurance) significantly increased VMMC uptake. Nevertheless, there are preconditions to achieve comprehensive VMMC services such as careful planning of skills, commodities and infrastructure. The scale-up of VMMC requires trained and competent health personnel to match the scale of service delivery. Further, work must be arranged in a manner to rationalize and maximize personnel time.

The MOVE adapted approaches are cost-effective even in low-income countries particularly intending to scale up a reduction in HIV infections when the right stakeholders are involved. Adaptation of the MOVE model within the military setting while cognizant of contextual specificities is highly effective, providing opportunity to scale up national VMMC coverage to achieve 2030 VMMC targets and HIV epidemic control.

Access to VMMC services and health services is a public health issue both globally and in Uganda. URC-DHAPP's implementation experience shows the importance of continued efforts to expand targeted HIV services. These concerns could be addressed by tailoring the MOVE model to the general population.. The use

of mobile camps could increase access to HIV services and benefit hard-to-reach people and key populations. Data strengthening and general approaches that could be used to maintain service quality and social welfare and significantly increase VMMC uptake. We recommend a MOVE approach for the civilian population that accentuates demand creation to balance supply and demand, maintenance of safety and quality of VMMC services, follow-up of adverse events and referral of HIV-positive men for enrolment into care and treatment. As demand creation increases for VMMC the population must be continuously sensitized about its partial protective capacity, supported and availed with comprehensive packages or products to prevent risky behaviour and contribute to HIV prevention targets.

CONSENT

Consent was obtained from all males before undergoing VMMC.

ETHICAL APPROVAL

The implementation of both program and research activities adhered to required ethical standards. We obtained research approval for the study from The AIDS Support Organisation (TASO) Institutional Review Board (IRB); Uganda National Council of Science and Technology (UNCST), The Ministry of Health and Uganda People's Defense Forces (UPDF).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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