Chapter

Scaling Safe Circumcisions in Communities

Shazia Moosa and Lubna Samad

Abstract

Male circumcision (MC), although a common and simple procedure, is not available to a majority of the population as a safe, sterile intervention. The convincing evidence of the protective role of circumcision towards the spread of STDs (particularly HIV) led to the establishment of voluntary, adult male circumcision programmes in high-HIV-burden countries. In low- and middle-income Muslim countries, where the need for circumcision is high, there is an evident gap in access to, and delivery of, this procedure. Large-scale programmes aimed at circumcising male babies in settings where circumcision is a religious requirement, as opposed to a medical indication, have not been established. This chapter would draw upon current guidelines and literature, review existing programmes that have attempted to establish community-based safe circumcision initiatives and discuss strategies for sustainable scale-up to meet this huge public health need. We believe it is important to translate existing clinical knowledge into a population-based healthcare intervention.

Keywords: male circumcision, early infant male circumcision, plastibell circumcision, task sharing, health provider, scale-up

1. Introduction

Amidst the debate on whether the benefits of circumcision outweigh risks, regardless of the reason for circumcision and irrespective of geographical, ethical and socio-economic boundaries, circumcision continues to be one of the commonest surgical procedures performed globally [1]. Since male circumcision (MC) is universal in Muslim and Jewish populations, circumcision prevalence of 99.9% was estimated, and in non-Muslim, non-Jewish states, a minimum prevalence of 0.1% was assumed to calculate the global MC prevalence of 37–39% [2]. This estimate is higher than the one given by the WHO in 2008 which was 30% [3]. The reason for the rise in MC prevalence could be attributed to the rising number of Muslims worldwide [4, 5] and to the initiation of voluntary medical male circumcision (VMMC) programmes encouraged by the WHO and the joint United Nations agency programme on HIV/AIDS—UNAIDS in sub-Saharan African countries as a preventative strategy to curb the rising incidence of HIV [2].

2. Scale of practice

2.1 Burden of circumcision

According to the *CIA World Factbook*, the annual global birth rate is estimated to be more than 134.5 million births [6]; assuming half of these to be males and using the above-mentioned global MC prevalence, 25.5 million potential circumcision procedures are required across the globe every year. Religion, culture and medical reasons are the main indications prompting families to opt for circumcision.

2.1.1 Religious considerations

An estimated 23.2% of the world's population comprise Muslims with nearly 69% of them residing in Asia and 27% in Africa [4]; 0.2% are Jews, 80% of whom live either in Israel or the USA; religious traditions in both communities staunchly advocate circumcision.

Taking Pakistan as an example of a developing Muslim country in Asia, an estimated 2.5 million male babies are born in Pakistan every year [6], almost all of whom undergo circumcision in their infancy or childhood [3]. Presently, the vast majority of circumcisions are performed by traditional circumcisers, barbers and untrained paramedical staff using unsterilized instruments and unsafe techniques with no follow-up or record of any complications; only 5–10% of boys present to qualified surgeons and physicians [7]. It would be unreasonable to rely on specialists and general practitioners to fulfill this huge unmet need for safe circumcisions, given that the estimated physician density in Pakistan is 0.978 per 1000 with only about 200 registered pediatric surgeons in the country [8]. In countries where healthcare resources are insufficient, emphasis needs to shift towards developing a public health strategy whereby appropriate non-medical personnel are trained to perform circumcisions safely, using correct technique and modern infection control practices [9].

2.1.2 Cultural requirements

For thousands of years, traditional circumcision has been practiced in African tribes of sub-Saharan region and amongst many ethnic groups around the world, including aboriginal Australasians, the Aztecs and Mayans in the Americas and in the Philippines [3]. The prime reason for circumcision in most of these groups is to emphasize and celebrate the occasion of rite of passage to manhood.

2.1.3 Medical indications

Around 80 percent of American men are circumcised, one of the highest rates in the developed world [10]. The USA is the only country in the world where newborn circumcision in male babies is highly prevalent, allegedly for health benefits [11], and an overwhelming majority gets circumcised in hospitals, soon after birth [12]. According to estimates, 80–95% of male infants were being circumcised in the USA by the 1970s [13]. The US Centers for Disease Control and Prevention (CDC) proclaimed that this trend showed a decline thereafter, possibly influenced by the pronouncements of the American Academy of Pediatrics (AAP) in 1971, deeming there are no valid medical indications for circumcision in the neonatal period [14]. The CDC, however, collects voluntary data only from participating hospitals, some of which withdrew neonatal circumcision services due to financial reasons, thereby

displaying sharp decline in circumcision rates in those particular settings [11, 13]. Many hospitals chose to discontinue coding circumcisions as procedures which may have led to inaccuracy in the collected data; moreover, circumcisions performed during subsequent hospital admissions or as outpatients were not recorded. Therefore, accurate conclusions about the actual number of procedures being performed cannot be drawn. Nelson et al. reported that the incidence of newborn circumcision increased steadily between 1988 and 2000 in the USA from 48.3 to 61.1%, with the overall weighted incidence of circumcision being 54.4% [12]. Revision in the stance of AAP Task Force on Circumcision in 1989 to a more neutral position that stated 'Circumcision has potential medical benefits and advantages as well as disadvantages and risks' and that parental decisions should be based on informed consent, could be a possible factor influencing the circumcision rates. Availability of health insurance is another important factor favorably influencing the numbers of circumcisions [15]. Being the commonest surgical procedure performed in the USA, circumcision exerts a considerable impact on the health system of the country; on one hand, it usurps the medical budget by utilizing the health personnel and consumables that collectively build towards the direct cost of the procedure and its associated complications, and on the other hand, it helps to reduce any potential indirect costs by diseases that are averted as a result of benefits from the procedure.

In recent years, increasing evidence has linked male circumcision to lower rates of asymptomatic urinary tract infection (UTI) [16, 17], especially during infancy and to lower risk of transmission of sexually transmitted diseases, most notably of the HIV [18]. At the end of 2006, an estimated 39.5 million people were living with HIV, and the incidence of new cases was 4.3 million that year [19]. Three randomized controlled trials were conducted to assess the impact of MC on HIV risk [20–22]; all three studies were aborted when interim analysis showed compelling evidence that MC reduces the risk of acquiring HIV through heterosexual sex by 51–60%. This led to global attention on this procedure, thereby encouraging prophylactic circumcision in many countries with a high prevalence of HIV/AIDS [23], especially in sub-Saharan Africa. The WHO/UNAIDS recommended rapid scale-up of MC in settings where prevalence of heterosexually transmitted HIV infection is high, the levels of male circumcision are low, and populations at risk of HIV are large.

Africa has a unique burden of circumcision with many Muslim-majority countries, a high prevalence of HIV in many countries and cultural preferences in certain tribes. Somalia, a sub-Saharan African Muslim country displaying a very high birth rate and inadequate health services, has an unimpressive physician density of 0.02 per 1000. Uganda has 13.7% Muslims, with a high birth rate, physician density of 0.09 per 1000 coupled with a high burden of HIV cases. Kenya, accommodating 11.2% Muslims, with a high birth rate superimposed with a huge burden of HIV cases and a physician density of 0.2 per 1000 shows 84% of all Kenyan men are circumcised, predominantly due to cultural obligation [3].

3. Interventional strategies

Circumcisions prompted by religious, cultural or general health benefits are not an emergency. However, those required to control the spread of HIV epidemic globally are urgent, and crucial steps need to be taken to ensure their instatement. Therefore, the implementation of 'voluntary medical male circumcision' and 'early infant male circumcision' (EIMC) programmes to tackle HIV spread and high volumes of routine circumcisions, respectively, provide plausible solutions.

3.1 Voluntary medical male circumcision

3.1.1 Counseling and dissemination of correct information

First and foremost, factual information should be clearly provided to high-risk communities in general and to the men opting for circumcision and their partners in particular. MC has shown to reduce, *not eliminate*, the risk of acquiring HIV through heterosexual sex; it is not known whether MC directly reduces sexual transmission of HIV from HIV-positive men to women or if MC has a protective role in men who have sex with men (MSM). MC should be considered only as an adjuvant to therapy along with other HIV prevention measures, and it should not mislead circumcised individuals into considering high-risk sexual behaviors as inconsequential. Additionally, it should be conveyed that abstinence from sexual activity is required after circumcision for at least 6 weeks to ensure that the wound has healed completely; otherwise the circumcised men would be at a higher risk for contracting HIV from an infected partner, or if HIV-positive, then there would be a higher risk of infecting their sexual partners.

3.1.2 VMMC: a preventative strategy

The vast majority of people living with HIV belong to low- and middle-income countries, particularly in Africa. Immediate intervention proposed by the WHO/UNAIDS in 2007 for impeding HIV spread was provision and rapid scale-up of VMMC services in at least 14 vulnerable countries in Africa where HIV prevalence was high, spread was predominantly through heterosexual transmission, and MC levels were low [24]. Target was to achieve 20 million circumcisions in HIV-negative men by 2016. By the end of 2013, only 30% of the target was achieved, and a joint strategic action framework was devised by UNAIDS, the WHO and other stakeholders to review the steps in order to expedite the scale-up of VMMC to fulfill the desired goal [25]. Although the time-bound ultimate target seemed ambitious to be achieved by 2016 mainly due to large numbers of trained healthcare workers required along with a continuous flow of funds [24], all involved countries showed an increase in the pace of scale-up of VMMC programmes leading to 12 million circumcisions of adolescent boys and men by the end of 2015 [26]. This proximity to the target encouraged UNAIDS and the WHO to launch a new, more holistic framework for action—VMMC2021. This document gives newer strategic directions on VMMC for HIV prevention and envisions that 90% of males aged 10–29 years will have been circumcised by 2021, in priority settings in sub-Saharan Africa.

It should be kept in mind that VMMC is unlikely to provide public benefit in areas where HIV prevalence is low or is concentrated in specific populations such as intravenous drug users, MSM or sex workers.

3.2 Early infant male circumcision

Whereas VMMC programmes have been popularly introduced and implemented in high-risk populations, there is a comparative absence of EIMC programmes in relevant countries. To promote the safe circumcision initiative, a manual was developed by joint efforts of the WHO and JHPIEGO in 2010, which also provided the technical guidance for structuring an EIMC [27]. However, large-scale adoption of this recommendation by stakeholders is yet to be seen. For effective implementation, a careful needs assessment should be conducted in advance to investigate the expected scale of requirement.

3.2.1 Muslim-majority countries

Promotion of early infant male circumcision programmes could be a simple, safe, reasonable and economical strategy in countries where burden of circumcision is high, financial constraints are present, and standard of healthcare services is low. In Muslim-majority countries like Pakistan, male circumcision is considered an essential religious practice; there is unanimous consensus that the male baby should be circumcised. Therefore, the focus needs to be on ensuring that these circumcisions are performed safely, as early as possible in life with the lowest possible risk of complications. Introduction of service delivery programmes, promoting and delivering safe, sterile early infant circumcisions at a subsidized cost or as part of the free public sector healthcare package, could provide a meaningful and long-term solution.

3.2.2 Developing countries with high-HIV prevalence

The WHO/UNAIDS and UNICEF also recommend EIMC be implemented simultaneously with scale-up of MC services as a long-term strategy for the control of HIV. Modeling studies show promising results for universal MC in sub-Saharan Africa, claiming it could significantly reduce morbidity and mortality associated with HIV over time [19]. For effective execution of EIMC services, maternal and infant health programmes need to be engaged as well.

3.2.3 Developed countries with a high circumcision burden

In countries like the USA with a high prevalence of circumcision or in other developed countries like the UK with pockets of Muslim-majority communities, the need for these procedures is high. Since medical insurance does not cover circumcision, there is risk of this procedure being restricted to affluent or insured patients, as indicated by falling circumcision rates in the USA in patients without insurance coverage [12, 15]. EIMC programmes introduced in these settings could fulfill the patient requirements as well as bring about significant cost reduction associated with the procedure.

4. Implementation and scale-up of EIMC programmes

The key aspects for successful implementation and scale-up of EIMC include training of health workers, developing programme infrastructure, ensuring supply of equipment and consumables, identifying funding and establishing robust monitoring and evaluation systems and policy development.

4.1 Training of health providers

Health providers need to be provided with theoretical knowledge about basic anatomy of the area and details of the surgical technique [1, 27, 28] and possible complications related to the procedure. This should be followed by practical demonstration of the technique. A US-based training programme employed the Gomco clamp method of circumcision [13] to train certified nurse-midwives (CNMs) in 1981, under supervision of obstetricians. In 1996, volunteer nurses in the UK were trained by consultant urologists to perform Plastibell circumcisions. A similar protocol is being followed by an EIMC programme established in Karachi, Pakistan,

since 2016, in which pediatric surgeons are training OR technicians, midwives, health workers and family physicians to perform circumcisions using the Plastibell method.

These training programmes have adopted a similar approach with theoretical training followed by skills teaching, initially performing procedures under close supervision, and subsequently independently with routine monitoring of outcomes. At the end of the training period, a knowledge and skills assessment is carried out before the health providers are certified to practice. This process allows the procedure to be performed safely and efficiently in settings where large numbers of circumcisions are required.

4.1.1 Types of providers

Task sharing is a well-established approach worldwide, whereby health providers are trained to perform high volume, technically less demanding tasks, under close supervision and monitoring with a referral system in place [29]. The 'manual for early infant male circumcision under local anaesthesia' by the WHO recommends that early infant male circumcision should primarily be the task of nonphysician healthcare workers which include, but are not limited to, nurses, midwives, clinical officers, health officers and assistant medical officers. Non-specialist medical doctors can also be trained for this procedure. The competence of the providers is the single most important factor affecting the outcome of the procedure and, hence, is critical to the success of any large-scale implementation.

Non-medical, religious providers called 'mohels', trained and supervised by the Ministry of Religion and the Ministry of Health, perform circumcisions in Israel [9]. Trained and certified nurses and midwives are another pool of non-medically trained providers that commonly perform this procedure in West Africa. Medically trained providers include obstetricians, pediatricians, general practitioners, general surgeons or pediatric surgeons and urologists, who routinely undertake ritual neonatal circumcisions in hospital settings commonly in countries like the USA and the Gulf states, in addition to performing therapeutic circumcisions in countries around the world.

The selection of the provider is influenced by preference of the family, the cost of the procedure, location, accessibility, culture and socio-economic status of the parents. If adequate numbers of physicians and specialists are available to run an EIMC, this may be the preferred approach in resource-rich settings. The real challenge arises in resource-constrained settings, especially in rural areas, where families approach traditional, untrained providers since they are the only viable option due to convenience, proximity or cost dynamics [9]. In Pakistan, 90–95% of circumcisions are performed by untrained barbers, technicians, religious or traditional circumcisers [7], who remain oblivious to the associated risks and are unable to handle complications that occur far too frequently. Similarly, barbers or traditional circumcisers are the popular choice in Egypt, Turkey and Iran for this procedure [9]. Not surprisingly, these untrained and unmonitored providers pose the biggest threat, with short- and long-term sequelae being the norm.

Links between the formal and informal health sectors could help increase the safety and quality of the procedure and enhance the monitoring and evaluation aspect of the program. In Accra (the capital of Ghana), where neonatal circumcision is almost universal, good links have been established between the Public Health Service and traditional circumcisers in order to provide regular training in safe infant circumcision. Similar models should be explored in other settings.

Circumcision is a simple surgical procedure that can be safely performed by a trained person. It does not have to be done by a doctor or a specialist. All types of health providers, whether they are surgeons, nurses, technicians or traditional

circumcisers [7, 27, 28, 30], have shown comparable results as long as they are adequately trained.

4.1.2 Circumcision techniques

The three common methods of neonatal or early infant circumcision include Plastibell, Mogen clamp and Gomco clamp. Providers can be trained to perform any of these techniques as all of them have comparable safety profiles [27, 31]. Adoption of a single method is recommended to ensure standardization of technique in order to facilitate the training of the providers and their monitoring by making fair comparisons based on occurrence of complications; additionally, employment of a single method enables ease of procurement for the program. Plastibell technique of circumcision is a simple method that is easily taught and can be performed safely by health providers with low complication rates [31–34]. However, the clamping devices may be safer for EIMC in regions where follow-up services to deal with complications, like retained rings, are unavailable [33].

4.2 Programme infrastructure

EIMC programmes best serve their purpose and provide maximum benefit to communities when they are integrated into existing healthcare systems such as the maternal, neonatal and child health (MNCH) programmes. For example, introduction of such programmes at birthing or vaccination centres is advised, where a stream of age-appropriate patients is already expected. Targeting these places would result in early and successful establishment of these programmes. Vertical, solitary programmes may be useful as short-term, pilot programmes or as training centres for health providers in areas where circumcision rates are high and healthcare systems are weak. Once piloted, replication and scale-up strategies should be employed to achieve sustainability.

4.2.1 Timing of circumcision–a critical factor

Circumcision can be performed at any age. Judaism proposes the eighth day of life in a healthy baby; in Islam, the time could be anywhere between birth and puberty. In some Muslim countries like Pakistan, cultural pressures influence the timing of circumcision. The ritual is ordained to be celebrated as a festive occasion with special arrangements including dinner, requiring the presence of relatives and friends, especially amongst certain ethnic groups. This exerts an unnecessary financial strain on the families who often delay the circumcision of their babies till they have enough money to organize the event, which often makes them cross the beneficial age-limit of 2 months following birth. In order to discourage this practice and to create awareness amongst masses regarding the advantages of early infant circumcision, a video was developed in the national language as a tool for information dissemination by an EIMC programme established in Karachi, Pakistan. The link to this Video 1 (with English subtitles) is available here: https://bit.ly/38be8P5.

From the medical point of view, the neonatal period offers the best opportunity for circumcision with avoidance of general anesthesia and its associated challenges; additionally, it provides all possible benefits of circumcision to the baby as early as possible in life, with better and early chances of recovery, lower cost and a lower incidence of post-procedure complications. MC should not be performed until at least 24 hours after birth to ensure the infant is stable and has had time to void, feeding has initiated, and abnormalities, if any, become apparent [27]. Therefore, for large-scale EIMC programmes, early procedures performed from the second day

of birth up to 2 months, in otherwise healthy babies, are preferred [27, 35]. Since circumcision is an elective procedure, it should be deferred in case the baby is unwell, underweight, preterm or if any doubts surface during screening. Physiological jaundice is not considered a contraindication; however, if the baby is deeply jaundiced, circumcision should be deferred, and referral for appropriate work up and management should be initiated as soon as possible [35, 36]. Ethical arguments propose that circumcision should be deferred till the patient is old enough to make his own decision; however, delaying or postponing the procedure negates the protective effect of circumcision required as early in life as possible and the concomitant reduced-cost benefit due to avoidance of general anesthesia.

4.2.2 Programme prerequisites

During the 1970s in the USA when circumcision rates were at their peak, the procedure was considered so beneficial that many hospitals did not require a written consent [13]. However, in 2012, the Task Force on Circumcision (which included members of the American Academy of Pediatrics (AAP), American Academy of Family Physicians (AAFP), American College of Obstetricians and Gynecologists (ACOG) and Centers for Disease Control and Prevention) stated that 'benefits of circumcision outweigh its risks' and strong recommendations were made to obtain 'informed consent' from parents or guardians prior to the procedure [1].

While establishing neonatal male circumcision programmes, the Task Force on Circumcision and the WHO [27] also recommend vitamin K to be routinely administered to the babies before the procedure in order to help prevent post-procedure bleeding. Routine pre-procedure investigations are not advocated nor justified in large-scale EIMC programmes [35]. Circumcision is contraindicated in babies born with genital abnormalities (like epispadias, hypospadias, chordee, ambiguous genitalia, micropenis, buried penis, penoscrotal web or bilateral hydrocele), blood dyscrasias or those with a family history of bleeding disorders.

Additionally, pain relief should be provided to the infant during the procedure. For this purpose, dorsal penile nerve block or ring block could be employed; the former has the advantages of lesser number of pricks and a shorter duration of onset.

4.2.3 Post-procedure care

If trained providers perform the procedure, post-circumcision complications are generally minor and easily managed. However, they can and do occur, even in the best hands. Health providers should be equipped to handle simple post-procedure complications like minor bleeding requiring application of pressure with or without topical adrenaline or simple cutting and removal of a Plastibell ring that fails to shed spontaneously. If these complications occur in post-clinic hours, then a referral system to handle these or other common complications following circumcision ensures the success of EIMC programmes. The ongoing recruitment and training of health providers in large-scale programmes poses a constant challenge in terms of high chances of occurrence of complications by new trainees; this can be addressed by a reliable referral system to handle these when the need arises.

4.2.4 Patient follow-up and outcome documentation

Patient follow-up and outcome determination are of utmost importance in any public health intervention. In EIMC programmes, active and passive follow-up after the procedure allows documentation of post-procedure adverse events and

helps assess parental satisfaction with the process. Diligent and regular review of data allows the programme team to monitor quality and safety outcomes and address any challenges that may be identified. Refresher training and modification of technique or approach may be instituted to address any issues that may arise. A helpline or open access to the clinic allows patients to call or come in with concerns that can either be adequately dealt with by the primary team or referred appropriately.

Low literacy levels, socio-economic constraints and geographical barriers are all hurdles to early recognition and reporting of complications, which if left unattended, could lead to serious adverse events following a simple procedure like neonatal circumcision [37]. Regular engagement between providers delivering health services and families in the communities, to counsel them before and after the procedure, helps build a rapport which is the basis of successful public health programmes. This bond could be utilized by the providers to probe and carry out a qualitative analysis to judge the acceptability of the programme by the community or to find ways to improve the services by getting direct input from the biggest stakeholders in this arrangement. On the other hand, the health providers could be the source of correct information and guidance for these communities regarding various aspects of health promotion. Participants of the programme usually share their experiences with others in the community; reputation, good or bad, spreads through word of mouth, either encouraging or discouraging others to opt for similar services.

4.3 Programme equipment and consumables

Timely procurement of programme equipment like circumcision sets and boards, amongst others, along with adequate stock of consumables, is vital to ensure smooth running of these programmes. The major hurdle towards scale-up of this programme into the community and especially in rural areas is the limitation of availability of central sterile services department (CSSD) for sterilization of instruments used for circumcision. Scale-up of such programmes would be facilitated by the employment of pre-packed circumcision sets, containing single-use, low-cost instruments and consumables. This approach has already been adopted by VMMC programmes [24] in Africa but is currently under consideration and trial for EIMC programmes. Large-scale implementation would allow the cost of these sets to be minimized.

4.4 Funding

Countries which require establishment of EIMC programmes should draft a budget and allocate funds accordingly. Continuity of disbursement of funds is vital for programme operations. In countries where religious circumcision is needed and those with a high requirement of circumcision due to HIV prevalence, EIMC service delivery programmes should be established with no cost or lowest possible cost to the patient. Private donors and governments should consider cost saved from avoidance of occurrence of diseases like UTI and sexually transmitted diseases like HIV. Additionally, circumcisions performed on older children are costlier because of the need of general anesthesia and hospitalization; there is also an increased risk of post-circumcision complications in older children which require medical attention and, hence, account for added expense. Lastly, the societal cost of botched circumcisions in the hands of untrained providers must be avoided under any circumstances.

4.5 Monitoring and evaluation system

Strong coordination between the programme team members is important for effective functioning of the program. Adherence to programme guidelines, regular surveillance of data and management of inventory should be ensured by the programme manager. In our experience, the use of a software application for data collection allows real-time monitoring and rapid access to data for analysis which forms a critical part of a large-scale-up implementation. This also serves as an effective monitoring tool. All complications per provider should be recorded and feedback shared with the team on a regular basis to review and revise the technique as required.

Goals and objectives of the programme should be specified when the programme is being conceptualized. Goals are achieved over for a long term (5–10 years); as an example, with effective establishment of EIMC programmes, an increased prevalence of circumcision in infants should be detected. Objectives are shown by results achieved. Additionally, parameters to study the structure, process and outcome indicators should be delineated. These should be monitored routinely to assess the progress of the program. An example of an outcome indicator is the number of post-procedure complications out of the total procedures performed.

4.6 Policy development

For scale-up of EIMC programmes, it is essential that there is a legal framework supported by policies to ensure that neonatal or early infant circumcisions are performed safely. This includes obtaining informed consent from parents or guardians prior to the procedure and, in the absence of any coercive influence, use of safe technique and sterile instruments along with reliability of trained providers. Most countries display a lacking in it but Israel is an exception [9]. According to Israeli law, circumcision of baby boys up to 6 months of age is considered a religious ritual which can be performed by religious or traditional circumcisers; beyond this age, only qualified surgeons are allowed to do so. Additionally, Israeli government is directly involved in the training of traditional providers or mohels. Formulation of a national policy on similar lines, to promote safe circumcisions in Muslim-majority countries or regions, is urgently required.

Circumcisions are being done by nurses and other health providers in VMMC programmes; however, some countries like Pakistan have not looked at task sharing as a way to address the critical shortage of healthcare professionals. A national health policy framework should be developed to facilitate and encourage task sharing [29]. This has been done successfully in maternal and child health by training nonphysician clinicians (NPCs) and traditional birth attendants (TBAs) in comprehensive emergency obstetric care [38].

While circumcision is being employed as an option to curtail the number of HIV cases, it could well be the source of spread of blood-borne infections like hepatitis or HIV, if aseptic measures are not adopted [35, 39]. Circumcisions performed by untrained traditional providers in non-clinical settings with unsterilized instruments pose the greatest threat. Therefore, awareness and training of health providers to practice a safe, sterile technique in EIMC programmes is imperative for success and scale-up. Policies should be structured to ensure sterility of equipment used for circumcision.

5. Existing models of EIMC

Table 1 shows a comparison of a few EIMC programmes of somewhat similar characteristics.

Country of origin/ study reference	Year/duration of program	No. of circumcisions	Age of babies	Type of provider	No. of providers trained	Method	Complication rate
USA/ [13]	1981–1991/10 years	1000	Newborns	Certified nurse-midwives	3	Gomco clamp	0.1%
UK/ [40]	1996–1998/2 years	168	6–14 weeks	Nurses	3	Plastibell method	18%
UK/ [28]	1996–2005/9 years	1129	6–14 weeks	Nurses	Not specified	Plastibell method	8.2%
Pakistan	From 2016 (ongoing)	3755	Up to 3 months	OR technicians, midwives, health workers, family med residents	12	Plastibell method	3%

Table 1.
Comparison of EIMC programmes.

6. Conclusion

Impact of EIMC programmes can be realized immediately in countries where religious obligation is the motivation; however, impact on HIV incidence will not be evident until at least 20 years from commencement of the programmes. Implementation followed by scale-up of EIMC programmes should be encouraged as this relieves the stress on the health system of any country requiring high volumes of circumcisions. Technicians, nurses, midwives and health workers could serve as the promising pool of task-sharers to reduce the financial and technical burden without compromising on patient safety and outcomes.

Success of these programmes depends on proper training of health providers, close monitoring of outcomes and a reliable referral system. Additionally, strict adherence to programme protocols and provision of clear instructions to families on the need for early reporting of complications are essential for best results.

Conflict of interest

The authors declare no conflict of interest.

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References

[1] Circumcision AAoPTFo. Male circumcision. Pediatrics. 2012;**130**(3):e756

[2] Morris BJ, Wamai RG, Henebeng EB, Tobian AA, Klausner JD, Banerjee J, et al. Estimation of country-specific and global prevalence of male circumcision. Population Health Metrics. 2016;**14**(1):4

[3] World Health Organization Report. Male Circumcision: Global Trends and Determinants of Prevalence, Safety and Acceptability. Geneva, Switzerland; 2008

[4] Kettani H, editor. 2010 world muslim population. In: Proceedings of the 8th Hawaii International Conference on Arts and Humanities. 2010

[5] Kettani H. Muslim population in europe: 1950-2020. International Journal of Environmental Science and Development. 2010;**1**(2):154

[6] Central Intelligence Agency. The World Factbook. Washington D.C; 2019

[7] Rizvi S, Naqvi S, Hussain M, Hasan A. Religious circumcision: A Muslim view. BJU International. 1999;**83**(S1):13-16

[8] '200 paediatric surgeons cater to 45pc population'. Dawn Newspaper. Pakistan. March 04, 2017. [Accessed: 26 November 2019]

[9] Joint United Nations Programme on HIV/AIDS (UNAIDS). Neonatal and Child Male Circumcision: A Global Review. Geneva, Switzerland: World Health Organization Report; 2010

[10] Rabin RC. Steep Drop Seen in circumcisions in U.S. The New York Times. New York City, United States of America; 2010

[11] Wallerstein E. Circumcision. The uniquely American medical enigma. Urologic Clinics of North America. 1985;**12**(1):123-132

[12] Nelson CP, Dunn R, Wan J, Wei JT. The increasing incidence of newborn circumcision: Data from the nationwide inpatient sample. The Journal of Urology. 2005;**173**(3):978-981

[13] Gelbaum I. Circumcision: To educate, not indoctrinate—A mandate for certified nurse-midwives. Journal of Nurse-Midwifery. 1992;**37**(S1):97S-113S

[14] Library TCR. United States Circumcision Incidence. 2010. Available from: http://www.cirp.org/library/statistics/USA/

[15] Mansfield CJ, Hueston WJ, Rudy M. Neonatal circumcision: Associated factors and length of hospital stay. Journal of Family Practice. 1995;**41**(4):370-376

[16] Simforoosh N, Tabibi A, Khalili SAR, Soltani MH, Afjehi A, Aalami F, et al. Neonatal circumcision reduces the incidence of asymptomatic urinary tract infection: A large prospective study with long-term follow up using Plastibell. Journal of Pediatric Urology. 2012;**8**(3):320-323

[17] Morris BJ. Why circumcision is a biomedical imperative for the 21st century. BioEssays. 2007;**29**(11):1147-1158

[18] Krieger JN. Male circumcision and HIV infection risk. World Journal of Urology. 2012;**30**(1):3-13

[19] WHO. New Data on Male Circumcision and HIV Prevention: Policy and Programme Implications. Geneva: WHO; 2007

[20] Auvert B, Taljaard D, Lagarde E, Sobngwi-Tambekou J, Sitta R, Puren A. Randomized, controlled intervention trial of male circumcision

for reduction of HIV infection risk: The ANRS 1265 trial. PLoS Medicine. 2005;**2**(11):e298

[21] Bailey RC, Moses S, Parker CB, Agot K, Maclean I, Krieger JN, et al. Male circumcision for HIV prevention in young men in Kisumu, Kenya: A randomised controlled trial. The Lancet. 2007;**369**(9562):643-656

[22] Gray RH, Kigozi G, Serwadda D, Makumbi F, Watya S, Nalugoda F, et al. Male circumcision for HIV prevention in men in Rakai, Uganda: A randomised trial. The Lancet. 2007;**369**(9562):657-666

[23] Kim HH, Li PS, Goldstein M. Male circumcision: Africa and beyond? Current Opinion in Urology. 2010;**20**(6):515-519

[24] Ledikwe JH, Nyanga RO, Hagon J, Grignon JS, Mpofu M, Semo B-W. Scaling-up voluntary medical male circumcision-what have we learned. HIV AIDS. 2014;**6**:139-146

[25] WHO. UNAIDS, Joint Strategic Action Framework to Accelerate the Scale-up of Voluntary Medical Male Circumcision for HIV Prevention in Eastern and Southern Africa, 2012-2016. Geneva: WHO; 2011

[26] WHO. A Framework for Voluntary Medical Male Circumcision: Effective HIV Prevention and a Gateway to Improved Adolescent boys'& men's Health in Eastern and Southern Africa by 2021. Geneva: World Health Organization; 2016

[27] WHO. Manual for Early Infant Male Circumcision under Local Anaesthesia. Geneva: World Health Organization; 2010

[28] Palit V, Menebhi DK, Taylor I, Young M, Elmasry Y, Shah T. A unique service in UK delivering Plastibell® circumcision: Review of 9-year results. Pediatric Surgery International. 2007;**23**(1):45-48

[29] WHO. First Global Conference on Task Shifting. Geneva: WHO; 2008

[30] Chaim JB, Livne PM, Binyamini J, Hardak B, Ben-Meir D, Mor Y, et al. Complications of circumcision in Israel: A one year multicenter survey. Israel Medical Association Journal. 2005;**7**(6):368-370

[31] Bowa K, Li MS, Mugisa B, Waters E, Linyama DM, Chi BH, et al. A controlled trial of three methods for neonatal circumcision in Lusaka, Zambia. Journal of Acquired Immune Deficiency Syndromes. 2013;**62**(1):e1

[32] Moosa FA, Khan FW, Rao MH. Comparison of complications of circumcision by'Plastibell device technique'in male neonates and infants. The Journal of the Pakistan Medical Association. 2010;**60**(8):664

[33] Plank RM, Ndubuka NO, Wirth KE, Mwambona JT, Kebaabetswe P, Bassil B, et al. A randomized trial of Mogen clamp versus Plastibell for neonatal male circumcision in Botswana. Journal of Acquired Immune Deficiency Syndromes. 2013;**62**(5):e131

[34] Bode C, Ikhisemojie S, Ademuyiwa A. Penile injuries from proximal migration of the Plastibell circumcision ring. Journal of Pediatric Urology. 2010;**6**(1):23-27

[35] Jan IA. Circumcision in babies and children with Plastibell technique: An easy procedure with minimal complications-experience of 316 cases. Pakistan Journal of Medical Sciences. 2004;**20**:175-180

[36] Eroglu E, Balci S, Ozkan H, Yorukalp O, Goksel A, Sarman G, et al. Does circumcision increase neonatal jaundice? Acta Paediatrica. 2008;**97**(9):1192-1193

[37] Samad L, Jawed F, Sajun SZ, Arshad MH, Baig-Ansari N. Barriers to accessing surgical care: A cross-sectional survey conducted at a tertiary care hospital in Karachi, Pakistan. World Journal of Surgery. 2013;**37**(10):2313-2321

[38] Gessessew A, Ab Barnabas G, Prata N, Weidert K. Task shifting and sharing in Tigray, Ethiopia, to achieve comprehensive emergency obstetric care. International Journal of Gynecology & Obstetrics. 2011;**113**(1):28-31

[39] Khan N-u-Z. Circumcision–A universal procedure with no uniform technique and practiced badly. Pakistan Journal of Medical Sciences. 2004;**20**:173-174

[40] Shah T, Raistrick J, Taylor I, Young M, Menebhi D, Stevens R. A circumcision service for religious reasons. BJU International. 1999;**83**(7):807-809