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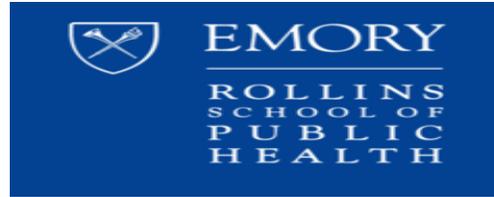
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Determinants of female and male sterilization uptake in crisis affected settings such as in the North Kivu province, Eastern of the Democratic Republic of Congo.

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Determinants of female and male sterilization uptake in crisis affected settings such as in the North Kivu province, Eastern of the Democratic Republic of Congo.

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Abstract.

Determinants of female and male sterilization uptake in crisis affected settings such as in the North Kivu province, Eastern of the Democratic Republic of Congo.

By Dr. Jean Jose Nzau Mvuezolo.

Background Supporting Access to Family Planning and Post-Abortion Care in Emergencies (SAFPAC) has supported governments in Sub-Saharan Africa by integrating essential sexual and reproductive health services into new and ongoing humanitarian emergencies since 2011. SAFPAC's work in the Democratic Republic of the Congo (DR Congo) aims to reduce unintended pregnancies and deaths from unsafe abortion. Among the many components of SAFPAC project in the DR Congo is the integration of female and male sterilization into the existing family planning programming in three health districts in North Kivu province affected by more than twenty years of social instability and war. Project's interventions include strengthening skills and improving attitudes of healthcare providers, equipping health facilities, implementing a community engagement strategy to engage religious leaders, community health workers (CHWs) and previous clients of female and male sterilization to facilitate participatory dialogue sessions and share their testimonies through radio broadcasts. This study seeks to identify determinants that led to a steady uptake of female and male sterilization in the three health districts since the beginning of the integration of these two methods that started in January 2016.

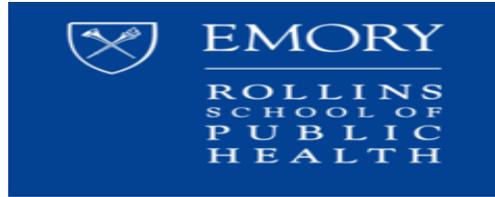
Methods We conducted a mixed method study (qualitative and quantitative) using an explanatory sequential design model. We first conducted in September 2018, 330 surveys (56 clients of male sterilization, 130 clients of female sterilization and 144 female users of other modern contraceptives methods). The preliminary analysis of quantitative data was used to develop instruments for the collection of qualitative data in October when we conducted nine focus group discussions (106 participants) and key informant interviews (with four healthcare providers) using open-ended surveys. Epi 7 and SAS software were used to analyze quantitative data and MAXQDA for qualitative data from which emerged themes.

Results The results have revealed that individual, programmatic, and environmental factors were the key contributors to the steady uptake of female and male sterilization. Limited resources (*p-value*:.02) and partner health issues (*p-value*:.001) were found to be associated with the decision of men of adopting male sterilization.

For sterilized women, a history of c-section was associated with the decision of women to adopt female sterilization (*p-value*:.003) and for users of other modern contraceptive methods, the decision to shift to a sterilization method could be justifiable if this method was recommended by a physician. (*p-value*: .027)

Other programmatic and environmental factors including 1) the confidence of healthcare professional to provide sterilization methods, free services, the support from partner and the buy-in of local religious leaders (Adventists and other protestant leaders).

Conclusion A holistic approach aiming to identify and address barriers at multiple levels (individual, interpersonal, community and programmatic) is essential in integrating male and female sterilization into existing family planning programming. Further research is needed to determine the contribution of each factor and test the replication of the package of interventions in other contexts.



Determinants of female and male sterilization uptake in crisis affected settings such as in the North Kivu province, Eastern of the Democratic Republic of Congo.

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Table of contents.

Acronyms.....	04
Table of contents	05
Introduction	06
Background	06
Review of the literature	14
Methods	25
Results	30
Discussion	53
Discussion	
Limitations	
Implications, recommendations and conclusion	
References	61

List of tables

Table 1: Socio-demographic characteristics of respondents in Lubero, Butembo and Kyanna/DRC.

Table 2: Family planning and sterilization: Knowledge and previous utilization.

Table 3. Reasons for choosing sterilization.

Table 4: Elements of the enabling environment.

Table 5: Bivariate logistic regressions

List of figures

Figure 1: Contraceptive prevalence among married or in-union women aged 15 to 49 by method and region, 2015.

Figure 2. Percentage share of specific methods of all contraceptive use among married or in-union women aged 15 to 49 worldwide, 1994 and 2015.

Figure 3: Map of Health zones in North Kivu Province, Eastern of the DR Congo.

Figure 4: New users of female and male sterilization in 8 health facilities supported by the SAFFAC Initiative in North Kivu, from January 2016-June 2018.

List of acronyms.

CARE	: Cooperative for Assistance and Recovery Everywhere
CBCA	: Communauté Baptiste du Congo en Afrique
CHW	: Community Health Worker
CEPAC	: Communauté Evangélique Presbytérienne en Afrique Centrale
DIHS2	: District Information Health System version 2
DHMT	: District Health Management Team
DHS	: Demographic Health Survey
DRC	: Democratic Republic of the Congo
FGD	: Focus Group Discussion
FP	: Family Planning
FS	: Female Sterilization
HZ	: Health Zone
ICPD	: International Conference on Population and Development
IUD	: Intra-Uterine Device
MDG	: Millennium Development Goals
MOH	: Ministry of Health
MS	: Male Sterilization
OCHA	: Office of the United Nations for the Coordination of Humanitarian Affairs
SAFPAC	: Supporting Access to Family Planning and Post-Abortion Care
UN	: United Nations
UNFPA	: United Nations Population Fund
UNHCR	: United Nations High Commission for Refugees
USAID	: U.S. Agency for International Development
WHO	: World Health Organization.

Chapter One: Introduction-Statement and Context.

1.1. Introduction

Evidence suggests that modern contraceptive methods are one of the most effective health interventions reducing maternal and child mortality, along with having other positive economic and social outcomes. Voluntary family planning brings transformational benefits to women, families, communities, and countries and there is a consensus that investing in family planning is a development “best buy” that can accelerate achievement across the Five Sustainable Development Goal themes of People, Planet, Prosperity, Peace, and Partnership. (Ellen S and all, 2016).

In early 1970, the World Fertility Surveys demonstrated the direct relationship between family planning and maternal-child health. (Aizenman DE, 1988). A modeling study of 172 countries estimated that, in 2008 alone, family planning averted 272,040 maternal deaths—a 44% reduction compared with the maternal deaths that would have occurred without contraceptive use (Ahmed S, 2012). Moreover, satisfying unmet needs for contraception could prevent another 104,000 maternal deaths per year (an additional 30% reduction). Similar analyses indicate that between 2012 and 2020, family planning could help avert approximately 7 million under-5 deaths and prevent 450,000 maternal deaths in 22 priority countries of the U.S. Agency for International Development (USAID,2014).

According to the 2015 report on trends in contraceptives use worldwide, 64 percent of married or in-union women of reproductive age worldwide were using some form of contraception with large differences across regions and countries. Most frequently, these women chose modern contraceptive methods so that 57 per cent used a modern method of family planning. Among all the regions, West Africa had the lowest modern contraceptive prevalence (12.6 percent) followed

by the Sub-Saharan Africa region (23.6 percent), with significant differences across sub-regions and countries. (United Nations, 2015)

Despite progress, political attention, and huge investment in the family planning sector, substantial gaps still persist in the use of modern contraceptive methods among couples and individuals who want to prevent pregnancy. More than 225 million women and girls in developing countries—particularly the poorest and most vulnerable—still have an unmet need for this basic health care service. (Singh S, Darroch JE, Ashford LS, 2014). Women with unmet need are defined as those who want to stop or delay childbearing but are not using modern contraceptive methods.

Across countries and regions, contraceptive prevalence reflects different mixtures of methods with long acting and permanent methods being more predominant, especially female sterilization, Intrauterine (IUD) and implants that account for 56 percent of contraceptive prevalence. In 2015, sterilization methods including female and male sterilization accounted for 21.6 percent of all users of contraception; specifically, female sterilization accounts for 19.2 percent and male sterilization accounts for 2.4 percent. (United Nations, 2015).

Worldwide, more than 200 million men and women have been sterilized and China and India account for 75 percent of the world's total number of sterilization users. But, prevalence and incidence of female and male sterilization remain very low in Sub-Saharan Africa, where percentages are 1.6 per cent for female sterilization and 0.0 per cent for male sterilization respectively. (Engender Health, 2014). While female sterilization is the most used long-term method worldwide accounting for 19 percent of all contraceptive's users, male sterilization is much less common except for a small group of countries (United Nations, 2015).

1.2. Problem statement

Drivers of dramatic and steady increase in the uptake of female and male sterilization in the health districts of Lubero, Kayna and Butembo, in North Kivu, eastern province of the DR Congo from 2016 to date remain unknown and undocumented. The Democratic Republic of the Congo (DRC), a Belgian colony until 1960, is a country with vast resources. The modern contraceptive prevalence at the national level remains low (8 percent) and estimates of the prevalence of female and male sterilization for married or in-union women and men are respectively 0.8 percent for female sterilization and 0.1 percent for male sterilization according to the latest Demographic Health Survey (DHS, 2014).

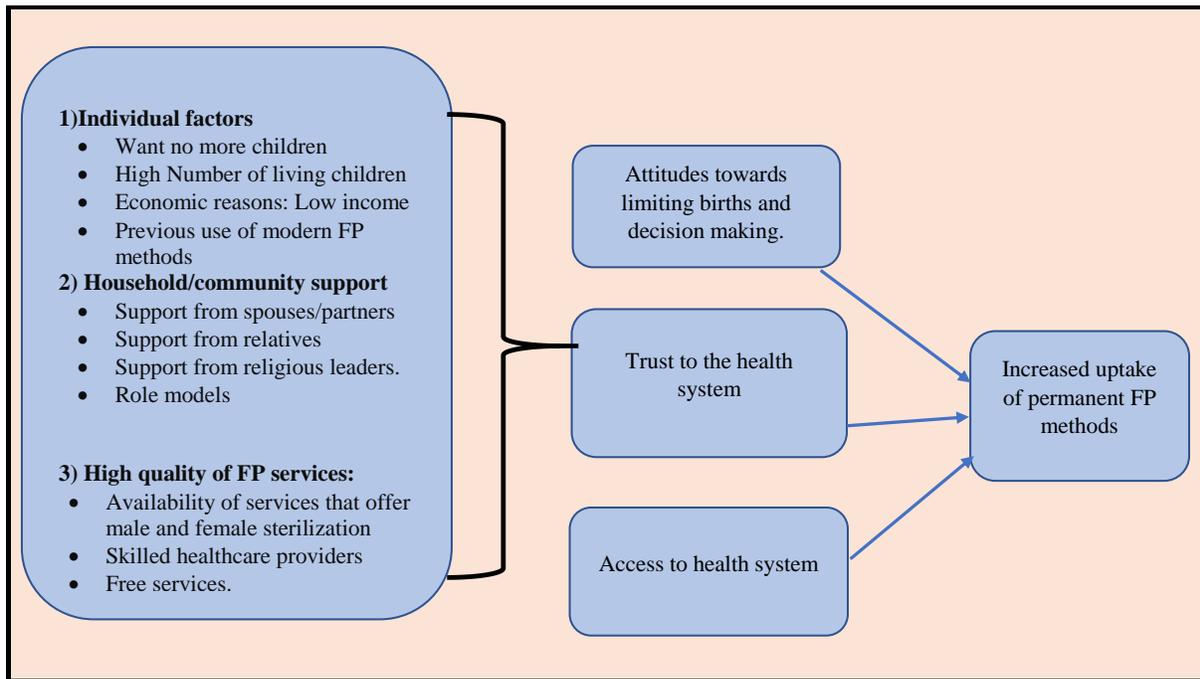
Over the last two decades, the DRC has faced chronic political instability and wars that destroyed existing social structures and infrastructures. The North Kivu province has been the most affected region with millions of lives lost and more than 4,1 million internally displaced people in November 2017. (OCHA, 2017). Despite this fragile context, local communities assisted with international non-profit organizations and supported by the local government strive to recover from this chaos and build a society of hope where the realization of everyone's sexual and reproductive health rights become a reality. Like most of the crisis affected settings where the provision of family planning services has been inadequate (UNHCR/IAWG, 2004), fertility rate remains high (6.5 children per woman of reproductive age) in North Kivu Province with a low modern contraceptive prevalence as 11.6 percent and the contraceptive prevalence per specific method is 2.1 percent and 0.0 percent for female and male sterilization respectively. (DHS,2014)

CARE International is a non-profit organization that advocates for women and girls to exercise their rights to access sexual and reproductive health information and services including rights to use family planning services. Since 2011, CARE has been implementing the Supporting

Access to Family Planning and Post Abortion Care (SAFPAC) Initiative in three core countries in Sub-Saharan Africa including in the North Kivu Province, eastern part of the Democratic Republic of the Congo. Starting in 2015, the SAF PAC project in North Kivu piloted the integration of female and male sterilization as part of routine family planning services in eight clinics in Lubero, Kayna, Butembo and Karisimbi health districts. Data from service delivery indicated a dramatic and steady increase in the uptake of female and male sterilization. Drivers and factors contributing to this trend remain unclear to the project team and health authorities and this study aims to explore these unknown factors as determinants of the dramatic uptake in a country with low uptake of male and female sterilization.

1.3. Theoretical Framework

The below theoretical framework describes the rationale that the study pursues in exploring the determinants or factors that have led to the dramatic increase of female and male sterilization in the four health districts where CARE International is implementing the SAF PAC initiative. Adapted from the socioecological framework, the theoretical framework of the study aims to identify factors at individuals, household/family and community levels as well as the impact of project interventions in improving access to high quality of FP services.



Our assumption is that various factors may have influenced the attitudes of individuals toward female and male sterilization that contributed to couples or individuals deciding to seek these services. These factors may be at individuals, household and community levels (Large family size, medical reasons, economic reasons, support from partners etc.) as well as strong FP services as supported by the SAFPAC Initiative. All these factors led to increased trust in the health system which influence the adoption of services seeking behaviors and increased uptake.

1.4. Purpose statement

This study seeks to identify factors that led to a dramatic increase of uptake of male and female sterilization in eight health clinics supported by CARE in the North Kivu Province, a region affected by twenty years of political and security instability in eastern region of DR Congo.

1.5. Research questions and hypotheses

The research will strive to answer four main questions:

- What were the key factors that led to the dramatic and rapid uptake of male and female sterilization in context like North Kivu affected by a protracted crisis?
- What characterized programmatic interventions implemented during the timeframe period of this study (January 2016 to June 2018) that led to the uptake of sterilization methods?
- Were these factors different for women and men using these sterilization methods?
- What differentiates those who have taken these sterilization methods with those using other forms of modern contraceptive methods? (exposure to CARE’s program interventions? social support? etc.).

Throughout the thesis process, we want to verify the following hypotheses:

Hypotheses	
Hypothesized reasons for choosing sterilization	Hypothesized reasons for not choosing sterilization
<p><i>Individuals factors such as:</i></p> <ul style="list-style-type: none"> • Want no more children • High number of living children: Large family size • Economic reasons: low income • Medical reasons: After C-sections or other • Previous use of modern contraceptives • Well informed about sterilization <p><i>Supportive environment:</i></p> <ul style="list-style-type: none"> • Availability of free FP services provided by skilled providers • Support from partners and relatives 	<ul style="list-style-type: none"> • Want more children • Not sure if want more children • Do not trust providers • Do not want surgery • Religious beliefs • Partner objects • Not well informed about sterilization • Cost of procedure/getting to clinic/lack of correct knowledge about sterilization

1.6. Significance statement

The findings of the study will contribute to the public health knowledge and influence practices among program/project designers and implementers of family planning programming especially in crisis affected settings as well as inform national policy frameworks in similar contexts, especially countries with low uptake of female and male sterilization in Sub-Saharan Africa.

1.7. Definition of terms

Family planning: Family planning encompasses the services, policies, information, attitudes, practices and commodities including contraceptives that give women, men, couples and adolescents the ability to avoid unintended pregnancy and choose whether and/or not when to have a child. (Ellen S and all, 2016). It allows individuals and couples to anticipate and attain their desired number of children and the spacing and timing of their births. It is achieved through use of contraceptive methods and the treatment of involuntary infertility. (WHO,2018)

Contraception: The deliberate use of artificial methods or other techniques to prevent pregnancy as a consequence of sexual intercourse. (Oxford, 2018).

Female sterilization: Refer to permanent surgical contraception for women who do not want more children. (Global Handbook, 2018). The three surgical approaches most often used are a) Minilaparotomy involves making a small incision in the abdomen. The fallopian tubes are brought to the incision to be cut or blocked. b) Laparoscopy involves inserting a long, thin tube containing lenses into the abdomen through a small incision. This laparoscope enables the doctor to reach and block or cut the fallopian tubes in the abdomen. Also called tubal sterilization, tubal ligation, voluntary surgical contraception, tubectomy, bi-tubal ligation, tying the tubes, minilap, and “the

operation.” Works because the fallopian tubes are blocked or cut. Eggs released from the ovaries cannot move down the tubes, and so they do not meet sperm. c) hysteroscopic method consists on placing a hysteroscopic sterilization system bilaterally into the fallopian tubes and require 3 months for adequate fibrosis and scarring leading to bilateral tubal occlusion. After hysteroscopic sterilization, women are advised to correctly and consistently use an effective method of contraception while awaiting confirmation.

Male sterilization: Permanent contraception for men who will not want more children. Through a puncture or small incision in the scrotum, the provider locates each of the 2 tubes that carries sperm to the penis (vas deferens) and cuts or blocks them by cutting and tying them closed or by applying heat or electricity (cautery). Also called male sterilization and male surgical contraception. Works by closing off each vas deferens, keeping sperm out of semen. Semen is ejaculated, but it cannot cause pregnancy.

Permanent methods: Refer to male and female sterilization as contraceptive methods aiming to limit birth and using surgical procedures without possible reversibility once the procedure is completed.

Chapter Two: Review of the Literature.

2.1. Introduction

Over the past 25 years, considerable progress has been made in women's sexual and reproductive health, including increases in contraceptive use, spurred by the Millennium Development Goals (MDGs) and the 1994 International Conference on Population and Development (ICPD). (WHO,2018). Family planning is considered a development “best buy” and a life-saving intervention for millions of women and girls. An estimated 214 million women of reproductive age in developing countries want to avoid pregnancy but are not using a modern contraceptive method. The reasons for this are many and varied. Millions more are using a contraceptive method that nevertheless results in an unintended pregnancy.

Benefits of using family planning have been well documented including reinforcing people’s rights to determine the number and spacing of their children and by preventing unintended pregnancy; preventing deaths of mothers and children; reducing the incidence of abortion especially unsafe abortion and related consequences, and prevention of the transmission of HIV and other sexually transmitted by using some family planning methods, such as condoms; prevention of endometrial cancers and reduce acne. In addition to these health benefits, there are many other non-health related benefits of use of contraceptives including empowering people and enhancing education, reducing adolescent pregnancies and demographic dividend meaning aligning population growth to available resources and opportunities. (WHO,2018).

2.1.1. Unmet need for modern contraception

Contraceptive prevalence almost doubled, from 35 per cent in 1970 to 63 per cent in 2017. Worldwide in 2017, 63 per cent of women in the reproductive age were using some form of contraception including any modern or traditional methods of contraception. However, contraceptive use was much lower in Africa (36 per cent) compared to the other major regions in the world, where it ranged from 58 per cent in Oceania to around 75 per cent in Northern America and Latin America and the Caribbean in 2017. (UN,2017). Modern contraceptive methods account for most of the contraceptive use worldwide. Globally in 2017, 58 per cent of married or in-union women of reproductive age were using a modern method of family planning, comprising 92 per cent of all contraceptive users. (UN,2017). Despite this increase, unmet need for family planning

remains very high in many regions and countries in the world and for several reasons including limited choice of methods; limited access to contraception, particularly among young people, poorer segments of populations, or unmarried people; fear or experience of side-effects; cultural or religious opposition; poor quality of available services; users and providers bias, gender-based barriers. (UNDESA, 2015). In Africa, 24.2% of women of reproductive age have an unmet need for modern contraception. (UNDESA,2015).

2.1.2. Rights to access and prevention of unintended pregnancies

Having the information, power and means to decide whether, when and how often one becomes pregnant is a universal human right (UNFPA,2017). Demographic and health surveys of women and men in developing and some developed countries have collected extensive data on access and outcomes relating to sexual and reproductive health. These data indicate varying levels of inequality, even as, in some cases, access and outcomes have improved (UNFPA,2017). The reality is that today, across the developing world, that right is far from universally realized, with hundreds of millions of women still struggling to obtain information, services and supplies to prevent a pregnancy.

One measure of access to sexual and reproductive health services is the extent to which a woman who wants to use a modern method of contraception has access to it. Access to family planning services is a foundational element, not just of reproductive health, but of social and economic equality, since unintended pregnancy constrains opportunities that women would otherwise have for education, civic participation and economic advancement. Estimates by Guttmacher Institute indicate that, if all women who want to avoid a pregnancy used modern contraceptives and all pregnant women and their newborns received care at the standards recommended by WHO the unintended pregnancies would drop by 70%, maternal deaths by 67%, and newborn deaths would decline by 77% as compared to the current situation (UN,2017).

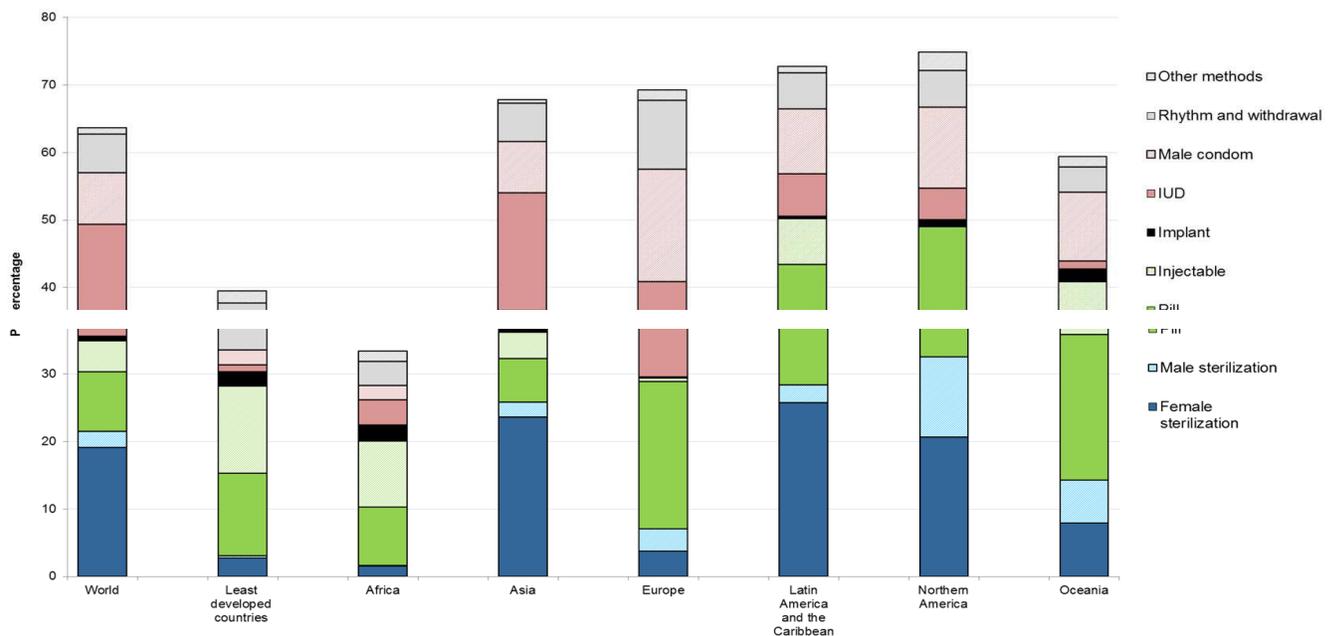
2.1.3. Sterilization

More than six out of every ten contraceptive users in the world rely on modern methods of contraception (UN, 2017). Approximately 222 million women of reproductive age around the world are protected from unintended pregnancies by sterilization. Most sterilization users live in Asia with India and China accounting for 75% of the world total number of sterilization users.

(Engender Health, 2002). Overall use of contraceptive sterilization has been growing considerably worldwide over a number of years and shows no sign of decline anywhere.

Female sterilization is the most common method of contraception, used by 19 per cent of women aged 15 to 49 who are married or in a union worldwide (UN,2013). Female sterilization is an important part of the method mix in the Americas, Oceania and some parts of Asia, but it is uncommon in Africa as well as in Central Asia, South-Eastern Asia and Western Asia. Female sterilization is most prevalent in Latin America and the Caribbean (26 per cent).

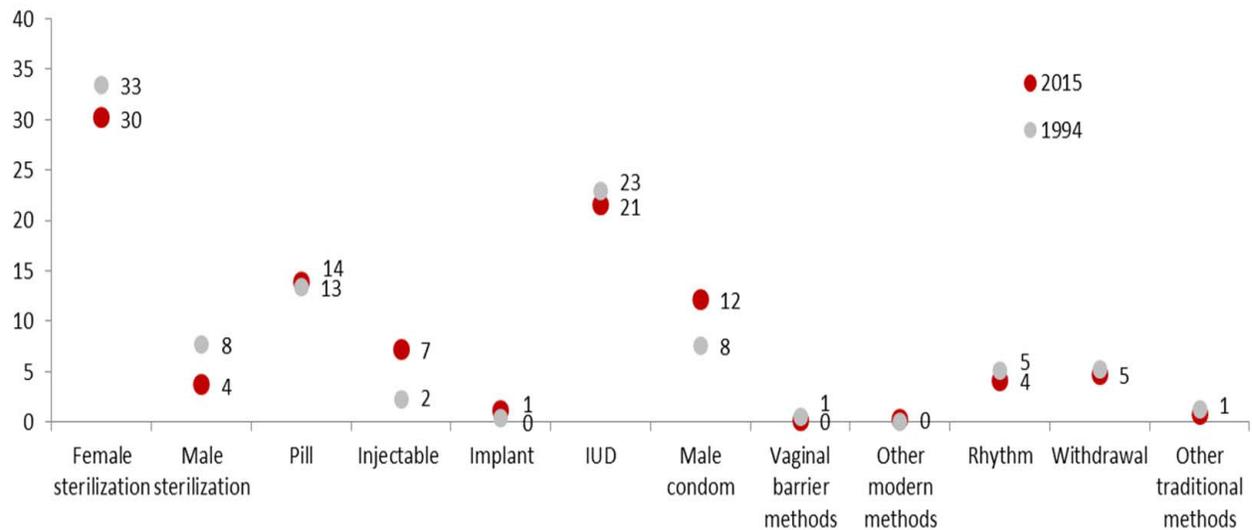
Figure 1: Contraceptive prevalence among married or in-union women aged 15 to 49 by method and region, 2015



Source: Trends Contraceptives use in 2015 Report (UN, 2015)

Men's contraception / sterilization. With the exception of a small group of countries, male sterilization is much less common than female sterilization. Contraceptive methods that require men's direct participation—male sterilization (vasectomy), the male condom and withdrawal—accounted for 21 per cent of contraceptive practice worldwide in 2015 (UN,2013). The rate of use was 30 per cent in Europe, Northern America and Oceania; around 20 per cent in Asia and Latin America and the Caribbean, and around 10 per cent in Africa. (UNDESA, 2015).

Figure 2. Percentage share of specific methods of all contraceptive use among married or in-union women aged 15 to 49 worldwide, 1994 and 2015.



Source: Trends Contraceptive use in 2015 Report (UN, 2015)

Improvements in methods used by men have been limited to refinements of the male condom and improved techniques for performing vasectomy (Hatcher and others, 2011). Although several potential new methods for men have advanced as far as clinical trials, it is still not clear when they will become widely available. The lack of new methods for men does not, however, explain the low (and declining) prevalence of male sterilization, given that vasectomy is more effective, less expensive to perform and has fewer complications than female sterilization (Shih, Turok and Parker, 2011).

Male vs female sterilization. The contrast in levels of use of male and female sterilization is large and gender differences accounted in the use of sterilization in 47 countries including in South Africa where female sterilization accounted for 15.3% while male sterilization accounted for 0.7% (UN, 2015). In Africa, the prevalence of female and male sterilization in 2015 was estimated to be 1.6% and 00% respectively. The highest prevalence for female sterilization is noted in South Africa (15.3%), Cabo Verde (15.2%), Mauritius (12.1%) and Malawi (9.9%). The only country in Africa with a prevalence of male sterilization over 1% is Congo Brazzaville (1.6%). (UN,2015).

2.2. Current state of knowledge

2.2.1. Female sterilization technique

Female sterilization is one of the most effective modern contraceptive method though it carries a small risk of failure with less than 1 pregnancy per 100 women over the first year after having the sterilization procedure. Female sterilization is also known as tubal sterilization, tubal ligation, voluntary surgical contraception, tubectomy, bi-tubal ligation, tying the tubes, minilap, and “the operation.” It is a permanent surgical contraception for women who do not want more children. The three surgical approaches most often used are 1) Minilaparotomy that involves making a small incision in the abdomen then the fallopian tubes are brought to the incision to be cut or blocked; 2) Laparoscopy involves inserting a long, thin tube containing lenses into the abdomen through a small incision; and 3) hysteroscopic method which consists on placing a hysteroscopic sterilization system bilaterally into the fallopian tubes and require 3 months for adequate fibrosis and scarring leading to bilateral tubal occlusion. Sterilization generally cannot be reversed, and fertility does not return because the procedure is intended to be permanent. Reversal surgery is difficult, expensive, not available in most areas and often does not lead to pregnancy.

2.2.2. Male sterilization technique.

Male sterilization, also known as vasectomy or male surgical contraception is a permanent contraception for men who will not want more children. Fewer than 1 woman out of 100 becomes pregnant in the first year after her male partner undergoes sterilization. Through a puncture or small incision in the scrotum, the provider locates each of the 2 tubes that carries sperm to the penis (vas deferens) and cuts or blocks them by cutting and tying them closed or by applying heat or electricity (cautery). Some men reported that they like vasectomy because it is safe, permanent, and convenient, has fewer side effects and complications than many methods for women, the man takes responsibility for contraception—takes burden off the woman and it increases enjoyment and frequency of sex. (Tekou and all, 2016). Male contraceptive methods represent a “huge missed opportunity” for the development community both in terms of driving family planning and in helping to promote gender equality. The negative trend in uptake of male sterilization matters not just because of the health risks and other complications associated with unwanted pregnancy

for women, but also because it perpetuates the “current paradigm which leaves the burden of responsibility of family planning on women and sees it as a women’s only problem.

2.3. Factors that influence sterilization uptake

Many factors account for change in sterilization incidence and vary by contexts. These factors can be demographics, policy and programs factors. (Begum and all, 2000).

2.3.1. Demographics factors

Demographic factors that may influence sterilization incidence include changes in the age distribution, the percentage of married or cohabiting, the average age at marriage, average parity and mean educational attainment. For instance, in some countries in Latin America, the increasing number of couples seeking to limit births correspond with the increasing number of couples reaching their reproductive health years. (Merrick, 1994).

2.3.2. Policy factors

Policy factors that influence sterilization incidence are illustrated in India and China with national sterilization campaigns (Roos & all, 1985). In India, changes in sterilization incidence in 1970s coincided with government-led interventions to increase sterilization acceptance rate through massive recruitment campaigns and some coercion. In China, changes in the legally permissible of marriage age combined with demographic factors such as irregular age distribution influenced by famines produced dramatic changes in the number of new users of sterilization (Ross and Frejka, 1998).

2.3.3. Program factors.

Program factors such as *method mix*, meaning the range of contraceptive methods available to couples and individuals, influences the sterilization incidence. For instance, in countries with high prevalence of IUD, this method has become a partial substitute for earlier sterilization, leading to decrease in incidence of sterilization. That’s the case in Middle Eastern countries such as Egypt, Turkey and Syria.

Availability of high-quality sterilization services has proven to be critical in influencing sterilization uptake. Despite sterilization being greatly weighted towards female sterilization, there are some countries where male sterilization contributes to overall levels of incidence and

prevalence of sterilization (Ross, Hong and Huber, 1985). Sri Lanka and Thailand have developed strong family planning program including vasectomy and have seen a rise in their vasectomy incidence (more than 5 per 1,000 each). In regions such as Middle East and Northern Africa where incidence of female sterilization tends to be low (0.5%), factors incriminated encompassed lack of available services, religious opposition and legal restriction (Ross, Hong and Huber, 1985).

In the US alike in many countries in Latina America, despite the decreased rate of female sterilization incidence, the wide availability of female sterilization services and historical popularity of female sterilization explain the high sterilization incidence. (Engender Health, 2000). The rise of female sterilization incidence in Kenya in 1990s was attributed to program factors mainly the introduction of Minilaparotomy. (Church and Geller, 1990) and the incidence of female sterilization is anticipated to continue to rise in response to demographic momentum of a younger population in Africa.

2.3.4. Individual factors

Several other studies have explored individual's factors that influence use of modern contraceptive including female and male sterilization. While socioeconomic reasons drive men's interest for family planning (Tekou and all, 2016), misconceptions surrounding modern methods can hinder support for family planning; and limited method choice for men, insufficient venues to receive services, and few messages that target men create barriers for male engagement in family planning. Beyond socioeconomic reasons, education of children and health benefits for women and children constitute reasons to support family planning as reported by men (Ross, Hong and Huber, 1985).

In contrast, irreversibility of vasectomy and the belief that It can lower male sexual performance were cited as reasons of opposition to vasectomy in a Togolese study about engaging men in FP. Men participants felt that male methods were too limited, and this was used as an explanation for poor male engagement in family planning (Tekou and all, 2016).

It is also well documented that men's general knowledge and attitudes related to family size, spacing between children, and contraceptive methods affect women's family planning preferences and opinions. DHS data from seven African countries revealed that the percentage of women who used modern contraceptives was higher among those who had discussed family

planning with their spouses than among those who did not. Many scholars have argued that the inability to engage men in family planning is impeding progress to increase uptake of contraception. Other individual factors influence uptake of female and male sterilization include early childbearing and education attainment of both men and women (Matthews and others, 2009).

2.3.5. Factors that negatively affect female and male sterilization

In contrast, lower acceptance of sterilization, older age at sterilization, restrictive sterilization policies, less-established programs, reliance to abortion or other forms of contraception (e.g. condoms, IUD, implants) are characteristics associated with lower sterilization in many countries. (Turner,1993). Other factors such as regret rate after sterilization accumulates over time and may discourage others from getting procedures. (D. Hollander,2002).

2.4. Sterilization in DR Congo

The DR Congo faced over the past twenty years a chronic political instability and recurrent conflicts that destroyed existing social structures and infrastructures and the North Kivu province has been the most affected region with millions of lives lost and more than 4,1 million of internally displaced people estimated in November 2017. (OCHA, 2017). Despite, this fragile context, local communities assisted with international non-profit organizations and supported by the local government strive to recover from this chaos and build a society of hope where the realization of everyone sexual and reproductive health rights become a reality. The recent outbreak of the tenth Ebola Virus Epidemic (WHO, 2018) in North Kivu in the territory of Beni has significant impact in the health system including reduced utilization of health services and shortage of healthcare providers due both by the Ebola outbreak and the insecurity with recurrent massacres of civilians by armed groups and militias. (WHO, 2018).

The 2014 DHS conducted by the government of the DR Congo revealed a low modern contraceptive prevalence (8%) with female and male sterilization accounting for 0.8% and 0.1% respectively. After decades of conflict, predatory governance and weak rule of law, the economic and socio-cultural life of people in eastern DRC is catastrophically stressed. The stressed socio-political and cultural environment affects males and females differently, and these differences are underpinned by rigid gender norms and long-standing social hierarchies that attribute far greater value, rights and privileges to males. Forty-nine percent of women in North Kivu report

experiencing sexual violence by a partner, higher than a national study that found 27 percent of married female respondents (aged 15+) had experienced sexual violence in the past year, largely at the hands of their spouse or partner. Many cases of rape have led to unwanted pregnancies and in this context, where the health system is broken access to emergency contraception is limited.

Maternal mortality remains high in DRC (846 per 100,000 live births) according to the DHS 2013-2014 and nearly 80% of married women or women in union in DRC have risky pregnancies. Factors explaining this situation are a high total fertility rate (6.6); low modern contraceptive prevalence (8%) despite high proportion of people (80%) who can cite at least one modern contraceptive method in the population and high unmet need for contraception (28%). Access to family planning services is still limited, especially in rural areas where family planning services are available in less than half (46%) of the country's 516 health zones (MOH,2014). The national strategic plan for family planning, adopted in early 2014 aims to increase the prevalence of modern contraception from an estimated baseline of 6.5% to 19% by 2020 and to ensure that at least 2.1 million women have access to and use modern contraceptive methods by 2020 (MOH,2014).

2.5. CARE's programming in North Kivu

CARE DRC, in collaboration with the RAISE Initiative (Columbia University), began supporting the Ministry of Health (MOH) since 2011 by implementing the Supporting Access to Family Planning and Post-Abortion Care (SAFPAC) Initiative which supports provision of post-abortion care and modern family planning services including female and male sterilization in 48 health facilities in Lubero, Kayna, Butembo and Goma health districts. CARE's strategy to advance women's and adolescent girls' ability to realize their rights to access high quality reproductive health services in this complex environment addresses four broad intervention areas: 1) competency-based clinical training with follow-up assessment and coaching to providers, 2) provision and supply chain support of contraceptives and medical supplies, 3) data-driven supervision in partnership with local government health officials, and 4) community engagement in support of women's access to reproductive health services.

In May 2015 eleven healthcare providers (all physicians except one nurses from eight hospitals managed by the MOH and the Adventist, CBCA and CELPA churches) attended a ten-days clinical competency-based training on female and male sterilization aiming to enable them to

provide appropriate counseling for sterilization methods and obtain clients ‘consent, to perform the procedures according to the national and clinical protocols and follow up clients in post-surgery period. (CARE DRC,2016). The training was supported by a vibrant radio campaign promoting the two newly introduced methods then followed by the provision of medical equipment and supplies for provision of these two contraceptives. The campaign consisted on radio broadcasts four times a week, participatory discussions on the benefits of the two methods and testimonies of those who have used these methods.

Since January 2016, a dramatic uptake of female and male sterilization in Lubero, Kayna and Butembo Health Districts has been noticed where alike other regions of the country, rural communities are pro-natalist. Exploring determinants of this dramatic uptake to learn about factors that influenced this rapid uptake and may inform development of family planning programming that promote male and female sterilization. The figure below describes the trend in uptake of female and male sterilization from January 2016 to June 2018, period during which most activities (training, campaigns, availability of services, free services etc.) aiming to promote female and male sterilization were carried out.

Figure 3: Map of Health zones in North Kivu Province, Eastern of the DR Congo.

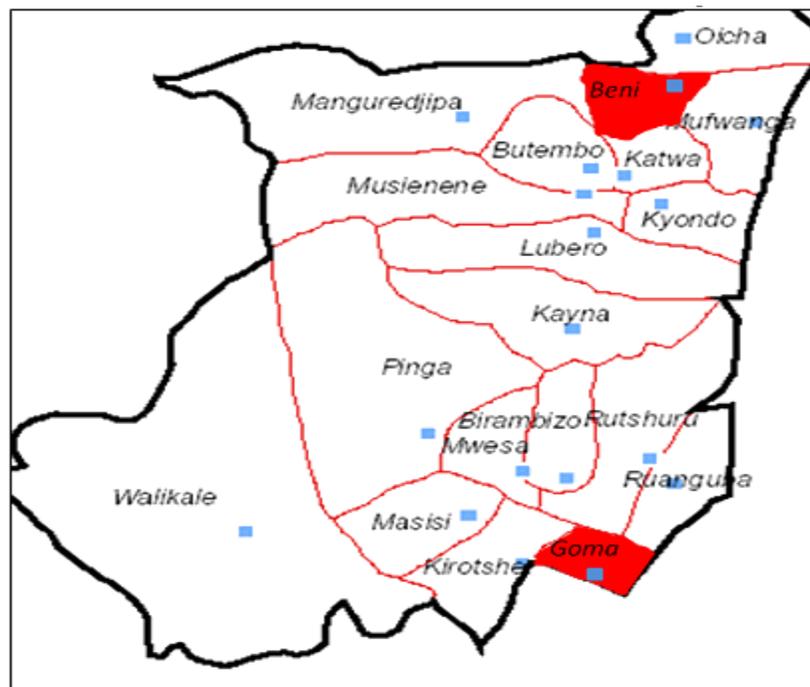
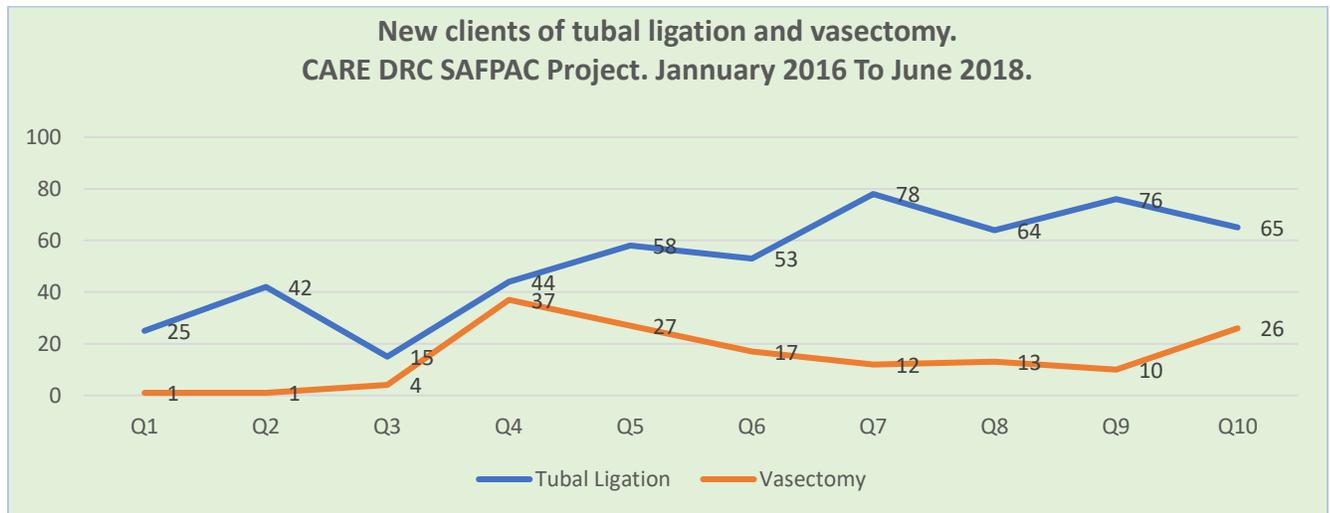


Figure 4: New users of female and male sterilization in 8 health facilities supported by the SAFPAC Initiative in North Kivu, from January 2016-June 2018.



Source: CARE USA, DISH2 database.

2.6. Gaps and research question

Despite the evidence from many studies about factors affecting uptake of female and male sterilization, most of these studies have been conducted out of zones of conflicts leaving a gap in understanding the drivers of female and male sterilization uptake in protracted crises such as in North Kivu. Further, there has been no examination of the reasons behind the dramatic change in sterilization rate in North Kivu. Therefore, this thesis aims to explore the factors (individual, programmatic, environmental and policy) that influence sterilization rates in the complex conflict-affected context of North Kivu, DRC Congo. Shedding light on these factors will enrich the knowledge of program implementers and decision makers and assist them to tailor and adapt programming in emergency and protracted crisis contexts to reduce unmet need for contraception and ultimately unwanted pregnancies.

Chapter Three: Methodology.

3.1. Introduction

Given the research goals and questions, we conducted a mixed methods study using both qualitative and quantitative methods as well as an explanatory sequential design model.

3.2. Research design.

3.2.1. Research objectives and hypotheses,

This mixed-methods study sought to identify individual, contextual and programmatic factors that led to a dramatic increase of uptake of male and female sterilization in eight health clinics supported by a family planning initiative implemented by CARE in the North Kivu Province, a region affected by twenty years of political instability and insecurity. The research questions included:

- What were the key factors that led to the dramatic and rapid uptake of male and female sterilization in context like North Kivu affected by a protracted crisis?
- Were these factors different for women and men using these sterilization methods?
- What characterized programmatic interventions implemented during the timeframe period of this study (January 2016 to June 2018) that led to the uptake of sterilization methods?
- What differentiate those who have taken these sterilization methods with those using other forms of modern contraceptive methods? (exposure to CARE's program interventions? social support? etc.).

Hypotheses	
Hypothesized reasons for choosing sterilization	Hypothesized reasons for not choosing sterilization
<p><i>Individuals factors such as:</i></p> <ul style="list-style-type: none"> • Want no more children • High number of living children: Large family size • Economic reasons: low income • Medical reasons: After C-sections or other <p><i>Programmatic factors:</i></p> <ul style="list-style-type: none"> • Availability of free FP services provided by skilled providers • Previous use of modern contraceptives <p><i>Supportive environment:</i></p> <ul style="list-style-type: none"> • Support from partners and relatives • Support from religious leaders 	<ul style="list-style-type: none"> • Want more children • Not sure if want more children • Do not trust providers • Do not want surgery • Religious beliefs • Partner objects • Cost of procedure/getting to clinic/lack of correct knowledge about sterilization

The research protocol was approved by the IRB committees of Emory University (IRB00102470) and the IRB committee of the Kinshasa School of Public Health/University of Kinshasa (ESP/CE/095/2018).

3.2.2. Population and sampling.

The study was conducted in eight catchment areas of the three health districts of the North Kivu Province, eastern part of the DRC where the CARE's SAFPAC Initiative is being implemented. While Butembo and Karisimbi health districts are urban areas, Lubero and Kayna health districts are rural and the predominant ethnic group is the Nande, and Swahili and Kinande are the main spoken languages in these communities affected by twenty years of instability due to war, multiple invasions from neighbor countries, poor governance and recurrent attacks of armed groups.

For the quantitative purpose of the study, we used family planning registers from the eight clinics to create three masters list of clients of female and male sterilization as well as clients of other modern contraceptive methods received between January 1st, 2016 and June 30,2018, all recorded in the registers with a unique client ID. The total clients for each master list were 515 for female and male sterilization and 14,445 clients of other modern methods. Using a random simple sampling methodology, 329 users were selected to be surveyed including 186 users of female and male sterilization (56 and 130 users of male and female sterilization respectively) selected from the first master list and 143 users of other modern contraceptive methods selected from the second master list. Participants to the survey were contacted by phone or during household visits and asked to participate to the survey. The one who was not reachable by phone or during the household visit were replaced by the next person in the master list.

For qualitative data, six focus group discussions of twelve participants each were facilitated (2 FGDs in each health district), three FGDs for females and three FGDs for males for a total of seventy-two participants selected by local community-based organization among community members who have lived in the eight catchment areas over the two years preceding the study, who were at least 25 years old during the time of the study, were married or cohabiting and who did not report actual use of any modern contraceptive method. In addition to FGDs participants, four clinical providers of female and male sterilization, two health district managers and three CARE's staff were selected to participate to semi-structured interviews. For both the surveys, the semi-structured interviews and the FGDs, informed verbal consent was obtained from each

participant and no personal information in the form of names or other identifying data was obtained for FGDs.

3.2.3. Study instruments.

Given the sequential explanatory design model chosen for this study, we first developed survey instruments comprised of three survey questionnaires including a questionnaire for clients of female sterilization, a questionnaire for clients of male sterilization and a questionnaire for users of other modern contraceptive methods. The questionnaires were adapted from the ones used for the Demographic Health Surveys (DHS). Later on, using the results from the quantitative data, we developed and refined instruments for FGDs and semi-structured interviews which included an open-ended semi structured guide for FGD as well as for interview.

All study instruments were developed in English then translated into French and Swahili allowing them to be piloted in three catchment areas. Feedback and inputs from the field were used to refine and improve these instruments.

3.2.5. Data collection.

Following a three-day training conducted for 10 CARE staff in North Kivu, a team of four enumerators was each assigned one of the three targeted health zones (HZ) for data collection. Data collection was sequentially carried out starting by surveys conducted in September 2018 with 329 people surveyed in eight catchment areas (Four areas in Kayna HZ and two areas each in Lubero and Butembo HZs) using survey questionnaires. Respondents surveyed included 56 male sterilization users (vasectomy), 130 female sterilization (tubal ligation) users, and 143 users of others forms of modern contraceptives and the response rate of the study was 96%

In October 2018, after a preliminary analysis of quantitative data, findings were used to revise the focus groups discussions and in-depth interview guides. Then, nine focus group discussions (four with men and four with women for a total of 106 participants) as well as KII with healthcare providers, CARE and health district staff were conducted in the three health zones.

Information collected during the surveys encompassed socio-demographic characteristics of participants, household characteristics, respondents' reproductive history, previous utilization of family planning services, attitudes toward male and female sterilization, and perceptions of sterilization as a method of contraception. Focus group discussions explored perceptions of participants towards female and male sterilization and surfaced any form of community support or concern about these services. KII with healthcare providers, health districts officials and project staff were critical to picture the situation prior to the project interventions and described interventions that may have contributed to the dramatic uptake of female and male sterilization.

3.2.6 Data treatment and analysis.

Survey data was initially cleaned and analyzed in Epi 7 then in SAS and the nine focus groups and the six KII conducted in French and Swahili were later transcribed and translated into English

Given the mixed-methods approach used for the study, data analysis was carried out into two steps.

Quantitative data analysis.

Data collected through survey questionnaires were recorded into Epi Info 7 and analyzed separately for male sterilization clients, then female sterilization clients and finally for users of other modern contraceptives methods to generate specific characteristics and variables for each group of survey participants. We then exported data from Epi Info 7 to SAS and ran bivariate linear and logistic regression, exploring eventual associations between different variables such as the association between the reason of choosing or shifting to a sterilization method and the following factors:

- Individual factors (want no more children, high number of living children, large household size, limited resources, history or partner history of c-section, personal or partner health issues and previous use of contraception);
- Environmental factors (support from partner, uncertainty of the future, war or conflicts and knew someone sterilized);
- Programmatic factors (attendance to an education session where sterilization methods were discussed, recommendation by a provider and free services).

Qualitative data analysis.

FGDs and interviews were recorded, then transcribed into verbatim and translated from Swahili into English and using MAXQDA V18 software, a thematic analysis was carried out, memos were developed, and transcripts segmented into related codes used to analyze the transcripts and surface themes. A thematic or code-based analysis was conducted using deductive and inductive coding process. First, 2 coders reviewed the transcripts several times to identify major themes and develop a broad coding scheme based on the research questions. The codes were refined, and emerging themes discussed and confirmed with the local research team. The coding team met regularly to discuss any discrepancy in code definitions and in the application of codes, ensuring the reliability of coded data and consistent coding of transcripts.

3.2.7. Limitations.

This study was not representative of the entire population of the DR Congo and focused on peri-urban and urban neighborhoods of one province. The study was conducted in hard to reach catchment areas due to insecurity and during an outbreak of Ebola Virus Disease epidemic making it challenging to reach out to some study participants. In addition, there was no group comparison for clients of male sterilization. Therefore, the inference of the study's findings to the general population and the application of recommendations from the study should be undertaken carefully and adapted in each specific context.

Chapter Four: Results.

4.1. Introduction.

In following sections, we report on the results of the analysis of both quantitative and qualitative data. Results of qualitative data analysis report themes that emerged from the focus groups discussions and in-depth interviews such as knowledge and perceptions of local communities on family planning and modern contraceptives, perceptions on sterilization methods, social context, influencers and support, motivations for sterilization methods and drivers of uptake including programmatic factors.

Findings of survey analysis describe the sociodemographic characteristics of respondents, reproductive health background, prior experience with family planning and modern contraceptive, reasons for choosing sterilization methods, and finally the characteristics of the immediate social environment in which they live in.

4.2. Results from qualitative data analysis

In total, six major themes emerged from the analysis describing: 1) the difference between women and men in regarding their knowledge and perceptions of modern family planning; 2) the perceptions of female and male sterilization in these communities; 3) the variance between men and women in motivations for seeking a sterilization; 4) the key influencers of the decision making process; 5) challenges faced by those who seek for sterilization methods; and 6) the contribution of programmatic factors in the rise of the uptake of female and male sterilization methods.

4.2.1. Knowledge and perceptions on family planning and modern contraceptives.

Participants in FGDs expressed different opinions about family planning and modern contraceptives. They can be grouped into two categories. The first category includes people who think that family planning, especially birth spacing (2-3 years), is good for the health and the wellbeing of the mother as well as the children. Among these respondents, some reported that they have used a modern family planning method or knew someone using family planning. Reasons for

using family planning included: limited financial resources; avoidance of stigma from their community when you have many unwanted pregnancies; and perceived advantages, such as poverty reduction.

“I'm planning because life is getting harder because if I have pregnancies every day and life here is about going to the farm. When you're carrying a pregnancy and have nothing to give the other children, you decide to use planning.” Female participant in Kanyabayonga Town.

“In my community, when a woman has joined the family planning program, the community finds that her beauty changes: she has gained weight, the skin has changed, she is healthy. She has become very beautiful and she can realize her projects”. Female participant in Lubero Town.

However, this positive opinion about family planning is not accepted by everyone and there are people who think that family planning is still a taboo; that using modern contraceptive methods is a sin and women using family planning are unfaithful and prostitutes.

“Someone cannot fail to have children. If God said 10 children, it's 10; planning is not a solution.”

Female participant in Kanyabayonga Town.

” I know that having a lot of children is good. I want to have a doctor, an engineer, an agronomist, a lawyer, rich or poor. Now when you talk to me about family planning, I consider that you challenge my ideology”.

Male participant in Makasi Town.

The most cited benefits of family planning are: prevention of unwanted pregnancies; women's rest, health and wellbeing; the reduction of maternal deaths; women's financial contribution to household income; child wellbeing; and an improved sex life. While benefits or advantages of family planning are obvious for some, others see family planning as a means of population control and a strategy to gain control over their lands.

“For men, family planning will also allow you to enjoy sex in your home, because you will do this without fear of pregnancy. And in my experience, a person who has done family planning will have good health and looks good.” Male participant in Kasalala town.

The best-known contraceptive methods that are offered in their health clinics are injectables (Depot Provera, followed by pills, implants, IUD, cycle beads, condoms and the calendar method. The main sources for counseling and information about family planning services are healthcare providers and CHWs. Despite people having an acceptable level of knowledge of

modern contraceptive methods, many misconceptions still persist, such as using FP causes: blood to accumulate in your body; breast and other forms of cancer; an increase in the C-section rate; weight gain or loss; and birth defects. In addition, some believe that implants can disappear from the arm and be found in the foot.

The main concerns reported about family planning use were: women secretly getting contraceptives without telling their husband; side effects (e.g. increased menstrual bleeding), slow return to fertility; insufficient counseling; and the political agenda behind family planning programming.

“Others say that family planning is politicized because they think that through family planning, people come with a hidden agenda, or they are preparing other people who will come to occupy our villages “.

(Male participant in Kasalala Town).

Participants had divergent opinions whether adolescents should use contraception or not with some arguing that the community should encourage adolescents to use contraception to complete high school and go to college. Others thought that this would encourage sexual misconduct and spread STIs and HIV in their community. Finally, the analysis did not find a big difference between men and women across the three health districts in terms of their perception of family planning and modern contraceptive methods. However, gender disparities and inequalities emerged in the form of men being judgmental of women who use family planning and greater worry among men about women’s unilateral decision to access FP services.

4.2.2. Perceptions of female and male sterilization

When the discussion was narrowed to female and male sterilization, participants differed by their level of knowledge about sterilization methods. While female sterilization was widely known among participants - many of whom could name friends and relatives who have used female sterilization as a method to limit birth - male sterilization was quite new for some participants who heard about it for the first time during the FGDs.

Participants reported that their perceptions of sterilization varied according to the gender of the user. It emerged from the analysis that female sterilization, also known as tubal ligation, is widely accepted when it is performed on married women who have at least five living children

regardless of gender, who have the consent of their husbands and relatives, and have specific medical indications, such as a history of C-sections and chronic health conditions.

“If a woman has had a considerable number of children, that's normal, but if you had only a small number of children, it's a problem, because we will say that you do not know the value of children.”

Women participants in Kitatumba Hospital.

Except for the indications and conditions mentioned above, female sterilization is a sin. Participants believe that women who seek sterilization will get cancers and backpain, will be stigmatized as prostitutes and killers, and should be divorced.

“A woman cannot afford to go to the center to close her pipes if she is not sick or if she has no health problem”.

Male participant in Kasalala Town.

“The majority of women who have surgery to close their tubes are prostitutes”

Male participant in Bwatsinge town.

The perception of male sterilization is quite different since this method is less known and widely assumed by communities that men will not accept it. The vast majority of FGD participants thought that male sterilization is castration (i.e. the removal of the testicles), results in sexual dysfunction as well as prostate cancer and is associated with occultism. As a result, a sterilized man could be stigmatized and chased out of the village. Sterilization is not considered to be an option for adolescents as they do not meet the criteria described above.

“If you do that you will be stigmatized in the village because everyone will wonder what made you decide that? You will be stigmatized in the village, you will have problems wherever you go”. Man, participant in Bwatsinge Town.

However, there is a minority of participants who thought that sterilization could be a good family planning option, especially for men whose female partners don't want to stop having children or have health conditions that make them ineligible to use some modern contraceptive methods.

“Instead of his wife taking the methods; the man said to his wife, you can rest, and I accept the vasectomy.” This is a man to congratulate.” Female participant in Kirumba Town.

” As all of these methods have side effects for women, some men prefer to close their pipes and others use condoms to avoid pregnancies”. Male participant in Kasalala Town.

4.2.3. Motivations of women and men seeking for sterilization methods.

Reasons that lead women to get sterilized differ from those of men who get sterilized. The analysis revealed that women's primary motivations are health-related and, often, women get sterilized when they have repetitive caesarians, chronic illness, other health conditions (e.g. heart disease, uterine prolapses, etc.), too many children but limited financial resources, an irresponsible husband/partner or after a divorce.

“Pregnancies tire the body of the woman and, if we cannot afford to meet the needs of the children, it is time to get tubal ligation”. Female participant in Kitatumba Village.

Other secondary reasons cited by both women and men were advanced age, losing a job during maternity leave and frequent displacement due to the civil war.

“The situation of the country; for example, if you have to quickly displace because of the war, how are you going to carry a lot of children? This can push women to seek a tubal ligation”. Male participant in Kayna.

Reasons that motivate men for seeking male sterilization are mainly income-related and financial. The focus group discussions revealed that when men decide to opt for vasectomy, the main reason is financial since they want to ensure that they have enough resources to take care of their families. Other reasons are: a spouse/partner that has repetitive caesarians; a partner/spouse with chronic health conditions; a spouse/partner that refuses to limit family size; or a spouse/partner is not eligible to use a modern contraceptive method.

“After giving birth to many children, the burden becomes difficult and the difficulty of doing work as a source of income. He may decide to do the vasectomy”. Male participant in Kirumba Town.

“The man does not want his wife to suffer; since his wife had difficulty making or continuing family planning methods; the man decides that it is him who does the vasectomy”. Female participant in Kirumba.

While the socially-permissible conditions for getting vasectomy are limited for men (i.e. must have five children or more and (ideally) a partner/spouse's consent, women are expected to meet many more conditions, including: consent of the partner/spouse; support from relatives; at least five children; and a medical history of multiple cesareans and chronic health disease. This gender disparity highlights the limited autonomy and agency of women to decide on their own.

4.2.4. Enabling environment and key influencers of the decision-making process.

We sought to explore the influence of the immediate environment on women and men who seek female and male sterilization and to better understand who the stakeholders are and what influence (positive or negative or both) they have over the uptake of female and male sterilization.

The influencers with the most significant impact on individual decisions to use a sterilization method are the spouse/partner, healthcare providers, relatives, religious leaders and friends.

In the case of female sterilization, the husband's consent is encouraged prior to the procedure because of the traditional husband's role in decision making as well as because permanent contraceptive methods are restricted to married couples in these communities. However, in some circumstances, such as the husband's refusal to limit family size or when a man refuses to take care of his family, it is acceptable for women to bypass their husbands and get female sterilization at the clinic.

“If you have a man who, every day, comes back home drunk and asks you to have sex, forces you to have sex while you are ovulating, this is an unwanted pregnancy. If it's repeated, the woman can go alone to the hospital to request a tubal ligation”. Female participant in Lubero.

Two aspects of gender disparities and power dynamics emerged from focus group discussions. Women seeking female sterilization are required to prove the consent of their husband and this can take many forms such as verbal consent or written letter. This requirement is not applied to all men seeking male sterilization as we can see in the results of the quantitative data analysis. While communities are supportive of female sterilization for married women with the consent of their husband, male sterilization is not widely accepted which reinforces the assumption that family planning is for women only. Addressing these gender norms and shifting power dynamics in these very patriarchal societies is critical for engaging men to use family planning services.

“When you are in a relationship, everything is planned together. We can even tie a woman with fewer children (for example two children) and especially if the means of living become difficult. We can say we stop there. We are going to support the two children we have.”. Man, participant in Lubero.

Relatives and families may play a role in couple's decision to use a sterilization method. Alike in many cultures, families and communities in Eastern Congo contribute financially to the dowry of their relatives then may have expectations about the couple having many children with the first one to come within twelve months following the marriage and have the power to interfere in the couple's decisions. So, a couple may want to limit family size using a sterilization method, but relatives and families may disagree with the couple's decision to limit births if the wife does not have a history of c-sections and/or a chronic health condition.

“A woman who gives birth without any problem, she cannot close her pipes”

Man participant in Kasalala.

Religious leaders and their congregations may influence the understanding and perceived benefits of using female and male sterilization. Congregations have different theological doctrines with some being opposed to female and male sterilization (e.g. Catholic congregation) while others are very supportive of sterilization methods (e.g. Adventists congregation in North Kivu). While the influence of church sermons on households is significant, focus group discussions revealed that for most participants, birth spacing, and birth limitation are a couple’s decision and religious congregations should not interfere.

“Everything we receive in the church, the different biblical words, priests and pastors ... we manage it according to the meaning and understanding of everyone. You can say that the church said this, but the church does not help you feed or school your children.”

Female participant in Lubero.

“The church may be right to speak negatively when some women start using a family planning method and become prostitutes and spread various sexually transmitted diseases within the home. Or, when we notice the occurrence of sexually transmitted infections among women who are misled because they are no longer afraid of pregnancy.” Female participant in Lubero.

“Even though churches defend tubal ligation, that does not influence the decision in any way. If the man and the woman have already agreed, this agreement overrides the decision of the church. Because it's not the church that helps us grow children. Children have a lot of needs.” Female participant in Lubero

“I say that other people refer to the biblical saying that everything humans decide here on earth will also be accepted to heaven. If we have agreed in the home between man and woman, God will also agree with our decision on tubal ligation. This is what we also hear some people say in the community.” Lubero participant referring to bible (Matthew 18:19 ASV)

Friends may be consulted when people are making decision for a sterilization method, but the final decision is made by the client.

4.2.5. Roadblocks: Challenges and barriers for accessing services that provide sterilization methods.

We explored with participants the challenges and barriers that one may face when seeking a sterilization method and most cited barriers related to the social environment, finances as well as limited capacity of health facilities. The main challenges cited were: lack of support from the partner/spouse; unaffordable costs/fees for services; fears of stigma from other women; the opposition of religious leaders/congregations; and disagreement of the in-law families.

“If the two families did not get along, it's a problem.” Female participant in Kirumba.

“Religion or church also prevents many people to even space births. Followers of the CEPAC religion make a lot of negative comments and even say that taking family planning methods is a sin”. Participant in Kirumba.

Other barriers cited by women is the letter of consent from the husband that healthcare providers require before performing the procedure, the lack of sterilization services in the area, and negative attitudes of healthcare providers.

“Providers refuse to make the woman tubal ligation, demanding the letter of consent from her husband himself.” Female participant in Kirumba.

For participants who were familiar with CARE’s SAFPAC initiative, which offers free male and female sterilization, cost is not a problem given the benefit of these methods in the long term.

“No, it's not a cost problem, if the man and the woman have already agreed, the cost cannot in any way influence. Because the procedure for tubal ligation costs less than the burden of raising the children”

Male participant Bwatsinge

4.2.6. Programmatic factors that could have influenced the steady uptake of female and male sterilization.

4.2.6.1. Pre-existing conditions.

In-depth interviews with CARE, Health Zone staff and healthcare providers explored the context in which the SAFPAC initiative was implemented and the opinion of interviewees regarding the key factors contributing to the steady uptake of female and male sterilization.

Respondents reported that fifteen to twenty years before the SAFPAC interventions, the leadership of the Adventist Church in Lubero and Butembo Health Districts actively promoted birth limitation in their sermons and managed hospitals where expatriate physicians from the USA

provided female and male sterilization. The Kanyabayonga referral health center in Kayna health district used to be a point of care for provision of both female and male sterilization before the CARE SAFPAC Project and the sterilization methods were provided by national physicians trained by the Adventist Church. The CBCA Church also used to promote and offer both vasectomy and tubal ligation in their health facilities.

“Vasectomy existed but only periodically among Adventists because there were American surgeons who came through the Adventist Church and were providing vasectomy. But when the Adventist surgeons left, everything failed down”.
CARE staff

“CARE arrived on a land already cleared and favorable because of the work of the Adventists.”.
Lubero Health District Manager.

“We contacted the legal representative of CBCA and he allowed us to hold a session in the Church, and we realized that there were even some members of the Church including the health coordinator who had already undergone vasectomy.” CARE staff

For the respondents, female sterilization is very common in their health districts and mostly performed during C-sections for women with repetitive caesareans and couples who have limited income. However, despite demands expressed by some men, vasectomy was no longer offered since the departure of the Adventists physicians and when men wanted vasectomy, they only had two options either the Kanyabayonga Referral health center or travel in Kampala/Uganda.

4.2.6.2. CARE SAFPAC’s interventions.

The SAFPAC Initiative’s added-value consisted of several interventions, including: training healthcare providers on new sterilization techniques; demystifying the taboo about sterilization through community dialogues; provision of medical equipment and supplies; and ensuring that services were free-of-charge.

Healthcare providers reported their satisfaction with learning new and simple techniques for female and male sterilization during training facilitated by CARE’s trainers. They used to perform female sterilization only during C-section and during laparotomy but with the new techniques learned, the procedure was easier. Similarly, the traditional technique used for vasectomy (with scalpel) was time consuming but the Non-Scalpel Vasectomy technic taught by CARE’s facilitators made it easier to perform.

“Before, Adventists did the technique with a scalpel. We introduced the non-scalpel technique that was not done before.” CARE staff.

“Before that, we could only perform the tubal ligation not the vasectomy, the demand for the two methods was small and we used the old techniques. But now, we learned new techniques that does not require client hospitalization. That's good.” Physician at Kayna Hospital.

Insufficient equipment and lack of medical supplies in health facilities limited the provision of the sterilization methods and CARE addressed this issue by providing equipment and supplies to all selected health facilities to ensure continuous provision of services free of charge. By doing so, trained healthcare providers had no excuse to provide these methods.

Another aspect of CARE’s interventions was about promoting these two methods and increasing awareness of local communities. This was achieved through different strategies including integration of vasectomy and tubal ligation topics in health education sessions during antenatal care visits; weekly radio broadcast and by supporting CHWs to facilitate reflective community dialogues with men and women.

“They were told tubal ligation during prenatal consultations and there they can already make a decision and the family of husband and wife write a letter that is put in the file.” Physician in Butembo Health Zone.

Finally, in order to boost the demand for female and male sterilization, CARE and the three health districts convened to offer these services free-of-charge which contributed to address financial barrier that could have limited access for many couples and individuals.

“Before CARE arrived, there were rare cases on request. But with CARE, as it's free, it makes the demand easier. Before the person had to pay \$40-50”. Physician in Butembo Hospital.

4.2.6.3. Other contributing factors to the uptake of female and male sterilization.

For healthcare providers, CARE and Health Districts staff, many factors contributed to the rapid and steady uptake of female and male sterilization in Kayna, Lubero and Butembo Health districts between 2016 to 2018. These factors were **1) a pre-existing supportive environment** (Faith-based organizations that used to promote and provide female and male sterilization in their health facilities), **2) programmatic factors** (availability of quality services; skilled and confident healthcare providers who demonstrated positive attitudes; health facilities with appropriate equipment & supplies; a multifaceted and integrated community mobilization strategy that

involved powerful local churches; and services free-of-charge) and finally 3) *individual factors* such as: a high rate of caesarean sections, limited income & financial resources for couples and households; male engagement; and client satisfaction due to an absence of side effects of sterilization methods compared to hormonal methods.

“*The contributing factors are the high frequency of caesarean sections, sensitization and free services.*”. Physician in Lubero

I think that the main factor for success was making people aware. (*Sensitization*).

They became our friends; they would come to our office every day (*Providers’ attitudes*).

Other factors were the availability of services and the attitude of some providers (**Availability and attitudes**)

Vasectomy clients raised awareness in neighborhoods and men arrived (*Social diffusion*)

The fact that the technique for vasectomy was less invasive and vasectomized men were telling their friends that this is a minor intervention (*Social diffusion*).

In addition to availability, services were also free (*Free services*)

I think there was a lot of exploitation of what already existed, like some of the religious denominations that were already open to it like the Adventist Church. (*Supportive environment*)

Fewer side effects as we have in other methods (*Comparative advantage*).

We had people who praised the method and said that they are even ready to go and testify on the radio if there are still people who are reluctant. (*Social diffusion/Champions*)

With the new techniques we learned, we became more competent and confident to perform vasectomy and tubal ligation (**Providers competence and confidence**)

Several factors explain the interest in these two methods, namely: awareness, confidence in providers and improvement of the working environment. (*working environment*)

Healthcare providers, CARE and DHMT.

4.3. Results from quantitative data analysis.

4.3.1. Sociodemographic characteristics of respondents.

There are significant variations of sociodemographic characteristics among respondents. More than half of users (55%) of other modern contraceptives were younger (on average age 27) than users of female and male sterilization, 34 and 41 years respectively. The majority (>98%) of respondents self-identified as Christians. Men were majority Protestants followers (55%), in contrast with the majority of women who were Catholic followers (64% for users of tubal ligation and other users).

Users of male sterilization were ten time more likely to have achieved college education (16%) than users of female sterilization (1.5%), and the average household size was greater among users of male sterilization (9) than among users of female sterilization and other modern methods (8 and 5 respectively). Female respondents (both users of female sterilization and other methods) were more likely to be unemployed (unemployment rate: 16.2% and 18% respectively) than men (Unemployment rate:1.8%) resulting in income disparities between women and men surveyed.

The average age at first pregnancy is lower among female respondents (18,5 years old for users of female sterilization and 16.8 years old for users of other FP methods) than for male respondents (25 years old). In terms of fertility desire, 39% of men reported that their current number of children is higher than what they planned for and 45% do not want more children.

Table 1: Socio-demographic characteristics of respondents in Lubero, Butembo and Kyanna/DRC.			
	Users of male sterilization. n=56	Users of female sterilization n=130	Users of other modern contraceptives n=144
Average Age (year)	41.4 (30-59)	33.95 (23-45)	27.17 (16-46)
Group age			
10-19	00%	00%	11.1%
20-29	00%	22.3%	54.9%
30-39	41.1%	59.2%	28.4%
40-49	46.4%	18.5%	5.6%
50-59	12.5%	00%	00%
Religion:			
Catholicism	42.9%	54.6%	63.9%
Protestantism	55.4%	43.9%	35.4%
Islam	00%	00%	00%
Other denominations	1.8%	1.5%	0.7%
Education attainment			
Never attended school	00%	13.9%	5.6%
Primary School	35.7%	43.1%	34%
High School	48.2%	41.5%	54.2%
More than high school	16.1%	1.5%	6.25%
Marital status			
Married/in union	100%	90%	52.8%
Divorced/Separated	00%	3.1%	08.3%
Single	00%	6.2%	37.5%
Widow	00%	0.8%	1.4%
Occupation			
Self-employed	30.4%	10%	18.1%
Daily wage worker	7.1%	2.3%	3.5%
Agriculture worker	41.1%	66.9%	23.6%
Farmer	00%	00%	34.7%
Work in private sector	12.1%	0.8%	2.1%
Work in public sector	7.1%	3.9%	00%
Retired	00%	00%	00%
Unemployed	1.8%	16.2%	18.1%
Average Household size	8.7 (5-19)	7.8 (3-15)	5.0 (00-13)
Monthly Income (\$US)			
\$01-50	66.1%	69.2%	66%
\$51-100	26.8%	7.7%	5.6%
\$101-250	7.1%	00%	00%
\$250-500	00%	00%	00%
>\$500	00%	1.5%	00%
Don't know	00%	00%	14.6%
No income	00%	00%	13.9%

Your/Spouse/partner age at first pregnancy.	25 (15-37)	18.5 (13-30)	16.8
Average number of living children	6.2 (3-11)	5.8 (2-17)	3.2 (0-12)
Number of children more than expected			
YES	39%	33.1%	22.2%
NO	61%	66.9%	77.8%
Want less children than current number			
YES	45%	33.1%	12.1%
NO	55%	66.9%	87.9%

4.3.2. Respondents' Knowledge of sterilization methods and previous experience with modern contraception.

The analysis revealed that before choosing a sterilization method, the vast majority of users of sterilization methods attended at least one health education session during which modern contraceptives were discussed (96.4% for men and 94.6% for women), and the main sources of information were counseling by healthcare providers, radio broadcasts, friends and education sessions facilitated by community volunteers. Most clients of sterilization methods attended an education session during which a sterilization method was discussed (84% and 92.8% for female and male respectively).

Prior utilization of family planning indicated that less than half of users have ever used a modern contraceptive method (47.3% and 39.3% for clients of tubal ligation and vasectomy respectively) and the most used methods were Long Acting and Reversible Contraceptives (LARCs), including IUDs and implants. The proportion of respondents who knew someone who had ever used a sterilization method was higher among clients of tubal ligation (78.5%) than for users of vasectomy and other modern contraceptives (42.9% and 55.2% respectively).

The interaction with the health system is an opportunity for providers to discuss with their clients about contraceptive options and the analysis indicated that prior to the sterilization, the majority of users of tubal ligation (65.4%) were advised by their physicians to limit birth. Consistent and systematic counseling for birth limitation is justified by a high C-section rate among female users of tubal ligation with 90% who reported history of C-section during which 80% of tubal ligation were performed.

Table 2: Family planning and sterilization: Knowledge and previous utilization.

	Users of male sterilization. n=56	Users of female sterilization n=130	Users of other modern contraceptives n=143
Knowledge of modern FP before sterilization			
YES	96.4%	94.6%	-
NO	3.6%	5.4%	-
Sources of information about family planning			
Education session at church/mosque	5.4%	1.5%	6.2%
Education session with community volunteers	7.1%	30.8%	37.5%
During a visit at the health facility	12.5%	31.5%	31.3%
During a counseling with a healthcare provider	32.1%	23.9%	9%
During a discussion with friends	10.7%	3.1%	8.3%
During a discussion with relatives	5.4%	1.5%	2.1%
Radio broadcast	19.6%	3.1%	4.9%
TV broadcast	00%	00%	00%
Books	1.8%	00%	00%
Online/Internet including social media	00%	00%	00%

Other (Mention)		5.4%	4.6%	0.7%
Attended an education session during which sterilization was discussed.				
YES		92.9% (n=22)	84.1%	68.5%
NO		7.2% (n=05)	15.9%	29.9%
I can't remember		00%	00%	1.6%
Ever used a modern FP method?	YES	39.3% (n=22)	47.3% (n=61)	
	NO	60.7% (n=34)	52.7% (n=68)	
Know someone who used a sterilization method.				
YES		42.9%	78.5%	55.2%
NO		57.1%	21.5%	44.8%
Advised by a healthcare provider to limit births.				
YES		42.9%	65.4%	9.2%
NO		57.1%	34.7%	80.8%
I/Spouse/partner had a C-section	YES.	39.3%	90%	20.1%
	NO	60.7%	10%	79.9%

4.3.3. Reasons for choosing female and male sterilization.

Reasons and factors for choosing a sterilization method vary between users of female sterilization and users of male sterilization and between users of female sterilization and users of other modern methods.

Reasons for choosing female sterilization were mostly related to individual factors such as respondents' reproductive history and included 1) large family size and high number of living children (82%); 2), limited financial resources (50.8%); 3) history of C-section (50%); and 4) provider recommendation to limit birth (27.7%).

Reasons for choosing male sterilization were mostly related to financial resources, including limited financial resources (75%) followed by large family size or high number of living children or have reached the number of children they wanted (39%).

Although these individual factors were determinant in deciding to use a sterilization method for both males and females, there were other secondary factors that were more programmatic, including the availability of sterilization services (34% for men and 30.8% for women), free services (32% for men and 16.15% for women), trust in healthcare providers (25% for men and 21.8% for women), and uncertainty about their future (28.6% for men and 32.3% for women).

Female users of other forms of modern contraceptives reported that the reasons to choose a female sterilization may include a history of C-section (34.7%), sterilization recommended by a healthcare provider (24.3%), when people reached the number of children they wanted (23.6%), and when people have limited financial resources (19.4%).

Table 3. Reasons for choosing sterilization.				
		Users of male sterilization. n=56	Users of female sterilization n=130	Users of other modern contraceptives n=144
3.1. Primary reasons for choosing a sterilization method				
Have reached the number of children I planned for.	YES	39%	82.3%	23.6%
	NO	61%	17.7%	76.4%
Sterilization was recommended by a provider	YES	1.8%	27.7%	24.3%
	NO	98.2%	62.3%	75.7%
My partner/spouse wanted to limit births	YES	5.4%	12.3%	2.1%
	NO	94.6%	87.7%	97.9%
Limited financial resources	YES	75%	50.8%	19.4%
	NO	25%	49.2%	80.6%
To offer our children a better life	YES	19.6%	4.6%	5.6%
	NO	80.4%	95.4%	94.4%
After my /spouse/Partner C-Section	YES	12.5%	50%	34.7%
	NO	87.5%	50%	65.3%
3.2. Secondary reasons for choosing a sterilization method				
War and displacement	YES	3.6%	12.3%	
	NO	96.4%	87.7%	
My partner health condition	YES	23.2%	12.3%	
	NO	76.8%	87.7%	
Unemployment	YES	3.6%	6.9%	
	NO	96.4%	95.1%	
Support from my pastor/priest/imam	YES	5.4%	0.8%	
	NO	94.6%	99.2%	
I had health issues	YES	10.7%	70%	
	NO	89.2%	30%	
We could not afford basic needs for our family	YES	58.9%	20.8%	
	NO	41.1%	79.2%	
Availability of services	YES	34%	30.8%	
	NO	66%	69.23%	
Free services	YES	32%	16.2%	
	NO	68%	83.9%	
Trust of healthcare providers	YES	25%	21.5%	
	NO	75%	78.5%	
Uncertainty about our future	YES	28.6%	32.3%	
	NO	71.4%	67.7%	

4.3.4. Enabling environment.

This study sought to explore household and community support that underlines a supportive environment for the users of sterilization methods, including support from partners and relatives, friends and role models in their community, and their congregations. The results indicate that the majority of respondents who informed their partner about their intention to use a sterilization method received a positive reaction (96.2% and 93.1% for men and women respectively).

However, women who decided to choose sterilization were more likely to be supported (91.8% by relatives and 87.3% by friends) than men (60% by relatives and 66.7% by friends). Only few (37.4%) users of other modern contraceptives methods thought that their relatives would support their decision if they knew that they wanted to use a sterilization method.

Despite the prominent role of religious leaders in these communities, only few people (1 man out of 56 respondents and 17 women out of 130 respondents) informed their priest or pastor about their decision to use a sterilization method, and 80% (14/17) of female respondents were supported by their priest or pastor.

Role models may play a role in emulation, social diffusion, and influence on individual behaviors in communities where they live. Findings indicated that 78.5% users of female sterilization, 55% users of other modern contraceptive methods and 43% of users of vasectomy that they knew someone who used a sterilization method before their decision for a sterilization method.

Table 4: Elements of the enabling environment.

		Users of Vasectomy. n=56	Users of T.L n=130	Users of other contraceptives n=143
Partner aware with positive reaction	YES	96.2%	95.9%	
	NO	3.8%	4.1%	
Relatives aware with positive reaction	YES	60%	91.8%	37.3%
	NO	40%	8.3%	62.7%
RL aware with positive reaction	YES	100% (n=1)	80% (n=17)	23.1%
	NO	00%	20%	76.9%
Friends aware with positive reaction (n=64).	YES	66.7%	87.3%	57.63%
	NO	33.3%	12.7%	42.4%
Congregation supports modern FP.	YES	60.7%	46.9%	37.1%
	NO	39.3%	43.1%	62.9%
Congregation supports MS/ FS.	YES	32%	45.4%	28%
	NO	68%	54.6%	72%
Community supports MS/FS.	YES	50%	52.3%	36.8%
	NO	50%	47.7%	63.2%
Knew a person who was sterilized.	YES	43%	78.5%	55.2%
	NO	57%	21.5%	44.8%
Willingness to share his experience	YES	83.9%	76.9%	
	NO	16.1%	23.1%	

4.3.5. Correlations/associations between factors that led to choose sterilization methods.

To test our hypotheses, we ran logistic regressions to explore the correlation/association between various factors (individual, programmatic and environment) and the reasons of choosing or shifting to one of the two sterilization methods. For men who used male sterilization, we found a positive and strong relationship between limited resources as well as partner health issues and the reason of adopting a sterilization method that were found to be statistically significant (p -value: .02 and p -value:.001 respectively).

For users of female sterilization, we found a strong and positive the relationship between women who had a history of caesarean and the willingness to adopt female sterilization and this relationship is statistically significant (p -value: .003). Finally, for users of other forms of modern contraceptive methods, we found a strong and positive relationship between shifting to female sterilization and sterilization recommended by a physician (p -value: .027) and the main reasons why these women would be willing to adopt female sterilization (51% had ever thought about shifting) are because they want to limit (88%) and they think female sterilization is the most effective way of limiting birth (7%).

Table 5: Bivariate logistic regressions.

Explanatory Variables	Dependent Variables	Parameter estimate. (95% CI)		
		MS	FS	Other
1.Individuals factors				
Want no more children	Reason of choosing sterilization	0.32	0.69	0.96
High number of living children	Reason of choosing sterilization	0.80	0.97	0.96
Large family size	Reason of choosing sterilization	0.55	0.19	0.71
Limited resources	Reason of choosing sterilization	0.02	0.31	0.96
History of C-sections	Reason of choosing sterilization	0.97	0.003	0.98
Personal health issues	Reason of choosing sterilization	0.97	0.97	0.68
Partner health issues	Reason of choosing sterilization	0.01	0.44	
Previous use of modern contraceptives	Reason of choosing sterilization	0.96	0.97	
2.Enabling environment				
Support from the partner	Reason of choosing sterilization	0.55	0.20	0.19
Uncertainty about the future	Reason of choosing sterilization	0.56	0.45	
War/social conflicts	Reason of choosing sterilization	0.97	0.97	
Knew someone who was sterilized	Reason of choosing sterilization	0.30	0.86	0.09
3.Programmatic factors				
Attendance to an education session where sterilization was discussed	Reason of choosing sterilization	0.97	0.61	0.5
Sterilization recommended by a healthcare provider	Reason of choosing sterilization	0.30	0.12	0.027
Service free of charge	Reason of choosing sterilization	0.77	0.20	

Legend: MS: Male Sterilization; FS: Female Sterilization and Other: Users of other contraceptives.

4.3.5.1. For users of female sterilization.

A **strong association** was found between respondents constrained financial resources and history of C-section ($r^2=0.05$). **No association** was found between age of first pregnancy and history of C-section ($r^2=0$). There was a **weak association** between the number of living children and history of C-section ($r^2=0.03$) and a weak association between the number of living children and the satisfaction about the number of children ($r^2=0.03$). Another weak association was found between the number of living children and the respondents' constrained financial resources ($r^2=0.01$). Finally, it was found that previous attendance in a FP session was associated with higher likelihood to hear about a sterilization method ($r^2=0.07$).

4.3.5.2. For users of male sterilization.

A **strong association** was found between the age of the respondent when his first child was born and his number of living children ($r^2=0.09$). Previous attendance at a FP session was associated with likelihood to hear about a sterilization method ($r^2=0.06$). A **poor association was found** between number of living children and respondent's limited financial resources ($r^2=0.01$), and **no association** was found between respondent's household size and their limited financial resources ($r^2=0$).

4.3.5.3. For users of other modern contraceptive methods.

More than half (51%) of users of other modern contraceptives reported that they may switch to female sterilization for the following reasons including if they don't want more children (69.9%); to avoid any risk of pregnancy (17.8%) and female sterilization is more effective than the method currently used (5.5%). Of those who never considered switching to female sterilization, 57.6% reported that they will support their male partner seeking for male sterilization.

We did not find any association between previous use of a modern contraceptive method and likelihood to choose a sterilization method, nor an association between previous attendance to an education session during which sterilization methods were discussed and likelihood to switch to female sterilization ($r^2=0.01$ and $r^2=0.02$ respectively).

4.3.6. Other findings.

Five elements were used to measure the quality of services provided, including obtained partner consent, waiting time, quality of welcome at the clinic, cost of services and level of satisfaction about services received. In regard to these elements, we found that there are some minor variations between users of female sterilization and those of male sterilization.

First, 98.1% of men and 99.2% women reported that the welcome by the healthcare providers at the clinic was warming and 100% of both men and women received counseling by healthcare provider prior to the procedure. While only few men (50.9%) reported that the provider asked for their spouse/partner's consent, this proportion was higher (93%) for users of female sterilization. This indicates a gender-disparity in the way that providers see women's autonomy in decision making.

Waiting time and cost for services were also analyzed, and 75% of men versus 64.6% women reported that the procedure was performed within an hour. One hundred percent of men compared to only 66.9% of women reported that the service was free for all. meaning more than one third of female clients paid out of pocket for services supposed to be free.

This highlights another gender-disparity in access to affordable healthcare services. One explanation could be that the majority (80%) of female sterilizations happened during C-sections and additional charges were requested. Moreover, 85.2% of men versus 76.9% of women reported that they would agree to openly share their experience to encourage other people to use sterilization methods. Regret after female sterilization was expressed by 9.2% of respondents, likely because 80% of tubal ligations were performed during C-sections. This may indicate that the vast majority of users of female sterilization opted for this method given this particular circumstance.

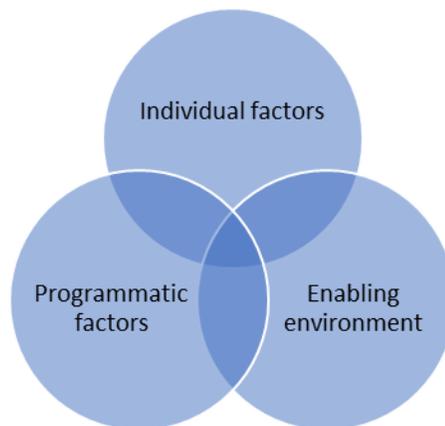
Chapter Five: Discussion.

5.1. Introduction.

This mixed methods study aimed to determine the drivers and factors that contributed to the rapid and steady uptake of female and male sterilization in Lubero, Kayna and Butembo Health Districts in North Kivu, Eastern Province of the DRC. The findings will inform program quality and improvement, as well as influence practices and policies.

5.2. Summary.

The findings have revealed that individual, programmatic, and environmental factors were the key contributors to the steady uptake of female and male sterilization.



5.2. a. *Individual factors in use of female and male sterilization.*

The study demonstrates that the decision to adopt a family planning method, in general, and sterilization, in particular is influenced by a variety of factors, including: 1) high number of living children (6 children for both users of vasectomy and tubal ligation and 3 children for users of other modern contraceptive methods); 2) **large household size** (9 people for users of vasectomy, 8 people for users of tubal ligation and 5 people for users of other modern contraceptives methods); 3) **low income of the head of the household** (Less than \$US 50 per month was the average income reported by 66% of users of vasectomy, 69% of users of tubal

ligation and 66% of users of other modern contraceptives methods); 4) *prior attendance to a health education session* during which sterilization methods were discussed; and 5) *influence of role models* (knowing someone who has already used a sterilization method). These factors are consistent among both men and women and generally take precedence over the influence of relatives, communities, and religious leaders.

However, it is crucial to highlight the significant difference between users of male and female sterilization as well as users of other modern contraceptive methods. While limited resources and partners health issues were the two main factors associated to men decision to adopt male sterilization, a history of c-section was associated to women decision to adopt female sterilization and only a female sterilization recommended by a physician was associated to the reason why a user of other modern contraceptive method could shift to a sterilization method.

Interviews and focus group discussions reported further reasons for men adopting female and male sterilization including 1) uncertainty about the future, 2) a large household size, 3) availability of free services and 4) trust in healthcare providers. For sterilized women, additional factors reported in FGDs included 1) partner willingness to limit birth, 2) health issues or partner health issues, 3) uncertainty about the future in a context of protracted crisis and limited economic opportunities as well as the availability of free services.

Some of these factors (economics, spousal influence, provider trust, reputation and availability; and uncertainty about the future) have been documented in other studies as overarching contributing factors to the vasectomy and tubal ligation decision making process. (Arwen.B & all; 2007)

The fact that the majority of female sterilization happened during cesarean section (90%) requires further exploration into whether these clients would have chosen female sterilization or not if their health, well-being, and lives were not at risk. This study shows that the majority of female sterilization users wanted to have more children, and 9% reported that they regret their decision after using female sterilization.

Study participants faced a high unemployment rate leading to low income; more than 65% of all participants had less than \$50 monthly income. Men seem to be the most affected by the low level of income as it is socially and traditionally their role to provide and protect their family. When men can no longer afford the basic needs for their dependents, male sterilization/vasectomy becomes the practical option to limit birth and minimize the burden of their large family size.

While all men (100%) who have been sterilized were married, 10% of users of tubal ligation were either divorced/separated or single. This could be explained by early pregnancy (17-18.5), which requires to further exploration of the motivations of unmarried clients and has implications for designers and managers of sterilization programs to think beyond married couples and specifically target sub-groups in the larger population.

In addition, inequalities and unbalanced power dynamics continue to lead to disparities between men and women, hindering women's ability to autonomously choose sterilization. Married women are required to get their husband or partner's authorization before undertaking a female sterilization procedure. Men, on the other hand, are not required most of the time. Sterilization programs should consider addressing social and gender norms, as well as power dynamics, to ensure that women's rights are upheld and supported by spouses, partners, friends and healthcare providers.

Finally, aligning with the social ecological model at both the interpersonal and community levels, the influence of immediate relatives, including husbands, and the support of social networks, including friends and religious leaders, in individual health decisions were explored. Our results support findings of other previous studies. The majority of both female and male sterilization were supported by their spouse/partner (at least nine out of ten). However, men were less supported by their relatives than women were (six and nine out of ten respectively). This supports our findings from interviews and focus group discussions. Participants reported that female sterilization was only considered socially acceptable after multiple cesarean or when a woman faces health issues. Consequently, we found that the vast majority of completed sterilizations were recommended by healthcare providers and were performed during cesarean sections.

Men, on the other hand, do not face parallel health issues and therefore received less support from relatives and friends. Possibly due to fear of stigma, they did not seek advice from their pastors or priests, as opposed to female sterilization users who were mostly supported by their religious leaders. When facing health issues, such as multiple cesarean sections and other maternal health conditions, combined with limited financial resources and multiple previous children, women seeking female sterilization are more likely to be supported by their relatives and communities than their male counterparts.

5.2.b. Programmatic factors leading to uptake of female and male sterilization

CARE's SAFFAC initiative was built upon previous experience in the region, including successes and lessons learned during the integration of long-acting and reversible contraceptives (LARC) in the three health districts. The initiative was designed to address both demand and supply by ensuring that services were accessible, affordable, human-centered, and rights-based.

The integration of female and male sterilizations methods was designed with the intent to address a number of social barriers. Following an initial health facility assessment and a situation analysis conducted across these health districts, the project team became aware of traditional social and gender norms and potential barriers that could hinder access to female and male sterilization. Barriers identified included lack of training and negative attitudes of healthcare providers, lack of basic equipment, cost of services and lack of confidentiality, and misconceptions about female and male sterilization (for example, associations of sterilization with castration and religious sins). These barriers were addressed by ensuring that healthcare providers were trained and skilled to provide appropriate counseling and services free of charge. Healthcare providers also participated in reflective discussions using values clarification for attitudes transformation activities that required them to provide respectful care and ensure confidentiality for all clients. Finally, health facilities were supplied and equipped with tubal ligation and vasectomy kits.

Recognizing that providers are originally from and share similar cultural values with the communities they serve, the CARE team also decided to implement provider attitude assessments. These assessments showed that most healthcare providers were neither keen to counsel clients for sterilization methods nor to use a sterilization method. However, through iterative and continuous reflective discussions using values clarification for attitudes transformation (VCAT) tools and by providing competency-based clinical training, healthcare providers became empowered and confident to counsel and provide services their patients.

Improvement in clinical skills as well as change in attitudes resulted in healthcare providers playing a critical role in providing counseling to patients. A number of clinic practices increased client satisfaction and spread positive perceptions about sterilization., Providers sought to ensure that clients felt welcomed at the clinic, and they provided services free of charge. They also limited

the waiting time at the facility, and the brevity of the procedure, thus allowing patients to leave the facility the same day (roughly after 30 min).

In addition to these interventions at the clinic level, the CARE team initiated participatory dialogue sessions with communities, as well as radios broadcasts. Both CHWs as well as previous users of female and male sterilization played a critical role in sharing the benefits of the procedures. These interventions were somewhat effective. The majority of participants interviewed reported that they attended a health education session where sterilization methods were discussed and most of them knew someone who had used a sterilization method. Men were informed of family planning methods primarily through healthcare providers, and through radio broadcasts, discussion with friends, and through CHWs. Similar to men, women were more informed about family planning by healthcare providers than by CHWs. This highlights the importance of ensuring that not only healthcare providers and CHWs are skilled at providing comprehensive counseling but also, that they are equipped to work together to dispel misconceptions and increase referrals.

Integration of female and male sterilization into an existing family planning program should be designed carefully to ensure that a holistic approach is adopted and that barriers of both supply and demand are equally addressed. Ensuring readiness of health systems (training, attitudes, quality of services, free of charge, supplies and equipment) as well as challenging misconceptions, social norms and power dynamics play a critical role in addressing obstacles toward accessing female and male sterilization services.

5.2.c. Contextual factors in the uptake of female and male sterilization

FGDs and interviews with healthcare providers, CARE staff, and Health District staff reported that pre-existing conditions and external factors created the conditions necessary to integrate sterilization into the existing SAFPAC project. The buy-in of health districts authorities

and the Adventist church leadership may also have contributed to community acceptance and may have eased the integration of both at the clinic and community levels. Because they have supported similar programs in the past and some of the leaders were already sterilized, Adventist Church leadership played a critical role in expanding sterilization services. The SAFPAC project was thus able to use their clinics for service provision, and CHWs and CARE staff facilitated dialogue sessions in Adventist churches.

Religious leaders often have an interest in modifying and molding community sexual behaviors. Our results support the findings of other studies that highlight the role that informed and trained religious leaders can play as facilitators and agents of change in their communities. (Orubuloye and all,1993). However, in spite of the influence of religious leaders, our results did not show a significant influence of religion on individual decision- making. Focus groups reported that users of sterilization prefer not to disclose their decision to others, including religious leaders, to avoid stigma and rejection. This contradicts other studies that have found positive correlation between religion teachings and large family size, which assumes an influence of religious teaching on individual behaviors (Heshmat S.; 2007).

5.3. What differentiate sterilized women from those using other modern contraceptives?

The analysis of quantitative data revealed that women users of other modern contraceptives were younger; they were mostly unmarried, more educated (high school education) and had few children than sterilized women. These differences in demographics support what was reported in previous studies with the use of surgical sterilization associated with increased age and larger family size (Khan AI1 & all; 2018) and parity at the time of the last wanted birth is a major factor affecting sterilization choices (Bumpass LL1 & all; 2000).

While in the general opinion, unmarried women seeking for sterilization are still associated to prostitutes and female sterilization is only admitted for women with health issues including a history of c-section, , they were 51% to report that they have once thought shifting to female sterilization if it is recommended by a healthcare provider and because they do believe sterilization would be the most efficient method to limit birth. Women using other modern contraceptives may be exposed to more social pressure than sterilized women because they are mostly not married, may not have a health issue and they may not have a history of c-section given their younger age.

5.4. Limitations

This study was not representative of the entire population of the DRC and only focused on peri-urban and urban neighborhoods of one province. This study was conducted in hard to reach catchment areas due to insecurity, including an outbreak of Ebola Virus Disease epidemic, thus making it challenging to reach out to some study participants. In addition, there was no group comparison for clients of male sterilization. Therefore, the inference of the study's findings to the general population and the application of recommendations from the study should be undertaken carefully and adapted to specific contexts.

5.5. Implications, Recommendations and Conclusion.

Currently 214 million women in developing countries want to avoid pregnancy but do not use a modern contraceptive method. Men are left with only one contraceptive option (condom) and family planning is still perceived as a women responsibility and men are rarely involved.

The limited choice of contraceptives that women and men have is not acceptable because limited contraceptive options hinder individuals and couples' ability to choose what fits with their needs. Expanding quality-assured contraceptive options is critical in reducing the current unmet need. Providing a wide choice of acceptable and effective contraceptive methods empowers men and women to make their own and informed decisions and this should be a fundamental principle that guide the provision of contraceptive information and services

High-quality family planning services should be designed in a way that address the needs of both men and women by expanding contraception options and offer a full range of contraceptives. Family planning programs that seek to integrate female and male sterilization should be designed in consultation with both men and women and should respect the human rights of women and men protect their privacy, and provision of services free of stigma, discrimination, violence or coercion are essential.

Although female sterilization is the most widely used modern contraceptive method in the world, most family planning programs in Africa have lagged behind. Many factors continue to hinder sterilization provision, including lack of interest from organizations working in the family planning sector, lack of sufficient training for healthcare providers, lack of demand, and lack of accurate information. Unhealthy gender stereotypes and misconceptions continue to keep male sterilization rare. Moreover, accurate data remain scarce in many African countries. These barriers should be identified in advance and interventions should be tailored to address these specific

factors in a way that engages local communities, religious leaders, healthcare providers, and health authorities.

A number of strategies in the SAFPAC approach could be adapted in other contexts to expand access to sterilization. The CARE SAFPAC Program in the DRC has proven to be successful in increasing access to female and male sterilization by: 1) addressing negative attitudes of healthcare providers and improving their clinical skills; 2) supplying health facilities with necessary clinical supplies; 3) ensuring that quality services are provided free of charge; and 4) by addressing misconceptions, gender, and social norms in collaboration with CHWs, religious leaders, and community members. By making both female and male sterilization options available, the project has expanded individuals' and couples' contraceptive options.

Programs designers and implementers should explore innovative ways to stimulate interest of married women to adopt for female sterilization out of the context of c-section and health issues. Effective counseling for shifting to sterilization methods should be integrated into national FP protocols and guideline and giving to users of other modern contraceptive the right information to help them make timely and informed decision to adopt for sterilization. The counseling should address concerns and misconceptions related to sterilization methods.

We know from previous studies that between 2 and 20 percent of women regret their decision to undergo sterilization and the factor most strongly associated with regret is being less than 30 years old at the time of sterilization. (Ernesto F;2007). The younger a woman is when she has a sterilization procedure, the more likely she is to regret that decision. (Curtis KM, 2006). Women undergoing sterilization at the age 30 years or younger were about twice as likely as those over 30 to express regret. We also know that early pregnancy and younger motherhood is common in many countries due to early marriage and limited access to contraceptives, a family planning

program that encourages younger women using other methods to use female sterilization as an option for limitation, should consider providing appropriate counseling to all clients and mitigate the risk of regret.

Communication strategies should be tailored and integrate messages that spread correct and accurate information about female and male sterilization to defeat misinformation. A particular attention should be given to interventions encouraging couples to a better dialogue about contraceptive options suitable to their situation. Addressing misconceptions through robust and effective communication strategies were cited as one of the three factors relevant to the acceptance of sterilization in the US in the 1970s. (Bumpass L; 1974).

Policy makers and programs designers should consider expanding family planning options for individuals and couples by designing guidelines that expressly recommend practitioners to expand contraceptive options by integrating female and male sterilization into existing family planning programming and offer a full range of contraceptive methods. Removing criteria for performing sterilizations has been found to be an effective solution for expanding access to both female and male sterilization. (Bumpass L; 1974).

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