Contraceptive Preferences and Adoption Following Female Genital Fistula Surgery in Uganda: A Mixed-Methods Study

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Research Article

Keywords: female genital fistula, surgery, contraception, family planning, fertility intention

Posted Date: March 15th, 2022

DOI: https://doi.org/10.21203/rs.3.rs-1426345/v1

Abstract

Background: Female genital fistula, largely caused by prolonged obstructed labour, is treated by surgical repair. Avoiding pregnancy for a minimum period post-repair is generally recommended to ensure adequate healing, so contraceptive preferences and use are important for optimizing post-repair outcomes.

Methods: We examined contraceptive preferences and use in the year following genital fistula surgery using mixed-methods. 60 Ugandan women were enrolled starting in December 2014 with data collection completed in August 2016. Sociodemographic characteristics, fistula-related incontinence, sexual activity, contraceptive use and pregnancy status were recorded quarterly for 12 months after surgery. In-depth interviews among purposively selected participants (n=30) explored intimate relationships, sexual experiences, reproductive intentions, and contraceptive use.

Results: Median participant age was 28 years (interquartile range [IQR]: 21–36 years), and almost half (48%) were married or living with partners. Counselling was provided to 97% of participants on delaying sexual intercourse and 59% received counselling on contraception. Sexual activity was reported by 7% after 3 months and 50% after 12 months. 6 (10%) women became pregnant during the study period. Eighty-three percent reported not trying for pregnancy. Among sexually active participants, contraceptive use was low at baseline (36%) but increased (to 75%) at 12 months. Interview participants who desired children immediately were young, had fewer children, experienced stillbirth at fistula development, and felt pressure from partners. Women adopted contraception to fully recover from fistula surgery and avoid adverse outcomes. Others simply preferred to delay childbearing. Reasons cited for not adopting contraception included fecundity perceptions, family planning misconceptions, and healthcare provider advice.

Conclusions: Contraceptive use following genital fistula repair increased over time, but unmet need still existed, and misconceptions were prevalent despite some counselling. Provision of comprehensive patient-centred contraceptive counselling at the time of fistula surgery and beyond is important for helping women to optimize healing from fistula and minimize recurrence, as well as to meet their own reproductive preferences.

Introduction

Female genital fistula in low- and middle-income countries is primarily caused by prolonged obstructed labour in the absence of high-quality emergency obstetric care, resulting in significant maternal morbidities. Fistula may also arise from iatrogenic or traumatic aetiologies. The primary presenting symptom is uncontrolled urine and/or faecal incontinence, depending on the fistula location, and may also be associated with a wider range of injuries broadly affecting gynaecological, urological, gastrointestinal, neurological, and/or musculoskeletal systems.[1] Prevalence and incidence data are limited; however, between 500,000 to 2 million women worldwide are estimated to live with the

condition,[2,3] with an annual incidence of 50,000–100,000.[4] The majority of cases occur in sub-Saharan Africa, including in Uganda.[5] Women with fistula experience significant physical, psychosocial and economic morbidity.[6] Surgical correction is the cornerstone of treatment for women with fistula, with fistula closure rates as high as 94%.[7] Holistic approaches to fistula programming that incorporate a range of supportive adjunct services are recognized as being important for optimizing women's post-repair health and quality of life, but are not broadly available.[8]

Many women with fistula also have experienced stillbirth, and with generally high fertility desires in low-income settings where fistula occur, some women who undergo fistula repair express an intent for subsequent childbearing. Although no formal guideline exists regarding the minimum amount of time that women should wait before becoming pregnant following fistula repair, providers often recommend waiting until fully recovered from surgery, typically somewhere between 3 months to 1 year, to reduce the risk of fistula repair breakdown and to optimize pregnancy outcomes.[9,10] For example, EngenderHealth's FistulaCare and FistulaCarePlus programs, two large USAID-funded programs on fistula, recommended 3–6 months of abstinence from sexual intercourse, followed by an additional period of contraception prior to post-repair pregnancy.[14]

Given the importance of delaying birth following fistula repair, contraceptive counselling is an important component of health education for both patients and their partners in the perioperative period. The few studies that have focused on contraception following fistula repair have found low uptake, ranging from 20–37% in Kenya,[11] Malawi,[12] Nigeria,[13–15] and the Democratic Republic of the Congo.[16] Available research suggests that non-adoption of contraception following fistula repair is due to socioeconomic reasons, religious and cultural beliefs, and myths.[11,13–17] Understanding women's perspectives on contraception following genital fistula repair and correcting misinformation is important for protecting women's post-repair health.

Due to persistent challenges in ensuring broad access to emergency obstetric care, Uganda has a comparatively high prevalence of female genital fistula, with approximately 2% of women reporting history of fistula symptoms in nationally representative surveys of reproductive-aged women.[18] Stillbirth is a common consequence of childbirth resulting in fistula formation, and Ugandan society places high social value on large families, with total fertility rate of 5.4 children.[18] This combination of higher fertility norms and infant loss may limit both knowledge and interest in contraception; however, there is not yet data on post-repair contraceptive adoption among this population. Research from other sub-Saharan African countries is heavily quantitative and few studies followed women longitudinally, limiting our understanding of women's unique decisions and experiences of a complex issue. [11,13–17]

To better inform acceptable family planning interventions among Ugandan women who have undergone genital fistula repair, we aimed to understand current practices, preferences, and unmet needs among a cohort of Ugandan women during the 12-month period following genital fistula repair, employing both quantitative and qualitative methods.

Methods

This analysis was situated within a larger sequential explanatory mixed-methods study on recovery and reintegration following genital fistula repair surgery in Uganda, described in detail elsewhere.[19] Study participants were women who received genital fistula surgery at Mulago National Teaching and Referral Hospital in Kampala, Uganda. Fistula repair is provided by the urogynaecology division as an ongoing surgical service and supplemented by four to five targeted fistula repair camps annually. This analysis is focused on contraception among women in the 12-months following genital fistula repair, including quantitative data regarding post-repair family planning behaviours collected quarterly and qualitative data reflecting women's post-repair contraceptive preferences at 12-months following fistula repair.

Quantitative Component

We recruited 60 women at the time of genital fistula surgery for 12-month longitudinal cohort participation. Our study was launched in December 2014 and recruitment lasted through June 2015. Study follow-up was completed in August 2016. Women were eligible if they spoke Luganda or English, resided in a community with cellular telephone coverage, and were able to provide informed consent for study participation. Individuals under age 18 years who experience genital fistula are considered emancipated minors; thus, no age-related eligibility restrictions were defined. All eligible participants were enrolled in the study following the provision of informed consent. Quantitative data were captured at baseline, 3-, 6-, 9- and 12-months post-surgery. Questions included sociodemographic characteristics; incontinence severity (International Consultation on Incontinence Questionnaire, Short Form),[20] sexual activity, contraceptive use, and pregnancy intention and status.

Qualitative Component

A purposively selected sample of 30 women from the quantitative longitudinal cohort were invited by the study team for an in-depth interview following the conclusion of the 12-month quantitative portion of the study to supplement our quantitative findings. Interviews took place from Jan-Aug 2016. Women were selected for a range of physical and psychosocial recovery experiences based on our quantitative data. In-depth interviews were conducted in-person in a private room at Mulago Hospital and lasted approximately 1-1.5 hours each. The in-depth interview guide included open-ended questions on women's post-repair recovery and reintegration experiences, including their relationships with their partners, sexual experiences, reproductive intentions, and contraceptive attitudes and use. Interviews were translated and transcribed into English for analysis.

Analysis

Quantitative data analyses were performed utilising Stata v14 software (StataCorp, College Station, TX). Univariate analyses were performed to describe the sociodemographic characteristics of participants. Descriptive statistics, including the mean and standard deviation for continuous variables and the number and proportion for categorical variables, were utilised to describe relationship status, fertility

status, and contraceptive use among the longitudinal cohort over the 12-month follow-up period. We compared sexual activity and contraceptive use at 12 months by age group, parity, household asset score, relationship status, educational attainment, time lived with fistula, and urinary incontinence using Fisher's exact test. We compared contraceptive use by number of children using the Kruskal-Wallis test. Qualitative data analyses were performed utilising Atlas.ti software. Transcripts from in-depth interviews were coded using inductive and deductive codes within Atlas.ti software, which were analysed to understand women's sexual behaviours, experiences, and family planning use following recovery from obstetric fistula surgery. Two members of the research team were involved in coding the qualitative data (HN and AE), one Ugandan and one American. Coding disagreements were resolved by discussion. Coded data were analysed thematically to describe the different dimensions and commonalities of each theme and the patterns and linkages between themes.

Ethical Approval

The study protocol was approved by the Makerere University School of Medicine Research and Ethics Committee (Ref# 2014-052) and the University of California, San Francisco Human Research Protection Program, Committee on Human Research (IRB# 12-09573 and IRB# 15-17467) and the Uganda National Council for Science and Technology (REF#:1541212101). All individuals eligible for participation underwent an informed consent process; those individuals unable to provide signatures for informed consent provided thumbprint confirmation. All study methods were performed in accordance with the relevant guidelines and regulations.

Results

Sociodemographic Characteristics

The median ages were 28 years (interquartile range [IQR]: 21–36 years) for participants in the longitudinal study and 31.5 years (IQR: 27–38 years) for participants in the nested qualitative study (Table 1). Almost half of the participants (48% and 50%, respectively) were either married or living together with their partners. Many were separated from their partners or divorced (27% and 37%, respectively). Most of the participants (68% and 63%, respectively) had some primary education, whereas few had secondary educations. Husbands were the main financial supporters of participants (40% and 43%, respectively), followed by themselves (28% and 33%, respectively), and relatives (32% and 23%, respectively). Many households had a mobile phone (65% and 57%, respectively), electricity (43% and 65%, respectively) or owned some land (47% and 37%, respectively.). Counselling on resuming sexual intercourse (97%) was reported by most women at the time of fistula surgery hospitalization, although fewer reported having received contraceptive counselling (59%; data not shown).

Resumption of Sexual Activity and Family Planning Use Following Surgery

Women gradually resumed sexual activity following surgery, with 6.8% reporting sexual activity after 3 months, 32% after 6 months, and 50% reporting sexual activity after 12 months (Table 2). A total of six

women became pregnant during the study period, including two within 3 months post-fistula repair. Across the 12-month follow-up, the large majority of sexually active women (83%) reported not trying for pregnancy. Despite this, contraceptive use was low but increased over the study follow-up, with 36% reporting method use at the time of fistula surgery compared with 75% at 12 months.[1] At 12 months post-surgery, female sterilisation was the most common method reported among family planning users (38%), followed by oral contraceptive pills (13%), implants (8%), intrauterine devices (IUDs; 4%) and injections (4%). Fewer reported using condoms.

The sociodemographic and clinical characteristics associated with sexual activity at 12-month follow up included relationship status and urinary incontinence (Table 3). Women whose urinary incontinence was resolved were also more likely to report resumption of sexual activity than those without incontinence (62% vs. 26%, p=0.012). Women married or living with partners were also more likely to report sexual activity than those without partners (80% vs. 18%, p<0.001). Parity also trended toward significance (p=0.057): women with 4 or more children (63%) were more likely to report resumption of sexual activity than women with 1–3 children (54%) or women with no children (30%). However, marital status also was patterned by parity, with 45% of women with no children currently married compared to 79% of women with 4+ children (p=0.079).

The sociodemographic and clinical characteristics associated with contraceptive use at 12-month study follow-up included relationship status, educational attainment, and number of children (Table 3). Women who were married or living with partners were less likely to use family planning than women without partners (11% vs. 50%, p=0.002). Women with higher levels of educational attainment were less likely to use family planning than less educated women (p=0.032). None of the women with secondary education or higher reported the use of family planning compared with 18% of those who completed primary education, 46% with some primary education, and 40% with no education. However, in this higher educational attainment group, only one-third were sexually active, and of those only 1 reported regular menorrhea. Contraceptive use also varied by parity; women with 4 or more children (64%) were more likely to report contraceptive use than women with 1–3 children (32%) or those with no children (55%; p<0.001).

Fertility Preferences

Fertility preferences varied across the qualitative sample, with some women sharing a desire to become pregnant immediately, others wanting to postpone until later, and some not interested at all in another birth.

Qualitative participants who asserted desires to have children immediately were generally younger, had fewer children, and had experienced stillbirth at fistula development. One 23-year-old participant who lost her only child when she developed a fistula could not wait to have a child; in few words she asserted, *'Right now I want a baby.'* (Interviewee, 23 years old, no living children; 30003) Other participants reported being anxious to become pregnant immediately due to pressure from partners who were

concerned about infertility, some with the added competition from co-wives. One 24-year-old participant whose husband desperately wanted her to have a girl child shared*:*

I was so anxiously waiting for [pregnancy]….. Well after the six months, it was the only thing which I was waiting for…the man was also suspicious; he always said, "You see some people whose uteruses are taken out are sometimes unaware of it. So maybe you are just unaware (that yours was removed and cannot conceive)." (Interviewee, 24 years old)

Some participants in the quantitative sample (12%) began trying for pregnancy starting at six months post-surgery (Table 2). Trying for pregnancy at 6 and 9 months was inversely patterned by age and number of children, but differences were not statistically significant (not shown); young women with fewer children began trying for pregnancy around 6 months whereas older women with more children were For example, at 6 months, those trying for pregnancy were median age 22 (IQR 21-23) and had median 1 child (IQR 0-1) compared to those not trying for pregnancy who were median age 31 (IQR 24-28) and had median 3 children (IQR 1-5).

Individuals who shared that they wanted to have a child, or more children, planned for both the short and longer term, with some wanting to become pregnant in the next one to two years, and a few younger women wanting to wait at least ten years. Women had various reasons for waiting. Some wanted to ensure that they were fully healed from fistula, others wanted to take some time to work and improve their economic status before the next child, and others felt aggrieved by prior low-quality relationships and were concerned about making sure they would find new caring and supportive partners. The following quotes highlight these perspectives:

"*When I look at my neighbours or friends' children, then I feel I need a child but truthfully speaking, I am only planning to give birth when I have completely healed." (Interviewee, 41 years old)*

"There is a type of man who thinks like, "I have a child with her, but I gave her a mattress, a jerrycan to take to the well, a saucepan for cooking food, a charcoal stove and a cup, then what else does she want from me? Whenever I feel like I need to have some time with her I would pay her a visit and then leave!" However, a man who takes you into his home with his property he is respectful because he has to handle you so gently such that you take care of his property. And by the way let me tell you something; I am not interested anymore in the let's-develop-together kind of men since I have been there before; his home is fully equipped but whenever I ask for anything he plays the same song, "Be patient!" It gives me a headache." (Interviewee, 19 years old)

The number of children desired varied across participants who expressed interest, with most wanting several children. Some participants stated that they would be happy with just one child whereas others reported wanting up to eight children.

Participants who reported not wanting any more children all had at least one living child, with those who had undergone sterilization having a minimum of three living children. These participants were in their

late thirties and forties and felt they had had their children and had moved beyond their childbearing years.

“Am old now, why would I give birth? In fact, I fear now. With where I have reached so far, my only wish is to heal and I don’t think about childbirth.?” (Interviewee, 40 years old, lived with fistula for 22 years)

I can’t imagine people seeing me pregnant at this age. My kid goes into labour and I also follow? That would mean that I am not well upstairs. That can’t be.” (Interviewee, 48 years old)

The few younger women who didn’t want additional children highlighted their focus on working to care for and educate the children that they already had. Some mentioned the intersecting fear of not being able to provide for their current children if they were to develop fistula again from a subsequent childbirth.

Desire for family planning

Participant narratives regarding family planning adoption mirrored our findings around fertility preferences but were more nuanced in their expression. These individuals thoughtfully chose to prevent pregnancy for reasons related to both their fistula experiences and broader life circumstances. Fistula-related influences included the desire to fully recovery from the fistula experience and avoid future adverse outcomes, as well as the desire to enjoy life again after suffering. Other reasons included a general desire to space children and concerns about partner commitment.

Desire to fully recover from fistula repair or prevent fistula repair breakdown

Some participants noted that they quickly adopted contraception to avoid becoming pregnant before they were fully recovered from the fistula repair. Some participants expressed their willingness to abstain from sex for longer periods of time, whereas others abstained from sex for a short period but later adopted contraception, particularly those who indicated doubts regarding whether their partners would respect their wishes to delay intercourse.

In that year, I refused to have intercourse with him because I felt that I hadn’t healed well… The reason why I had taken the injection that time was because I was afraid that he would force himself on me, something which I didn’t want; so, I chose to have that injection. (Interviewee, 23 years old)

One woman who had left her partner just prior to her fistula surgery due to an abusive relationship indicated no desire to find a new partner until she had healed:

I cannot get a man before getting better. I would love to take three more years (without having sex) and then get a man. It’s what my heart wants, and that’s after getting much better. (Interviewee, 29 years old)

Other participants were motivated to adopt family planning to avoid pregnancy and the risk of fistula recurrence because of the negative fistula experience. One interviewee observed, *'I have to keep away from giving birth because it was through it that I got the problem (fistula).' (Interviewee, 32 years old).*

Finally, some participants had been specifically counselled by health workers about contraception because of existing complications and the risks they would be exposed to if they conceived. One participant explained, '*The doctors did that (placing an IUD) because of the way how I had got torn and they said that would help me for three years without giving birth.' (Interviewee, 32 years old).* Although this participant did not have a partner at the time of the interview, she received an IUD because she was at high risk of fistula recurrence and indicated a desire to focus on her business and educating her existing children.

History of unplanned pregnancy or poor obstetric experiences

A history of unplanned pregnancies and certain obstetric events, such as multiple caesarean sections, compelled some participants to consider contraception to avoid the reoccurrence of such events. This perspective was voiced by one interviewee who underwent multiple caesarean surgeries and fistula repairs and wanted to avoid additional surgeries:

But since this [last] time I got pregnant without having prepared for it, then I think I need to go for family planning as well.I need [family planning] because [the doctors] have always been operating me for the births I have given. They have so far operated me on for four kids and then the bladder, it has been seven times of operation. All in all, they have operated me 11 times and it is not safe for my body for all those times. I don't want to go back to the theatre. (Interviewee, 40 years old)

Desire to end childbearing or space children

Several participants indicated not wanting to conceive again and adopted family planning, including permanent methods, particularly women who already had multiple children. Other participants shared that they adopted family planning to space their children rather than prevent all future pregnancies: '*I would like [family planning] if I give birth frequently … because I would like my child to grow up to a better stage …. But if not, I cannot use it.' (Interviewee, 29 years old).*

Perceived partner commitment to the relationship

Some participants experienced volatility in their intimate relationships. Although most quantitative participants (80%) reported having been married, only 60% of these were married or living with a partner at the time of the fistula surgery, and 33% reported having been divorced. At the 12-month follow-up, only 52% reported currently being married or living with a partner. The perceived stability of their intimate relationships affected the women's views on contraception, and some participants were not willing to have children in relationships they considered to be temporary, especially in cases in which their partners

were not financially supportive; thus, they indicated a willingness to use contraception to avoid becoming pregnant with such a partner:

It also depends on which kind of partner you have. Currently, if I met a person who would only give me money for food or pay rent, then I know that such a person is temporary and, therefore, it's not a good idea to have a child for such a person. (Interviewee, 19 years old)

Desire to enjoy life after fistula

A desire to enjoy sexual life after fistula repair, following suffering with fistula, motivated some participants to adopt contraception, although they did not always involve their partners in this decision for fear of unwanted pressure to have children. One participant who finally felt free to enjoy her life after recovering from fistula stated that she preferred her partner to think her uterus was removed rather than that she was using a contraceptive: '*These days it is all about enjoying (sex) and eating money. You just try to find all means of telling him that the uterus was removed.* (Interviewee, 32 years old)

Barriers to contraception

Many women who undergo genital fistula repair are counselled regarding family planning use and the options available to them before being discharged from the hospital; however, family planning adoption varied across individuals. Although some women reported using contraception upon the resumption of sexual activity post-fistula surgery, significant unmet need was identified among our longitudinal cohort during the 12 months following fistula surgery (Table 2). To fully understand the variance in contraceptive uptake, participants in the qualitative arm who reported not adopting contraception during the year following fistula surgery despite a desire to avoid pregnancy were requested to share their decision-making process. The reasons cited included perceptions of fecundity and fears and misconceptions about contraceptives generally and in regard to certain methods. Others reported they were advised by health care workers to stop using contraception.

Perceptions of not being at risk of pregnancy

Several participants felt that they were not at risk of pregnancy due to previous failure to conceive or altered menstruation, including reduced menstrual blood flow or complete amenorrhea. Women who considered themselves infertile felt no need to use family planning:

There is no need for me using [family planning] since I don't give birth, so why should I use them? That's what I think since it's been a long time…. I don't know whether it is a God-made form of family planning, but ever since I got that pregnancy (that resulted in the fistula) and the second one which was terminated,

I have never gotten another one, and yet I have never used any family planning medicine. (Interviewee, 28 years old)

Similarly, women who experienced altered menstruation or complete amenorrhea felt these symptoms were indicative of infertility. One woman described her menstrual pattern:

I can't lie to you [that I'm using family planning, but].... I don't bleed much blood; I get my period for a small time like for one or two days and then it stops… Since the removal of that baby. I would sometimes miss the periods for two months and then they reappear in the third month. (Interviewee, 39 years old)

Another participant shared*, 'I cannot plan when to have babies because I don't get my periods. From the time I had an operation for the delivery of my child, I didn't have my periods again'* (Interviewee, 22 years old).

One participant discussed how she planned to start contraception after resuming her periods and had assumed that she was infertile due to amenorrhea but was surprised by an unintended pregnancy: '*I was waiting to first get my periods, but by the time I got them, I went to hospital for a check-up and the test came out positive; I was pregnant,'* (Interviewee, 20 years old).

Fears or misconceptions about contraception including infertility

Participants' narratives revealed a variety of fears and misconceptions regarding contraceptives. Several expressed concerns about the effects that contraceptive methods might have on their future fertility: '*I have never used [family planning], and it is not good because you could reach a time of desiring to give birth and you fail to get pregnant.'* (Interviewee, 28 years old).

Some participants shared concerns about particular contraceptive methods that they feared would cause short- or long-term harm. Several thought that contraceptives would give them fibroids and discussed fears of cancer due to both hormonal and non-hormonal methods, including condoms. Concerns that contraception did not actually work to prevent pregnancy also were expressed. One participant stopped taking oral contraceptive pills due to information about their effectiveness that she received from others, '*I was told that those pills are not reliable and that I should stop using them…. So, I stopped taking them.*' (Interviewee, 19 years old). These concerns were primarily derived from information obtained from people in their communities:

Well sometimes you might try and swallow [oral contraceptive pills] but they say that tablets cause fibroids, except these things they put under the arm's skin (implant). (Interviewee, 23 years old; 30010)

Family planning? I don't like family planning. People say that it is bad; it causes fibroids. Every time, I hear women having issues in their menstrual periods, eh! People speak ill about family planning; they say that it is bad…people say things like, 'I used family planning and it caused me some issues; I don't stop bleeding when I am in my periods' or 'I get fibroids, which I never had before.' And besides, the condoms

that they recommend also cause illnesses. They cause cancer; they are the main causes of cancer in people, including those family planning tablets. In fact, I have never swallowed them. (Interviewee, 32-years old)

At times, however, participants cited health personnel as information sources, which may indicate miscommunication or misinformation:

The [health workers] said that for the injections, they reduce the ova that someone has and then the capsule (implant), it brings about over bleeding and having some complications. (Interviewee, 28 years old)

Other deterrents to contraception

Other deterrents included a lack of knowledge regarding available methods among some participants. One young participant who developed fistula at her first pregnancy stated, *'I have never used family planning, [and] am actually ignorant about it.'* (Interviewee, 22 years old).

Religious beliefs were also reported as deterrents to contraceptive use among some participants, particularly those who identified as born-again who felt that their family sizes would entirely depend on the will of God. One participant noted**, '***I don't like [family planning]. It is only God that can decide for me on that. I just fear it. [Our religion tells] us not to go for family planning.'* (Interviewee, 22 years old).

Contraceptive preferences

Several participants indicated they had completed childbearing and sought permanent birth control. However, regardless of their current contraceptive use, participants in the nested qualitative cohort consistently expressed a preference for the contraceptive injection. Several participants sharing this would be new contraceptive injection users, while others had previously used it in the past. Some identified family members or friends as users. Fewer participants shared the oral contraceptive pill as their preferred method.

[1] Sensitivity analyses of contraceptive use across follow-up excluding those women reporting amenorrhea were 40% at the time of fistula surgery to 69% at 12 months.

Discussion

Our study found that despite increasing contraceptive adoption over the year following genital fistula repair among Ugandan women, unmet need for contraception was persistent. Provider recommendations are generally that pregnancy be avoided for somewhere between 3-12 months following fistula repair, however, in our cohort several participants experienced another pregnancy before that time. Participant

narratives revealed that the factors facilitating and impeding post-repair contraceptive adoption were complex, and occurred at individual, interpersonal and community levels.

We observed an increasing trend in contraceptive initiation among our study participants over time following fistula surgery, from 40% at 6 months to 67% at 12 months. In this study, most women resumed sexual activity between 6-9 months following surgery. Many women who were sexually active and who did not desire pregnancy reported not using contraception. These findings were robust to sensitivity analyses where self-reported menstrual regularity was included.

Fertility preferences post-fistula repair vary across the reported literature, and many women reported a desire to become pregnant following fistula repair.[6] In this study we observed a higher desire to become pregnant rapidly among younger women, especially those with no living children, even before the recommended one year after fistula surgery. This may be attributed to the natural desire to replace a child lost with another or generally influenced by individual or societal expectations for childbearing, particularly given prevailing fertility rates in Uganda.[18] In a descriptive study of Malawian women undergoing fistula repair, 20% had a post-repair pregnancy with a median time to conception of 1.1 years (IQR 0.7-1.32 years).[12] Some studies have identified unwillingness to postpone childbearing after fistula repair where there is no living child.[15] However, other studies have identified decreased interest in childbearing following fistula, as in a Congo study where most (86%) reported a decreased desire to have children after developing a fistula.[8] In this study, 75% eventually reported a desire to have another child, though 65% wanted to wait a minimum of 1 year before another pregnancy.

Partner influence is a related factor in women's pregnancy decision-making. In this study, some women reported substantial pressure from their partners, and for our research participants, this experience was embedded with fears of infertility when they developed fistula or during the repair surgery. The importance of partner influence has also been identified in Nigeria where partner disapproval of contraceptive use accounted for about one-third of non-adoption.[15] These findings emphasize the importance of engaging not only the women themselves, but also their partners in post-repair contraceptive counselling to optimize informed decision-making on post-repair contraception.

Other barriers to contraceptive uptake observed during this study included low perceived risk of pregnancy, fears and misconceptions regarding family planning, lack of knowledge regarding contraceptive options, and religious beliefs. These findings primarily indicate a gap in the quality of information provided to these women during the counselling sessions they receive after being repaired for fistula. Knowledge empowerment and increased access to contraceptives represent important and initial steps that can be taken to help Ugandan women follow post-fistula care recommendations, such as abstinence from sexual activity for 3-6 months and delayed childbirth for 1-year post-repair, which can help them attain their desired goals of having healthy children after fistula repair without fistula recurrence. In other countries, such as the Democratic Republic of the Congo, Malawi and Nigeria, studies have revealed a moderate knowledge of family planning methods among about 60% of surveyed women,[14,16,17] prior to any intervention. However, contraceptive counselling can result in substantial

increases, such as to 98% after intervention In the DRC.[16] Among other studies in sub-Saharan Africa, only 53%–61% of women reported being aware of available contraceptive methods at the time of study enrolment or the importance of preventing unintended consequences due to subsequent pregnancies.[8-10] Lack of contraceptive method awareness assessment is a limitation of our study.

The abundance of myths and misconceptions regarding contraception among our study participants is also consistent with research in some other sub-Saharan African settings. In a Nigerian study, low uptake of post-fistula contraception (37%) was attributed to low socioeconomic status, culture, religion, and myths regarding contraception.[13] Some of these misconceptions are due to social norms within the communities to which these women belong, which often reflect more rural settings with high poverty. Massive community awareness programmes may be necessary to increase knowledge not only among fistula survivors but also within their communities to limit the influence of misconceptions and increase community support. Further support for the need for broad contraceptive education is evident in the limited range of method options discussed by our study participants, and from the literature which suggests geographic differences in unmet need for contraception across the country.[21,22] Surprisingly, none of the participants in this study indicated limited access to contraceptives was a barrier to uptake, which is a commonly cited barrier in studies regarding unmet need for contraceptives more generally.[23,24] This finding further emphasises the importance of ensuring high quality contraceptive education for women who have undergone fistula repair, with linkages to access.

Some respondents in the qualitative arm of the study expressed their desires to delay or end childbearing, either to recover from the physical and psychological trauma experienced with fistula or due to a lack of desire for more children, particularly among those who already had at least one child. Others cited poor obstetric histories or the lack of supportive partners. In this study, 66% of participants adopted at least one family planning method within 12 months after fistula repair, with the largest proportion of respondents reporting the use of oral contraceptives or sterilisation compared with other family planning methods (e.g., the injection, condoms, IUDs, and implants). Our quantitative findings on method used contrasted with the preferences voiced by our in-depth interview participants for the contraceptive injection. Sterilisation was more common among our study population. This may be due to the difficulties experienced during childbirth that resulted in fistula development and may have warranted permanent procedures, such as total hysterectomies, to save the woman's life, particularly for those who had undergone sterilization prior to study entry. Abstinence was also reported as an adopted method by some respondents. Method mix reported by our study participants is distinct from a cross-sectional study performed among women attending two obstetric fistula units in different Nigerian states, for which the injection and implants were reported as the most commonly utilised family planning methods, suggesting geographical variability in preferences or availability.[15]

Surprisingly, we found that contraceptive use in our study was inversely patterned by educational attainment, where women with higher educational attainment less likely to use contraception than women with lower educational attainment. It is possible that these findings are an artifact of the low

number of women with higher educational levels in our study and the fact that only one-third of these participants reported being sexually active at 12-months study follow-up.

Conclusions

Surgery to repair fistula is the first step in the managing this condition. Holistic approaches to care include consideration for the physical, psychosocial, and economic needs of patients.[28] Our study demonstrates a discrepancy between the need and the utilization of post-surgical contraception, with the majority of women resuming sexual activity by 12 months, without a similar utilization rate. To achieve holistic care, recovery programmes must also consider the contraceptive needs of women post-repair, which are complex and nuanced.

Post-operative counselling at the time of fistula surgery should be reassessed to increase the number of women, and their partners when relevant, receiving high quality, patient-specific, contraceptive counselling. Existing health worker knowledge of family planning methods should also be reassessed periodically to ensure that patient-centred education, considering each patient's concerns and preferences, is delivered before discharge.

Declarations

-Ethics approval and consent to participate

The study protocol was approved by the Makerere University School of Medicine Research and Ethics Committee (Ref# 2014-052) and the University of California, San Francisco Human Research Protection Program, Committee on Human Research (IRB# 12-09573 and IRB# 15-17467) and the Uganda National Council for Science and Technology (REF#:1541212101). All study participants underwent an informed consent process. Individuals unable to provide signatures for informed consent underwent informed consent in presence of a witness; participants provided thumbprint confirmation and witnesses signed. All study methods were performed in accordance with the relevant guidelines and regulations.

-Consent for publication N/A

-Availability of data and materials The datasets generated during and analysed during the current study are not publicly available due to limitations of the ethical approval involving the patient data and anonymity but are available from the corresponding author on reasonable request.

-Competing interests The authors declare they have no competing interests.

-Funding Primary data collection was funded by the Eunice Kennedy Shriver National Institute of Child Health and Human Development of the US National Institutes of Health (NICHD R21HD075008), the Fistula Foundation and from the United States Agency for International Development via the Fistula Care

Plus Project, administered by EngenderHealth. Support for qualitative interviews and continuing analytical work was funded by NICHD (R00HD086232).

-Authors' contributions AE, SM, OK, JBy, SO, and AK designed the study protocol. HN collected the data. AE and HN analyzed the data. All authors reviewed the study findings and contributed to manuscript development.

-Acknowledgements The authors would like to thank our study participants for sharing their time and experiences with us. We appreciate the Bixby Early Career Investigators Works in Progress group for review and discussion of manuscript revisions. Primary data collection was funded by the Eunice Kennedy Shriver National Institute of Child Health and Human Development of the US National Institutes of Health (NICHD R21HD075008), the Fistula Foundation and from the United States Agency for International Development via the Fistula Care Plus Project, administered by EngenderHealth. Support for qualitative interviews and continuing analytical work was funded by NICHD (R00HD086232).

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Tables

Table 1. Sociodemographic characteristics of participants at study enrolment

	Longitudinal cohort		Nested qualitative cohort	
	N = 60		N = 30	
	N	%	N	%
Sociodemographic characteristics				
Age[a], y	28 (21–36)		31.5 (27–38)	
Age at marriage[a], y	18 (17–20)		18.5 (17–21)	
Marital status				
Married	7	11.7	4	13.3
Living together	22	36.7	11	36.7
Divorced/separated	16	26.7	11	36.7
Widowed	3	5.0	0	0.0
Single/never married	12	20.0	4	13.3
Household characteristics				
Number of household residents[a]	4 (2–6)		4 (2–6)	
Other adult(s) in household	47	78.3	22	73.3
District of residence				
Central	57	95.0	31	99.7
Eastern	3	5.0	0	0.0
Socioeconomic status				
Educational attainment				
None	10	16.7	5	16.7
Some primary	24	40.0	10	33.3
Completed primary	17	28.3	9	30.0
Some secondary or more	9	15.0	6	20.0
Work outside of home	26	43.3	12	40.0
Primary source of financial support				
Self	17	28.3	10	33.3
Husband/partner	24	40.0	13	43.3
Relatives	19	31.7	7	23.3

Selected household assets				
Piped water	9	15.0	6	20.0
Electricity	26	43.3	39	65.0
Mobile phone	39	65.0	17	56.7
Land	28	46.7	11	36.7
Fistula characteristics				
Length of time lived with fistula				
<1 m	8	13.3	5	16.7
1–3 m	20	33.3	9	30
3–12 m	8	13.3	3	10
1–2 y	2	3.3	1	3.3
3–5 y	5	8.3	2	6.7
>5 y	17	28.3	10	33.3
Repair outcome				
Successful	50	83.3	28	93.3
Unsuccessful	10	16.7	2	6.7

[a] *Median (interquartile range)*

Table 2. Sexual activity and family planning use among study participants over the 12 months of follow-up after obstetric fistula surgery

	Baseline		3 months		6 months		9 months		12 months	
	N = 60		N = 59		N = 55		N = 55		N = 58	
	N	%	N	%	N	%	N	%	N	%
Partnered	30	50.0	25	42.4	28	49.1	28	50.9	30	51.7
Sexually active	11	18.3	4	6.8	18	31.6	26	47.3	29	50.0
Pregnancy status[a]	*N = 11*		*N = 4*		*N = 18*		*N = 26*		*N = 29*	
Pregnant	0	0.0	2	50.0	0	0.0	0	0.0	4	13.8
Trying for pregnancy	0	0.0	0	0.0	2	12.5	4	15.4	1	3.5
Not trying for pregnancy	11	100.0	2	50.0	16	87.5	22	84.6	24	82.8
Contraception[b,c]	*N = 11*		*N = 2*		*N = 16*		*N = 22*		*N = 24*	
None	7	63.6	0	0.0	9	56.3	13	59.1	6	25.0
Condom	1	9.1	0	0.0	0	0.0	2	9.1	0	0.0
Oral contraceptives	0	0.0	0	0.0	0	0.0	0	0.0	3	12.5
IUD	1	9.1	0	0.0	0	0.0	1	4.6	1	4.2
Implant	0	0.0	0	0.0	1	6.3	0	0.0	1	4.2
Injection	0	0.0	0	0.0	1	6.3	1	4.6	3	12.5
Sterilisation	2	18.2	2	100.0	5	31.3	5	22.7	9	37.5

[a] among those sexually active; [b] among those responding not pregnant or not trying for pregnancy; IUD, intrauterine device; [c] Sensitivity analyses among individuals reporting amenorrhea identified the following rates of no contraceptive use: 0 mo n=3/5 (60%), 3 mo n=0/0; 6 mo 7/11 (63.6%), 9 mo 7/12 (58.3%), and 12 mo 5/16 (31.3%).

Table 3. Relationships between sociodemographic characteristics and sexual activity or family planning use at 12 months

	N	Sexually active at 12 m					Family planning use at 12 m				
		Yes		No		p-value	Yes		No		p-value
		N = 29		N = 29			N = 18		N = 42		
		N	%	N	%		N	%	N	%	
Age group, y						0.382					0.063
<20	10	4	40.0	6	60.0		1	10	9	90.0	
20–29	22	12	54.6	10	45.5		6	25	18	75.0	
30–39	16	10	62.5	6	37.5		9	56.3	7	43.8	
≥40	10	3	30.0	7	70.0		2	20	8	80.0	
Number of children						0.057					0.001
None	20	6	30.0	14	70.0		1	4.8	20	95.2	
1–3	24	13	54.2	11	45.8		8	32.0	17	68.0	
4+	14	10	71.4	4	28.6		9	64.3	5	35.7	
Household asset ownership[a]						0.721					0.735
None	3	1	33.3	2	66.7		1	33.3	2	66.7	
1	12	5	41.7	7	58.3		3	25	9	75.0	
2	13	6	46.2	7	53.9		3	21.4	11	78.6	
3	11	5	45.5	6	54.6		3	25	9	75.0	
4 or more	19	12	63.2	7	36.8		8	42.1	11	57.9	
Relationship status						<0.001					0.002
Married or living together	30	24	80.0	6	29.0		3	10.7	25	89.3	
Separated, widowed, single	28	5	17.9	23	82.1		15	50.0	15	50.0	
Educational attainment						0.745					0.032
None	9	4	44.4	5	55.6		4	40	6	60.0	
Some primary	23	13	56.5	10	43.5		11	45.8	13	54.2	
Completed primary	17	9	52.9	8	47.1		3	17.7	14	82.4	

Some secondary or higher	9	3	33.3	6	66.0		0	0	9	100.0	
Time lived with fistula						0.116					0.561
<1 m	8	6	75.0	2	25.0		4	50	4	50.0	
1–3 m	20	12	60.0	8	40.0		7	35	13	65.0	
3–12 m	7	3	42.9	4	57.1		3	37.5	5	62.5	
1–2 y	2	2	100.0	0	0.0		0	0	2	100.0	
3–5 y	4	1	25.0	3	75.0		1	20	4	80.0	
>5 y	17	5	29.4	12	70.6		3	17.7	14	82.4	
Urinary incontinence						0.012					0.130
Yes	39	24	61.5	15	38.5		15	3.5	24	61.5	
No	19	5	26.3	14	73.7		3	15.8	16	84.2	

[a] Household assets included piped water, radio, bicycle, flush/pour flush toilet, television, refrigerator, electricity, mobile phone, land.