Educational Intervention Effects on Bilateral Tubal Ligation Knowledge among Women Attending Antenatal and Family Planning Clinics in Bomet County

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ABSTRACT

Bilateral Tubal Ligation (BTL) is a highly effective contraceptive method with more than 99% effectiveness at preventing pregnancy. Its uptake remains low in Sub-Saharan Africa, at 1.6%. The Kenya Health and Demographics Survey 2014, indicated that almost half of the married women did not desire further childbearing. The low acceptance of BTL as a method of contraception in this region has been attributed to a lack of knowledge and cultural and religious misconceptions. This study aimed to determine the level of knowledge about BTL at baseline and the impact of an educational intervention among women attending ANC/Family planning clinics at Tenwek and Longisa Hospitals in Bomet County. A quasi-experimental study design was used. Demographic characteristics, knowledge of BTL, perceived risks, and benefits were assessed at baseline and post-intervention. A difference measure was used to assess the impact of the intervention at 95% CI, with a p-value of 0.05 considered significant. The data was analyzed using STATA version 18. The mean age of the participants at baseline and post-intervention was 29.0±5.8 years and 29.2±5.6 years, respectively. Overall, 62% of participants said they would choose BTL, with 52% in the post-intervention arm. When asked if their religion allowed BTL, 80.6% said yes and were supported by their husband (92%), However 62% said they couldn't have it if their spouse was against it. In general, lower knowledge scores were obtained in the post-intervention arm, implying that the educational intervention provided did not influence participants' knowledge of BTL. There was no statistically significant difference in the participants' knowledge levels at baseline and post-intervention [3.3 (-3.2 to 9.9); p-value=0.3]. Educating families, particularly women of childbearing age, about alternative family planning methods would increase uptake, allowing families to achieve desired family sizes while limiting the impact of unwanted pregnancies and maintaining a healthy population.

***Keywords*:** *Bilateral Tubal Ligation, Contraceptive methods, Family planning services, Health education, Sterilization, Unwanted pregnancies*

I. INTRODUCTION

According to the World Health Organization (WHO), family planning involves the ability of individuals and couples to plan and achieve their desired number of children, through spacing and timing of their births. This can be achieved through the use of various methods, such as combined oral contraceptive pills, injectables, implants, intrauterine devices, as well as permanent contraception which could either be male or female sterilization(WHO, 2023). Permanent methods are mostly used by women who have already achieved their desired family size, and are achieved by disrupting the fallopian tubes, either laparoscopically or through mini laparotomy. Permanent contraceptive methods include Bilateral Tubal Ligation (BTL), hysteroscopic tubal occlusion, and vasectomy. The procedure could be done soon after delivery or as an interval procedure after the puerperium(ACOG, 2023).

Female sterilization is a widely used method of contraception worldwide, chosen by more than 20% of couples. It is the leading method of contraception for women in high-income countries. However, its uptake is still comparatively very low in sub-Saharan Africa with a prevalence of 1.7% in a region with an exponentially growing population and with a high rate of maternal deaths(Amo-Adjei et al., 2019; Scott & Glasier, 2003). There is a known unmet contraceptive need in about 21% of women in this region, contributing to about 38% of unwanted pregnancies(Wafula, 2015). The Kenya Health and Demographics survey conducted in 2014 evaluated women's knowledge about different contraceptive methods. The prevalence of Bilateral Tubal Ligation (BTL) uptake dropped from 4.8% in the 2008-2009 survey to 3.2% in the recent survey. Conversely, the usage of injectables increased from 21.6% to 26.4% (Dhsprogram, 2014). In Sub-Saharan Africa, there is a significant burden of unwanted pregnancies among women of reproductive age, this issue contributes primarily to maternal morbidity and mortality.

To address problems related to reproductive health, it is important for women to have knowledge of effective contraception methods, such as BTL (Ahmed et al., 2012; Olakunde et al., 2019; Stover & Ross, 2010). This will empower women and men in their reproductive decisions, allowing them to control their childbearing and attain desired financial freedom. Most importantly, it will enable them to take charge of their overall wellbeing(Adebimpe, 2016; Adegbola & Habeebu-Adeyemi, 2016; Tilahun et al., 2015). It is important to note that a healthy woman is equivalent to a healthy society. By promoting reproductive health and empowering women, we can greatly contribute to achieving SDGs (Ruel-Bergeron et al., 2020). The purpose of this study was to assess the social demographic characteristics of women attending ANC/Family planning clinics in Bomet county, their baseline knowledge level of BTL and to determine the impact made on knowledge of BTL following an educational intervention. We hypothesized that an educational intervention would significantly improve knowledge of bilateral tubal ligation among women attending ANC and family planning clinics at Tenwek Mission Hospital and Longisa County Referral Hospitals in Bomet County.

II. METHODOLOGY

Study Design

A quasi-experimental study design was used to assess the knowledge level of BTL before and after an educational intervention. The intervention included the use of a manual adapted from the Kenya National Family Planning guidelines a validated semi structured questionnaire.

Study Location

The study was conducted in two main hospitals in Bomet County: Tenwek Mission Hospital, a Level 6B faith-based referral hospital, and Longisa County Referral Hospital, a Level 4 government referral hospital. These hospitals are strategically located for women seeking services due to their extensive resources, which include mother-child health, antenatal services, emergency obstetric care, and postpartum services. Moreover, they serve as the two main referral hospitals in the county.

Tenwek Hospital is a 361-bed hospital with a wide range of surgical, medical, maternity, and paediatric services. It is one of the largest mission hospitals in the region and seeks to provide primary healthcare to 600,000 Kipsigis people within a 32-kilometre radius and serves as a referral centre for an even much larger region. Longisa county referral hospital is a level 5 county government health care facility located in Longisa which has a bed capacity of 144. It largely serves the Bomet population, offering more subsidized medical services. It offers a wide range of services including surgical, maternity, pediatric and general medical services

Study Population

All women over 18 presenting to Antenatal and Family Planning clinics at Tenwek and Longisa county referral hospitals.

Sampling Procedure

Women who attended ANC and family planning clinics at two different facilities were invited to participate in the study. A trained research assistant, who was also a nurse working at the mother-child health and family planning clinics, informed potential participants about the study and its objectives. This was done while they were waiting to be seen by the doctor, and a flyer providing information about the ongoing teaching on BTL was given to them. The research assistant answered any questions that the potential participants had and gave them enough time to think before they fully consented to the study. The two hospitals registered about 30 women each day, but it is important to note that some of them were on repeat visits. Therefore, there were approximately 10-15 new visits per day.

Convenient sampling was employed, women who presented and consented to participate in the study were included. Both the pre- and post-interventional groups of women were selected from a subset of women attending clinics within the study period. Baseline and post-intervention each had 40 women from the two hospitals, making a total of 80 per study site. We included all women attending ANC/MCH and family planning clinics at the two facilities, who were above eighteen tyears of age and excluded those who had underlying medical illnesses in whom participation would have caused a delay in their care.

Statistical Analysis

Participants demographic characteristics, knowledge of BTL, perceived risks, and benefits were assessed at baseline and post educational intervention. Knowledge level were assessed using the questions specific on knowledge from a manual adapted from the Kenya National Family Planning guidelines a validated semi structured questionnaire.
Six questions were used to assess knowledge of BTL at baseline and post educational intervention. Correct aggregate score was calculated and converted to percentages. Knowledge levels were graded as 50% (poor), 51-75% (moderate), and 76-100% (good). Pearson's chi square or Fisher exact tests was used to assess Participant's characteristics pre and post intervention. A difference measure was used to assess measure of effect on educational intervention at 95% confidence interval with a p value less than 0.05 considered significant. Data was analyzed using STATA version 18.

Ethical Considerations

Approval to do the study was sought from the Kabarak University Postgraduate School (IPGS), followed by the Kabarak University Research and Ethics Committee (KABU01/KUREC/001/01/02/23) and a research permit from the National Commission for Science, Technology and Innovation, NACOSTI, (Ref No:831260). Permission was also sought from the two hospitals research and ethics committees to conduct the study. Participation was voluntary without coercion and with no incentive or issue.

III. RESULTS

Participants Demographic Characteristics

The participants' mean ages were 29.0±5.76 years at baseline and 29.2±5.6 years post intervention. The average number of children was two both at baseline and post intervention, however approximately 40% of these women had 3 or more children. Thirty-nine percent of these women had completed college education and about 11% attaining university education level. The vast majority (98.8%) of these participants identified as Christians. Most (51.9%) were self-employed followed by those in formal employment moreover four were students. Assessing association between demographic characteristics at baseline and post intervention showed that number of children(p=0.02), marital status(p=0.03) and occupation(p=0.01) at baseline and post intervention were significant associated. However, no significant association was found in the participants' age, education level, or religion. More details in Table 1.

Table 1:
Demographic Characteristics of Women Attending ANC and Family Planning Clinics in Bomet County Pre and Post Intervention

Participants Characteristics	Baseline (n=80)	Post-intervention (n=80)	Total (N=160)	P-value
Age, mean (sd)	29.02 (5.76)	29.18 (5.46)	29.10 (5.60)	0.87
Age category(years), n (%)				0.13
≤20 years	0 (0.0)	4 (100.0)	4 (2.5)	
21 to 39 years	78 (51.3)	74 (48.7)	152 (95.0)	
≥ 40 years	2 (50.0)	2 (50.0)	4 (2.5)	
Children, mean (sd)	2.14 (1.38)	2.74 (1.75)	2.44 (1.60)	0.02
No of children, n (%)				0.06
No Child	4 (44.4)	5 (55.6)	9 (5.6)	

1 to 2 children	50 (58.8)	35 (41.2)	85 (53.1)	
≥ 3 children	26 (39.4)	40 (60.6)	66 (41.3)	
Married, n (%)				0.03
No	7 (87.5)	1 (12.5)	8 (5.0)	
Yes	73 (48.0)	79 (52.0)	152 (95.0)	
Education Level, n (%)				0.22
College	30 (48.4)	32 (51.6)	62 (38.8)	
Secondary education	23 (48.9)	24 (51.1)	47 (29.4)	
Primary education	14 (42.4)	19 (57.6)	33 (20.6)	
University	13 (72.2)	5 (27.8)	18 (11.2)	
Religion, n (%)				0.15
Christian	80 (50.6)	78 (49.4)	158 (98.8)	
Islam	0 (0.0)	2 (100.0)	2 (1.2)	
Occupation, n (%)				0.01
Formal employment	29 (56.9)	22 (43.1)	51 (31.9)	
Self-employed	32 (38.6)	51 (61.4)	83 (51.9)	
Housewife	15 (68.2)	7 (31.8)	22 (13.7)	
Student	4 (100.0)	0 (0.0)	4 (2.5)	

Assessment Related to BTL Amongst Women in Bomet County

Sixty-six percent of participants reported that they had not met their target number of babies, with slightly more than half from the post-intervention arm. The majority of participants (62%) reported they would choose BTL, with approximately 52% in the post-intervention arm. Whether their religion permitted BTL, the majority (80.6%) responded yes and were backed by their husband (92%), however 62% stated they couldn't have BTL if their spouse was against it. Slightly more than 31% of participants had utilized BTL, and the majority (98%) of them reported this on the post-intervention arm, with injection being the second option at 30% and 19% reporting they are currently not using any contraceptive methods. Only the present use of contraceptive methods in pre- and post-intervention showed a significant association. Table 2 has more details.

Table 2:
Assessment Related to BTL Amongst Women in Bomet County

Variables	Baseline (n=80)	Post-intervention (n=80)	Total (N=160)	P-value
Have you reached your target number of babies? n (%)				0.74
No	52 (49.1)	54 (50.9)	106 (66.3)	
Yes	28 (51.9)	26 (48.1)	54 (33.7)	
Do you want a permanent method of contraception in the form of BTL once you have reached your target family size? n (%)				0.51
No	32 (53.3)	28 (46.7)	60 (37.5)	
Yes	48 (48.0)	52 (52.0)	100 (62.5)	
Does your religion allow you to have BTL? n (%)				0.09
No	15 (55.6)	12 (44.4)	27 (16.9)	
Yes	61 (47.3)	68 (52.7)	129 (80.6)	
Not sure	4 (100.0)	0 (0.0)	4 (2.5)	
Do you need to involve your spouse in the decision of BTL? n (%)				0.55
No	7 (58.3)	5 (41.7)	12 (7.5)	
Yes	73 (49.3)	75 (50.7)	148 (92.5)	

Can you still have BTL even if your spouse is against your decision? n (%)				0.50
No	50 (48.5)	53 (51.5)	103 (64.4)	
Yes	30 (53.6)	26 (46.4)	56 (35.0)	
Not sure	0 (0.0)	1 (100.0)	1 (0.6)	
What is your current contraceptive method? n (%)				0.00
BTL	1 (2.0)	49 (98.0)	50 (31.3)	
Injection	31 (64.6)	17 (35.4)	48 (30.0)	
IUD	8 (61.5)	5 (38.5)	13 (8.1)	
Pills	3 (33.3)	6 (66.7)	9 (5.6)	
Implant	4 (57.1)	3 (42.9)	7 (4.4)	
Calendar	2 (100.0)	0 (0.0)	2 (1.2)	
None	31 (100.0)	0 (0.0)	31 (19.4)	

Knowledge Assessment of BTL Amongst Women in Bomet County

Participants were asked whether having BTL protects them from STIs/HIV, if there is a small risk of falling pregnant after BTL, if pregnancy can occur outside your womb, if they can change their mind about BTL before the procedure, if BTL will negatively affect their sexual life, and if BTL reversal guaranteed them the need to conceive. The majority of participants (85.6%) were aware that having BTL does not protect them from STIs or HIV. However, about 78% of those who answered "yes" were in the post-intervention arm. Nine participants were unsure, with 5 from the pre-intervention phase. About 56% claimed there is no risk of falling pregnant following BTL, with 57% found in the post-intervention arm and seven of ten people who were unsure found in the post-intervention phase.

When asked if pregnancy can occur outside the womb, 52% said "No," 37% said "Yes," and 11% said they were unsure. Sixty-one percent stated they are allowed to change their minds regarding BTL before the surgery, but 34% indicated they are not allowed. BTL does not negatively affect sexual life, according to 73% of subjects, with 8% unsure. According to 82% of the participants, BTL reversal is not guaranteed if one needs to conceive. "Is there a small risk of falling pregnant after BTL?" and "Is BTL reversal guaranteed if you need to conceive?" participants' responses were significantly associated pre-and post-intervention whereas the remaining questions on knowledge were not. Summary in Table 3.

Table 3:
Knowledge Assessment of BTL Amongst Women in Bomet County

Variables	Baseline (n=80)	Post-intervention (n=80)	Total (N=160)	P-value
Will BTL protect you from STIs/ HIV? n (%)				0.08
No	72 (52.6)	65 (47.4)	137 (85.6)	
Yes	3 (21.4)	11 (78.6)	14 (8.8)	
Not sure	5 (55.6)	4 (44.4)	9 (5.6)	
Is there a small risk of falling pregnant after BTL? n (%)				0.02
No	39 (43.3)	51 (56.7)	90 (56.3)	
Yes	38 (63.3)	22 (36.7)	60 (37.5)	
Not sure	3 (30.0)	7 (70.0)	10 (6.2)	
Can pregnancy occur outside your womb? n (%)				0.54
No	38 (45.8)	45 (54.2)	83 (51.9)	
Yes	32 (54.2)	27 (45.8)	59 (36.9)	

Not sure	10 (55.6)	8 (44.4)	18 (11.2)	
Are you allowed to change your mind about BTL before the procedure is done? n (%)				0.15
No	28 (50.9)	27 (49.1)	55 (34.4)	
Yes	51 (52.0)	47 (48.0)	98 (61.2)	
Not sure	1 (14.3)	6 (85.7)	7 (4.4)	
Will BTL negatively affect your sexual life, n (%)				0.13
No	57 (48.7)	60 (51.3)	117 (73.1)	
Yes	19 (63.3)	11 (36.7)	30 (18.8)	
Not sure	4 (30.8)	9 (69.2)	13 (8.1)	
Is BTL reversal guaranteed if you need to conceive? n (%)				0.01
No	59 (45.0)	72 (55.0)	131 (81.9)	
Yes	9 (60.0)	6 (40.0)	15 (9.4)	
Not sure	12 (85.7)	2 (14.3)	14 (8.7)	

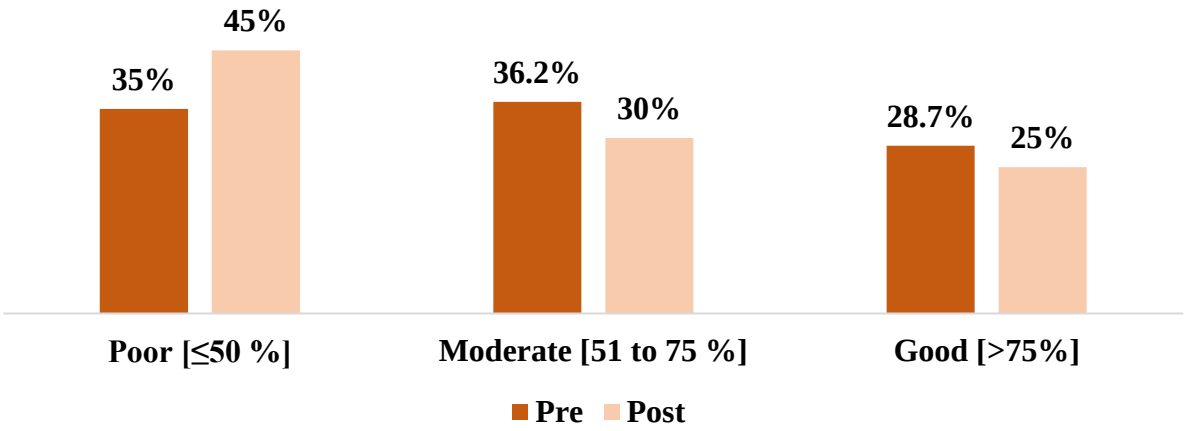
Knowledge Score on BTL Amongst Women in Bomet County; Pre and Post Intervention

Knowledge was graded as 50% (poor), 51-75% (moderate), and 76-100% (good). Out of six questions, the correct aggregate score was calculated and converted to percentages; the percentages were then classified as shown above. Forty percent of the participants were categorized as having poor knowledge of the tested items about BTL, with around 56% on the post-intervention arm; generally, lower scores on knowledge were obtained in the post-intervention arm, implying that the educational intervention provided had no influence on participant's knowledge about BTL. Table 3 and Figure 1 has details.

Table 4:
Knowledge Score on BTL Amongst Women in Bomet County; Pre and Post Intervention

Variables	Baseline (n=80)	Post-intervention (n=80)	Total (N=160)	P-value
Knowledge Score Category, n (%)				0.43
≤ 50 %	28 (43.8)	36 (56.2)	64 (40.0)	
51 to 75 %	29 (54.7)	24 (45.3)	53 (33.1)	
> 75%	23 (53.5)	20 (46.5)	43 (26.9)	

Figure 1:
Graphical Representation of Score On Knowledge of BTL Pre and Post Intervention Among Women in Bomet County



Impact of Educational Intervention on the Knowledge of BTL Amongst Women in Bomet County

The measure of effect on educational intervention showed no significant difference between pre- and post-intervention scores; [Absolute difference in the score: 3.3(-3.2 to 9.9); p-value=0.3] as indicated in Table 5

Table 5:
Impact of Educational Intervention on the Knowledge of BTL Amongst Women in Bomet County

Variable	Baseline	Post-Intervention	Difference[1]	95% CI	p-value
Score, Median (IQR)	67[50,83]	67[50,71]	3.3	[-3.2;9.9]	0.3

*[1]Two sample t-test; **CI**-Confidence Interval*

IV. DISCUSSION

Majority of these participant were women between 21 and 39 years of age with an average of 2.25 children. This finding could partly explain the participant's reluctance to use a method of contraception. The age of a woman plays part in the decision of the method of contraceptive to use, with a majority of young women preferring short acting methods. This however does not mean that these women do not require the knowledge for future use. It is imperative that women have the knowledge for the time they will need to make adjusted decisions. This survey confirms the findings of several studies. The KHDS 2014, indicated a finding of 1.7% of women utilizing BTL. This was a country wide survey of all women of reproductive age 15-49 years, additionally, the mean number of children was at 3.6 and more than half of the women in this survey did not desire further childbearing (Dhsprogram, 2014). Religion is critical in this locality, with more than ninety percent of study participants indicating that they were Christian, a woman misinformed or negatively influenced by religion or culture, may end up having more children against her wish(Sundararajan et al., 2019). Noteworthy, for family planning, a single time intervention may not be adequate to result into behavior change. Additionally, the mode of education has an impact on the knowledge translation to the target population. In this effort to increase health literacy, studies show that population education may seem like an obvious solution, but therein are more complex issues that may require educational interventions to be designed using a well-established psychological and behavioral framework(Saad & Sharafeldeen, 2020). Overall, our study did not translate into statistically significant knowledge level increment between the pre and post intervention phases.

Conclusion

The educational intervention showed no significant difference at baseline and post-intervention based on knowledge scores. Participants at baseline scored higher compared to post intervention even though the converse was anticipated. This could be attributed to lack of matching of participants with similar characteristic at baseline as participants in the post intervention phase could have been different and never got the educational bundle. However, eagerness to learn about BTL was evident at baseline which showed an increased need for education on family planning methods, to help women make informed decisions and take up methods that fit them as well as allay any misconceptions associated with the various methods of family planning.

Recommendations

There is a need to conduct a similar educational intervention on a large scale and on different family planning methods. This would relay correct information to women in the community and would enhance uptake of different family planning methods, hence women would achieve desired family sizes and limit the effect of unwanted pregnancies

For further research:

1. As a follow up to this research, an assessment in later years of the uptake of BTL in the area of study; though a causal effect would be hard to establish.
2. A study that includes men as part of the educational intervention as they play a role in women's decision-making process.
3. A study that follows the same women in the pre and post intervention phase as well as a control group, to establish a direct causal effect of the educational intervention.
4. A study of similar nature that employs a social network theory

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