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Determinants of modern contraceptive prevalence and unplanned pregnancies in Migori County, Kenya: results of a cross-sectional household survey

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Abstract

Family planning and contraceptive utilization can have significant effects in reducing unplanned pregnancies and improving maternal and child health indicators. We conducted a retrospective cross-sectional study analyzing survey response data within six sub-locations of Migori County, Kenya in 2018 and 2019. We utilize this survey data to estimate both the prevalence of contraceptive uptake and unwanted pregnancies in the study populations, and to examine the potential role that different factors play in meeting related family planning targets. Descriptive statistics were calculated, and multivariable logistic regression was used to model determinants of contraceptive use and reported unplanned pregnancy. A total of 3,642 female heads of household were included. 63% of respondents reported that they currently use some form of contraception, and the prevalence of unplanned pregnancy was 36.7%. Our findings reflect the need for family planning programs to focus interventions on those at highest risk. There is a need for additional research and investigation into community and individual beliefs surrounding family planning in order to ensure that interventions are culturally sensitive and locally responsive. *(Afr J Reprod Health 2021; 25[1]: 29-40).*

Keywords: Contraception; family planning; unplanned pregnancy; Kenya

Résumé

La planification familiale et l'utilisation de la contraception peuvent avoir des effets significatifs sur la réduction des grossesses non planifiées et l'amélioration des indicateurs de santé maternelle et infantile. Nous avons mené une étude transversale rétrospective analysant les données de réponse à l'enquête dans six sous-sites du comté de Migori, au Kenya en 2018 et 2019. Nous utilisons ces données d'enquête pour estimer à la fois la prévalence de l'utilisation de la contraception et des grossesses non désirées dans les populations de l'étude, et pour examiner le rôle potentiel que jouent différents facteurs dans la réalisation des objectifs de planification familiale connexes. Des statistiques descriptives ont été calculées et une régression logistique multivariée a été utilisée pour modéliser les déterminants de l'utilisation de la contraception et les grossesses non planifiées signalées. Au total, 3 642 femmes chefs de ménage ont été incluses. 63% des répondants ont déclaré utiliser actuellement une forme de contraception et la prévalence des grossesses non planifiées était de 36,7%. Nos résultats reflètent la nécessité pour les programmes de planification familiale de concentrer les interventions sur les personnes les plus à risque. Il est nécessaire de mener des recherches et des enquêtes supplémentaires sur les croyances communautaires et individuelles entourant la planification familiale afin de garantir que les interventions sont culturellement sensibles et adaptées localement. *(Afr J Reprod Health 2021; 25[1]: 29-40).*

Mots-clés: La contraception; planification familiale; grossesse non planifiée; Kenya

Introduction

Family planning and contraceptive utilization can have significant effects in reducing unplanned pregnancies, improving maternal and child health indicators, and serving as a tool by which to empower women in improving the health of themselves and their families[1-3]. Despite the known benefits of family planning, it is estimated that as of 2019 nearly 190 million women globally of reproductive age did not utilize any means of contraception, and that unintended pregnancies accounted for approximately 45% of all pregnancies between 2010 and 2014[4-6].

In recent years there has been significant global investment and attention focused on improving contraceptive uptake and utilization[3]. In the period of the Millennium Development Goals

(MDG), from 1990 to 2015, it is estimated that global contraceptive prevalence increased from 55% to 64%[7]. However, improvements seen have not been equal in all regions of the world. For example, while contraceptive prevalence has increased in sub-Saharan Africa over the same period, the rate of improvement has been considerably slower. As of 2015, contraceptive prevalence for the sub-Saharan African region as a whole was only 18.4%[8,9]. Furthermore, rural and lower-resourced communities across sub-Saharan Africa tend to have lower reported contraceptive uptake than resourced urban areas[10-12].

Kenya is one of those countries that has seen a slow but steady increase in contraceptive prevalence, increasing from 32% in 2003 to an estimated 59% nationally in 2017, and exceeding national targets[13,14]. However, like the sub-Saharan African subregion as a whole, disparities in the use of modern contraceptive methods persist across different regions and populations in Kenya as well. According to the 2014 Kenyan Demographic and Health Survey (DHS), urban areas reported a 56% contraceptive prevalence compared to a high of only 50% in rural areas. Additionally, regional disparities ranged from a low of 3.4% in the North Eastern region, to 38.3% in the Coastal region, to highs of 64% and 67% in the Eastern and Central regions, respectively[15].

Impediments to contraceptive usage in sub-Saharan Africa, and Kenya more specifically, have been associated with health system barriers, fear of adverse side effects, and socio-cultural factors such as spousal or familial objection and religious reasons[3,5,16-19]. Recently, the Kenyan Ministry of Health (MOH) and other health-promoting organizations have worked to address the barriers of contraceptive usage through initiatives such as expanding the number of counties with family planning budget allocations; integrating family planning with other health services such as routine HIV care and treatment; and promoting programs such as the "Reversing the Stall in Fertility Decline in Western Kenya", whose initiatives included improving the supply of family planning services at community and facility levels, and increasing the knowledge and demand for family planning services[1,14,20].

The Lwala Community Alliance (Lwala) is an organization that serves to promote the health and well-being of communities in Migori County, Kenya. Migori County had a reported contraceptive prevalence rate of just 44% in 2015, almost 15% behind the national average[21]. As part of its monitoring and program evaluation strategy, Lwala performed a comprehensive survey of 4,766 households within six sub-locations of Migori County, in order to determine the status of health, socioeconomic, and education metrics among this population. We utilize this survey data to estimate both the prevalence of contraceptive uptake and unwanted pregnancies in the study populations, and to examine the potential role that different factors play in meeting related family planning targets. Results are intended to inform current and future programming to address the burden of unmet need in family planning in this area.

Methods

Study design

This retrospective cross-sectional study analysed survey response data collected from households (HH) within six sub-locations of Migori County, Kenya, for the purpose of determining the status of health, socioeconomics, and education metrics of this population. Data collection was initially carried out within Rongo sub-county in the wards of North Kamagambo (NK) and East Kamagambo (EK) in May 2018, subsequently followed by surveying in Central Kamagambo (CK) and South Kamagambo (SK) in January and February 2019, and finally in two wards within Uriri sub-county, West and Central Kanyamkago in June and July 2019 (Figure 1). Information on demographics and sexual-reproductive health (SRH) were specifically extracted for analysis for this study.

Sampling strategy

Briefly, given the emphasis on maternal and child health, the survey's sample size was determined using under-5 mortality as a binary outcome using a binomial test to compare one proportion to a reference value. Using a power of 0.85 and alpha of 0.05, a sample size of 270 HHs in North

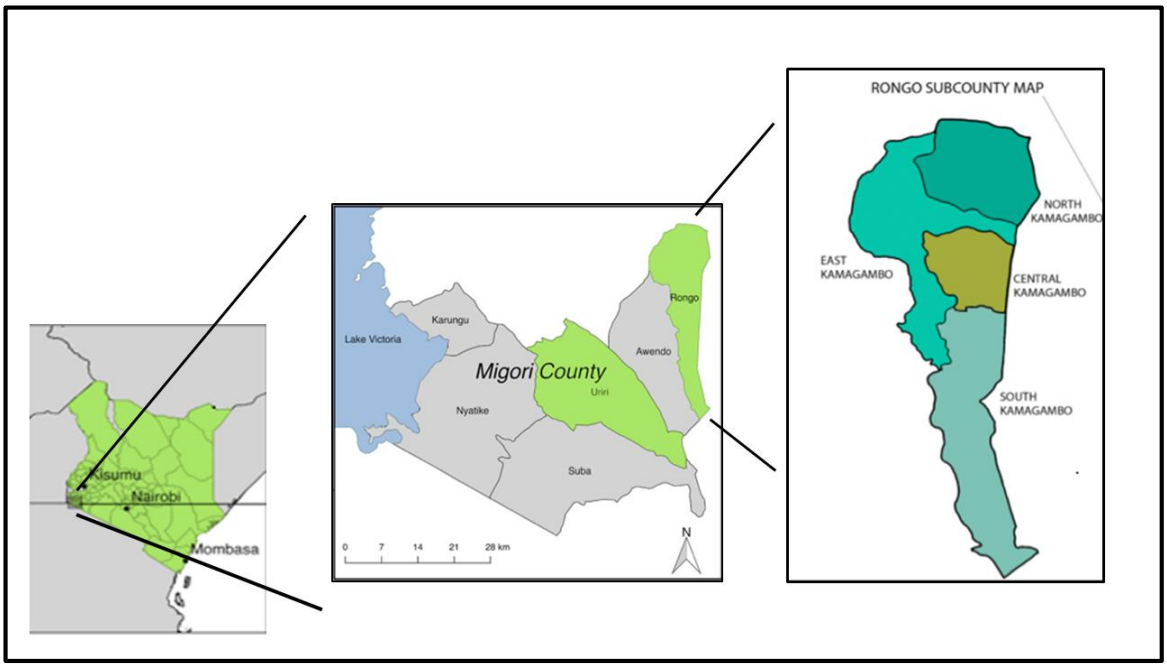


Figure 1: Map of Kenya with inlays representing the geographical divisions of Migori County and Rongo sub-County.

Kamagambo and 868 in East Kamagambo was needed to detect a reduction of 40 per 1,000 live births from the rate of 82 per 1,000 live births reported in Nyanza Province. A proportional stratified sampling method was further used to give all HHs an equal chance of selection despite differing population densities. Based on having a margin of error of 5% and an intra-cluster correlation coefficient (ICC) of 0.15 we then chose to divide each region into clusters or grid cells. Within each cluster, seven HHs were determined to be interviewed, of which a minimum of five HHs needed to have at least one child living there that was < 5 years old. Using GIS software, North Kamagambo was divided and mapped into 39 equal-sized grid cells; East Kamagambo into 124 equal-sized grid cells; Central and South Kamagambo into 176 equal-sized grid cells each; and West and Central Kanyamkago into 88 equal-sized grid cells, giving a total number of 176 grid cells for the Uriri sub-county. The two Uriri wards were combined and treated as one region, giving a total of five geographic regions for our analysis.

Selection of households and respondents

HHs were selected using a hybrid sampling technique to obtain as random of a sample as was possible. Because a truly random sample based on GIS data would be logistically infeasible due to travel time and expenses, a hybrid systematic and random sampling technique was used, with the following procedure: The center point of each grid cell was generated using GIS. This was the starting location for interviewers for each day's survey. Once the interview team reached the center of the gridded cell, they used a spin-the-bottle method to select the direction they travelled to begin recruiting HHs. Upon arrival to a HH the interviewer first asked to speak to the female head of household and whether she was ≥18 years of age. Male heads of household were interviewed only if it was reported that no female head of household was available. If a head of household was present, the interviewer then asked if they had children < 5 years old living in the HH. If no head of household was present or the head of household was < 18 years old, the interviewer skipped this house going to the next HH

along the line selected. If the interviewer reached the end of the grid cell before meeting the seven HH quota, they returned to the center of the grid to spin-the-bottle again selecting another direction. This was repeated until the interviewer team met the seven HH quota, when possible.

Survey tool

The survey contained more than 300 questions across multiple domains and was modeled on validated tools, including the Kenya Demographic and Health Survey[15]. The tool was administered to all respondents, utilizing branching logic based on the respondent's gender, age, and children in the household. Survey responses were de-identified, and participants received 50 KES (~$0.50 USD) in cellphone airtime for their time. Trained interviewers administered the surveys. All were hired from the community and were fluent in English, Dholuo, and Swahili. Surveys were administered on tablets using a customized Research Electronic Data Capture (REDCap) platform https://projectredcap.org/resources/citations/ to reduce data entry errors and ensure appropriate skip logic.

Data management

Survey responses were collected and temporarily stored on individual tablets that were password protected and minimized risk of information sharing with restricted device access. A new form was created for each respondent and forms were submitted immediately upon completion of the interview. The data were stored offline on the tablet application until synced to an online secure, privacy-protected server. All data were uploaded to the online server for initial analysis through the web-based platform. Data were exported to Excel software for cleaning purposes and the files were only shared with relevant study staff. All variables were checked line by line for any outliers. The variables were also matched against the survey questions to make sure skip logic was followed properly in the mobile form. Discrepancies in data were resolved through the mobile platform data management tools.

Statistical analysis

Descriptive statistics were calculated for categorical variables as unweighted percentages. Multivariable logistic regressions were used to model determinants of contraceptive use and reported unplanned pregnancy. Odds ratios (OR) with 95% confidence intervals (CI) were reported. The significance level for all tests was two-sided and set at 0.05. All analyses were performed using Stata version 14.2 (StataCorp LP, College Station, TX).

Results

Prevalence of contraceptive usage

A total of 3,642 female heads of household who provided responses to questions related to contraceptive usage across the five analysis regions surveyed were included in this analysis. Responses for these questions were not analyzed for the male head of households interviewed (Table 1). Of these, roughly 91% were between the ages of 18-39 years. The vast majority (~76%) reported being in a married monogamous relationship. More than 93% of respondents reported being one of four religions: Catholic (~15%), Seventh Day Adventist (~39%), Protestant (~23%) or Roho (~16%). Only 92 (2.5%) heads of household surveyed had Grade 4 or less of education.

Overall, 2,302 (63%) respondents reported that they currently used some form of contraception. Contraceptive prevalence was highest in North Kamagambo (79%) with all other regions being consistent between 58-65%. Contraceptive prevalence was between 66-70% for ages 25-39, followed by 56% for those aged 18-24, and then dropping off for those older than age 40. Heads of household that reported never having been married or divorced had the lowest proportion of contraception utilization, at roughly 46% and 33% respectively. Those reporting following the Islamic religion had the lowest contraceptive prevalence at only 43%, and those with a Grade 4 education or

Table 1: Demographic characteristics by contraceptive prevalence for female heads of household in Migori County, Kenya

Characteristic (N=3,642)	Contraceptive Prevalence N (%) *	Total N (%)
Age (years)		
18-24	555 (56.3)	985 (27.0)
25-29	710 (70.1)	1,031 (27.8)
30-34	608 (69.6)	874 (24.0)
35-39	295 (66.1)	446 (12.2)
40-44	95 (47.7)	199 (5.5)
≥45	39 (31.2)	125 (3.4)
Marital Status (missing = 1)		
Cohabitating	16 (61.5)	26 (0.7)
Married Monogamous	1,810 (65.3)	2,771 (76.1)
Married Polygamous	269 (63.3)	425 (11.7)
Never Married	74 (45.7)	162 (4.4)
Separated	17 (58.6)	29 (0.8)
Divorced	5 (33.3)	15 (0.4)
Widowed	110 (51.6)	213 (5.9)
Religion (missing = 5)		
African Independent Church	92 (63.4)	145 (4.0)
Catholic	344 (62.4)	551 (15.1)
Seventh Day Adventist	916 (63.9)	1,433 (39.4)
Protestant	533 (63.8)	835 (23.0)
Roho Church	371 (62.2)	596 (16.4)
Legio Maria	25 (52.1)	48 (1.3)
Hindu	1 (100.0)	1 (<0.1)
Islam	3 (42.9)	7 (0.2)
Other	11 (57.9)	19 (0.5)
None	1 (50.0)	2 (0.1)
Education (missing = 1)		
Class 4 or less	45 (48.9)	92 (2.5)
Class 5-8	1,254 (62.8)	1,997 (54.8)
Form 1-4	790 (64.9)	1,218 (33.5)
> Form 4	212 (63.5)	334 (9.2)
Region		
Central Kamagambo	602 (59.3)	1,015 (27.9)
East Kamagambo	315 (58.3)	540 (14.8)
North Kamagambo	147 (79.0)	186 (5.1)
South Kamagambo	631 (65.1)	970 (26.6)
Uriri	607 (65.2)	931 (25.6)

*Percentages represent the proportion of contraceptive usage of total persons in that category.

less had the lowest proportion at roughly 49%. Multivariable logistic regression was utilized to explore determinants of current contraceptive use (Table 2). Females aged 25-29 years of age (OR: 1.713, 95% CI: 1.418-2.069, p-value: <0.001) and 30-34 years of age (OR: 1.715, 95% CI: 1.407-2.091, p-value: <0.001) had roughly 1.7 times higher odds of current contraception use compared to those aged 18-24 years. Females who were currently married/cohabitating (OR: 1.932, 95% CI: 1.387-2.690, p-value: <0.001) had a roughly 2-fold higher likelihood of contraception utilization, compared to those who were never married. No statistically significant difference was seen in contraceptive prevalence by religious affiliation. Finally, compared to Central Kamagambo, female heads of household living in North Kamagambo were 2.6 times more likely to currently be using a modern contraception method (OR: 2.681, 95% CI: 1.825-3.939, p-value:

Table 2: Multivariate analysis of predictors of contraceptive prevalence (current use)

Characteristic	OR (95%CI)	P-value
Age (years)		
18-24	Ref.	
25-29	1.713 (1.418-2.069)	<0.001
30-34	1.715 (1.407-2.091)	<0.001
≥ 35	0.972 (0.795-1.188)	0.781
Marital Status		
Never married	Ref.	
Married/cohabitating*	1.932 (1.387-2.690)	<0.001
Separated/divorced/widowed	1.143 (0.751-1.740)	0.532
Religion		
Catholic	Ref.	
Seventh Day Adventist	1.074 (0.869-1.326)	0.508
Protestant	1.084 (0.863-1.362)	0.486
Roho Church	0.966 (0.753-1.239)	0.787
Other	0.937 (0.678-1.295)	0.693
Education		
Class 8 or less	Ref.	
Form 1 or higher	1.117 (0.962-1.296)	0.148
Region		
Central Kamagambo	Ref.	
East Kamagambo	0.978 (0.786-1.216)	0.841
North Kamagambo	2.681 (1.825-3.939)	<0.001
South Kamagambo	1.338 (1.111-1.612)	0.002
Uriri	1.296 (1.068-1.572)	0.009

<0.001), while those living in South Kamagambo (p=0.002) and Uriri (0.009), were each 1.3 times more likely to currently be using a modern contraception method.

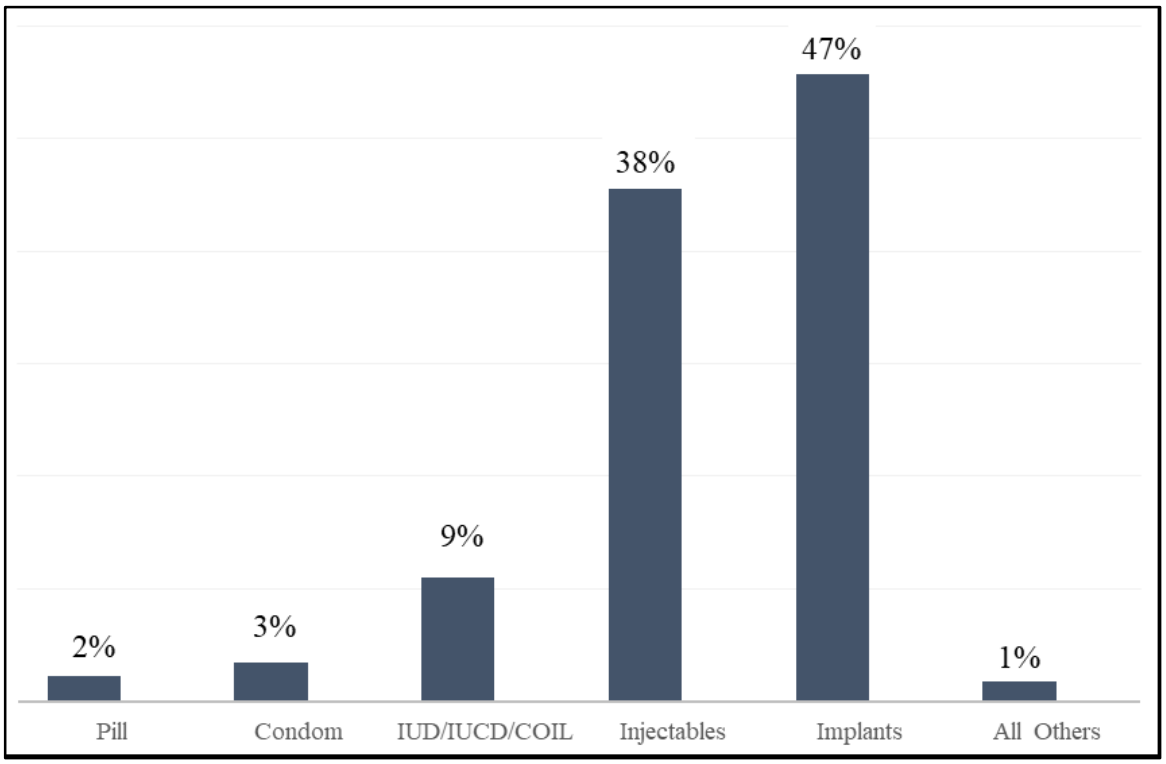
Type of contraceptive used

The distribution of contraceptive use among female heads of household in this study indicates that a majority of women use implants (47%), followed closely by injectables (38%). IUD, condom and pill were 9%, 3%, and 2% respectively (Figure 2).

Prevalence of reported unplanned pregnancy

3,573 female heads of household responded to the following question, "When you got pregnant with your last child, that is the last born or your current pregnancy, did you plan to get pregnant at that time?" Those who responded "no" were categorized as a "self-reported unplanned pregnancy." Among our population, the prevalence of reported unplanned pregnancy was 36.7% (n=1,313). The proportion of females reporting an unplanned pregnancy was highest among those aged 18-24 (48%), while all other age categories were consistent between 31-37%. When we look at marital status of females who reported they were never married or were in a cohabitating relationship, ~80% each reported their last pregnancy as being unplanned. This was followed by divorced females at 60%. Proportions of unplanned pregnancies by religion were fairly consistent across groups, ranging between 26-41%, with Islam, Lego Maria, and those reporting "no" religious affiliation each being at 50% or slightly above. Proportions of unplanned pregnancy were similar across education level achieved, at between 30-40%. Finally, the proportion of unplanned pregnancies by region was consistent for Central, East, and North Kamagambo, being between 43-47%, while lower proportions were seen in South Kamagambo (~34%) and Uriri (~24%) respectively (Table 3).

In multivariate models of analysis, females aged 18-24 years had an approximate 45% higher odds of their last pregnancy being unplanned, compared to women in older age groups (for example age 24-29 years: OR: 0.585, 95% CI: 0.482-0.710, p-value: <0.001). Women who were currently married/cohabitating (OR: 0.191, 95% CI: 0.130-0.279, p-value: <0.001) and those



*"All Others" includes female condom, female sterilization, lactation amenorrhea, rhythm method, withdrawal, other traditional method
IUD = intrauterine device/ IUCD = intrauterine contraceptive device

Figure 2: Type of contraceptive utilized

currently separated/divorced/widowed (OR: 0.225, 95% CI: 0.141-0.360, p-value: <0.001) were roughly 80% less likely to have an unplanned pregnancy compared to those who were never married. Compared to Catholics, those who identified as Protestant (OR: 1.405, 95% CI: 1.102-1.791, p-value: 0.006) or followers of the Roho Church (OR: 1.335, 95% CI: 1.028-1.733, p-value: 0.030) had a higher likelihood of their last pregnancy being unplanned. Finally, compared to Central Kamagambo, those living in East Kamagambo (OR: 0.752, 95% CI: 0.602-0.939, p-value: 0.012), South Kamagambo (OR: 0.532, 95% CI: 0.439-0.643, p-value: <0.001), and Uriri (OR: 0.286, 95% CI: 0.231-0.354, p-value: <0.001) had a roughly 25%, 50%, and 70% lower odds, respectively, of their last pregnancy being an unplanned pregnancy (Table 4).

Discussion

Overall, the prevalence of contraceptive uptake in our study population was high at 63%, higher than what has been reported in the literature for Kenya as a whole and other regions of sub-Saharan Africa. Several population-based studies conducted in the last two years report that the prevalence of contraceptive use among women of reproductive age in SSA was only 17%, though large variations exist across countries[8,9,13-15].

The higher prevalence of reported contraceptive utilization in our study population may result from focused family planning interventions in the region since 2016. For example, Lwala has promoted increased contraceptive access through service improvements at health clinics, behavior change communication campaigns, creation of youth-friendly sexual and reproductive health (SRH) spaces, support for the contraceptive supply chain, and promotion of SRH services by community health workers (CHW) and youth promoters. This is highlighted by the fact that North Kamagambo, the only ward where Lwala had implemented these initiatives at the time of the survey, was found to have a higher likelihood of

Table 3: Proportion of self-reported unplanned pregnancies by demographic characteristic

Characteristic (N=3,573)	Self-reported unplanned pregnancy N/total (%)
Total	1,313/3,573 (36.7)
Age	
18-24	462/957 (48.3)
25-29	317/996 (31.8)
30-34	270/863 (31.3)
35-39	146/441 (33.1)
40-44	72/194 (37.1)
≥45	46/122 (37.7)
Marital Status	
Cohabitating	21/26 (80.8)
Married Monogamous	918/2,725 (33.7)
Married Polygamous	159/419 (37.9)
Never Married	120/150 (80.0)
Separated	15/29 (51.7)
Divorced	9/15 (60.0)
Widowed	71/209 (34.0)
Religion (missing = 5)	
African Independent Church	50/143 (35.0)
Catholic	169/539 (31.4)
Seventh Day Adventist	489/1,402 (34.9)
Protestant	325/820 (39.6)
Roho Church	244/588 (41.5)
Legio Maria	24/47 (51.1)
Islam	4/7 (57.1)
Other	5/19 (26.3)
None	1/2 (50.0)
Education (missing = 2)	
Class 4 or less	30/89 (33.7)
Class 5-8	805/1,967 (40.9)
Form 1-4	380/1,193 (31.9)
> Form 4	97/322 (30.1)
Region	
Central Kamagambo	464/997 (46.5)
East Kamagambo	225/519 (43.4)
North Kamagambo	86/183 (47.0)
South Kamagambo	323/959 (33.7)
Uriri	215/915 (23.5)

contraceptive prevalence compared to the other regions surveyed. However, further studies that are specifically designed to explore the link between these initiatives and contraceptive prevalence are needed in order to more fully understand this impact.

Across younger age groups we found that contraceptive prevalence was high overall, ranging between 56% and 70% for females between the ages of 18-39 years and then dropping off after the age of 40 years. However, among younger age groups, being 18-24 years of age was significantly associated with a lower likelihood of contraception utilization compared to females aged 25-34 ($p < 0.001$). This is consistent with other surveys. For example, the 2018 Zambian DHS, found similar results, in that females aged 15-24 had a lower proportion of current contraceptive utilization compared to women aged 25-39, with the proportion falling off after the age of 40[22]. Additionally, though not as pronounced, the 2016 Ethiopian DHS also found similar trends, especially among females aged 15-19 years old in which current contraceptive utilization was only 7.4%, followed by 26% for females aged 20-24, and then ranging between 30-35% for females aged 25-39, before falling off for females older than 40 years[23]. The lower rates among our youngest age group may be reflective of stigma against contraceptive use, which might fall most heavily on younger women who are less likely to be married and more likely to be constrained by the preferences of older relatives. Not surprisingly, females aged 18-24 years in our cohort also had the highest rates of unplanned pregnancies, likely directly related to the lower contraceptive prevalence seen. Another possible explanation for our results may be that older aged women approaching or experiencing menopause may perceive themselves to have lower fertility and thus less likely to perceive a need for contraception utilization; however, future studies are warranted to better explore this finding more broadly in Kenya.

Across marital status categories, we found that those who were married/cohabitating or who were separated/divorced/widowed were more likely to be using contraception than those who were never married. Married and cohabitating persons in our cohort, whether the relationship was monogamous or polygamous, had contraceptive uptakes of >60% across all groups. Our reported contraceptive prevalence for select regions of Migori County are much higher than the rates reported elsewhere in Kenya. For example, the 2014 Kenya DHS reports contraceptive prevalence for married women as falling somewhere between 38% and 66%, depending on the region[15].

Our study population predominantly identified themselves with one of four Christian denominations (Catholicism, Seventh Day

Table 4: Multivariate analysis of predictors of unplanned pregnancies

Characteristic	OR (95%CI)	P-value
Age (years)		
18-24	Ref.	
25-29	0.585 (0.482-0.710)	<0.001
30-34	0.539 (0.440-0.661)	<0.001
≥ 35	0.586 (0.474-0.725)	<0.001
Marital Status		
Never married	Ref.	
Married/cohabitating*	0.191 (0.130-0.279)	<0.001
Separated/divorced/widowed	0.225 (0.141-0.360)	<0.001
Religion		
Catholic	Ref.	
Seventh Day Adventist	1.053 (0.839-1.321)	0.656
Protestant	1.405 (1.102-1.791)	0.006
Roho Church	1.335 (1.028-1.733)	0.030
Other	1.285 (0.915-1.805)	0.148
Education		
Class 8 or less	Ref.	
Form 1 or higher	0.545 (0.465-0.638)	<0.001
Region		
Central Kamagambo	Ref.	
East Kamagambo	0.752 (0.602-0.939)	0.012
North Kamagambo	0.892 (0.642-1.239)	0.494
South Kamagambo	0.532 (0.439-0.643)	<0.001
Uriri	0.286 (0.231-0.354)	<0.001

Adventist, Protestant, and the Roho Church). Only a small proportion of participants identified with other religions such as Islam, Hinduism, or the African Independent Church. Compared to Catholics, we found no statistically significant differences in contraceptive prevalence among the predominant religious affiliations of our study population. Other studies have tried to draw associations between religion and contraception usage with varying results[24,25]. Our findings are likely specific to Migori County and may not be representative of areas with a different religious make up.

This study did not reveal a statistically significant association between contraceptive uptake and education level. However, those with the lowest level of education (class 4 or less) had a lower proportion of contraceptive utilization by 14% compared to the other education levels. As seen in the literature, there is a consistent trend that lower levels of education are associated with lower levels of contraceptive usage[26-28]. Educational achievement has been associated with improved reproductive health knowledge and attitudes towards modern contraception, especially amongst women, thus likely empowering them to delay marriage and to make more informed personal decisions related to family planning issues[29].

Implants and injectables were the most utilized method of contraception for our study population overall. Unfortunately, we were not able to differentiate the reasons why our study population chose a specific type of method or not, as the survey questionnaire was limited to only asking questions about the types of contraception used and not the reasons why. One´s choice for contraceptive method used is based on a variety of factors including personal preference, availability, perceptions about risks and benefits, as well as relationship dynamics related to decision making within couples; as such, this is likely to differ region to region and country to country[19,26,30].

In contrast to contraceptive prevalence, we found that the prevalence of unplanned pregnancy for our study population was roughly 37%. As mentioned, reported unplanned pregnancies was highest amongst those aged 18-24 years (48%), with all other age groups reporting rates of unplanned pregnancy between 31-37%. Again, this is consistent with what the literature has reported. In a systematic review of over 200 articles published between 2000 and 2017, unplanned pregnancies in

the adolescent age group were attributed to numerous factors, including peer influence, unwanted sexual advances from adult males, poverty, unequal gender power relations, early marriage, lack of comprehensive sexual education, as well as issues such as alcohol and substance abuse, high cost of contraception, and perceptions that it is the male´s responsibility to provide condoms[27]. More in-depth questioning of younger females in Migori County is needed to better understand this dynamic amongst our population of females.

We found that those with a Form 1 education or higher were 45% less likely to have an unplanned pregnancy compared to those who had only completed Class 8 or less. Though this study did not find that education level was a statistically significant predictor of contraceptive use, it did find that it was a predictor of unplanned pregnancy.

Unplanned pregnancies were more common in our population who reported they were "never married" (80%). Kenyan social norms can be quite strong, often disfavoring women who get pregnant outside of marriage, and likely contributing to the high proportion of reported unplanned pregnancies in those identifying as "never married"[3].

Strengths and limitations

The strength of this study is the large sample size and survey design that was representative of Migori County. Moreover, survey interviewers were local residents that administered the interview in the participants preferred local language. The main limitation of this study is that it is cross-sectional in nature and does not allow for conclusions to be drawn about why results are what they are or for analysis of behavior over time. In addition, the survey relied on participant recall of subjects that are historically sensitive or "taboo". With this, there is potential for respondents to not be completely honest with their answers out of fear of judgment or embarrassment. Finally, survey questions were written in English with the interviewers trained on the word choices to be used when they needed to conduct the interview in either Dholuo or Swahili. As such, there was potential for participant misunderstanding of concepts or loss of translation for specific wording.

Ethical Considerations

Ethics review and approval were received from the AMREF Ethics and Scientific Review Committee (P452/2018) and the Vanderbilt Institutional Review Board (#161396).

Conclusion

This study found overall high levels of contraceptive utilization among female heads of household in the surveyed areas of rural, western Kenya, compared to national estimates. This study's results identified decreased contraceptive prevalence for those aged 18-24, those over age 40 years, and those who reported having never been married. The most preferred methods of contraception were implants and injectables. Unplanned pregnancy in contrast was highest among younger females, while also being highest in those reported to have never been married. These findings reflect the need for family planning programs to tailor their interventions with a focus on those at highest risk for low contraceptive uptake.

This study's findings highlight the need for additional research and investigation into community and individual beliefs surrounding family planning, to ensure that interventions are culturally sensitive and locally responsive in order to enhance contraceptive uptake and decrease prevalence of unplanned pregnancies.

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Contribution of Authors

TM, VO, DR, JM and AR were involved in the design of the study. VO, EO, and JM were involved in data collection. TM, JS, DR, JM and AR were involved in data analysis. TM, VO, JS, EO, DR, JM, and AR were involved in preparation and edits of the manuscript. All authors approve of the manuscript.

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