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Prevalence and socio-demographic determinants of unwanted pregnancies among adolescent girls in Kakuma refugee camp

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Abstract

Introduction:

Globally, an estimated 21 million adolescent girls aged 15–19 years become pregnant annually, with the burden often higher in refugee contexts. Despite the availability of sexual and reproductive health (SRH) services in Kakuma Refugee Camp, unwanted pregnancy among adolescent girls continues to occur, driven by factors such as early and forced marriage, sexual exploitation, coerced sex, early childbearing, and gender-related risk-taking behaviors. A total of 1,079 adolescent pregnancy cases were reported between January 2024 and July 2025, highlighting the magnitude of the problem. However, little is known about the determinants of unwanted pregnancy in these unique multinational refugee settings. Thus, the aim of this study was to assess the determinants of unwanted pregnancy among adolescent girls in these settings. Specifically, to establish the prevalence of unwanted pregnancy, examine socio-demographic and sexual and reproductive health factors associated with unwanted pregnancy.

Methodology:

In this community-based analytical study, a total of 431 adolescent girls aged 12-18years were recruited through multistage cluster sampling. Pretested questionnaire was administered to collect sociodemographic and SRH data. Audio-recorded interviews were conducted with four purposively selected health staff as key informants, and a focus group discussion with adolescents using an interview and FGD guide, respectively. Questionnaire data was analyzed using descriptive statistics, chi-square tests, and bivariate and multivariable logistic regression to establish prevalence, and assess relationships at statistical significance of $p \leq 0.05$.

Results:

The overall prevalence of unwanted pregnancy is 28.7%. In multivariable analysis, age (AOR = 5.9; 95% CI: 1.70–22.9; $p < 0.001$), marital status (AOR = 2.14; 95% CI: 1.78–3.14; $p < 0.001$), school attendance (AOR = 5.0; 95% CI: 2.3–10.90; $p < 0.001$), religion (AOR = 1.96; 95% CI: 1.00–3.84; $p = 0.049$), and camp section (AOR = 0.11; 95% CI: 0.05–0.24; $p < 0.001$) are independently associated with unwanted pregnancy. Education level [COR = 0.71, CI= (0.33–0.90), $p = 0.038$] is not statistically significant. Family planning awareness (FP) [AOR = 0.40, CI= (0.20–0.90), $p = 0.038$], is associated with unwanted pregnancy outcomes.

Conclusion:

determinants of the high prevalence of unwanted pregnancy among these adolescents are socio-demographic, contextual, and sexual reproductive health related. Strengthening adolescent friendly sexual reproductive health services, targeted contraceptive education, and community-based interventions addressing structural vulnerabilities within refugee settings are essential to reducing unwanted pregnancies.

Introduction

Globally, an estimated 21 million adolescent girls aged 15–19 years become pregnant annually, nearly half of which are unintended, and a substantial proportion result in unsafe abortion, particularly in low-resource settings (WHO, 2023). In humanitarian and refugee contexts, the burden is often higher due to compounded vulnerabilities, including disrupted health systems and limited access to sexual and reproductive health (SRH) services (United Nations High Commissioner for Refugees. (UNHCR,2022). Evidence suggests that adolescent pregnancy prevalence ranges from 21% to over 40% in refugee camps, reflecting compounded vulnerabilities associated with displacement (Bol et al., 2022).

Unwanted pregnancy among refugee adolescent girls represents a major public health burden (WHO, 2020). These pregnancies contribute substantially to morbidity and mortality among adolescent girls, accounting for up to 23% of the disease burden in this age group, and are associated with poor maternal and neonatal outcomes, unsafe abortions, school dropout, and long-term socio-economic disadvantage (Asnong, 2018). Routine health data indicates 1,079 adolescent pregnancies recorded between January 2024 and June 2025. (UNHCR,2025)

An unwanted pregnancy is a pregnancy that is reported to have occurred when no children, or no more children, were desired (Adhena & Fikre, 2023).Whilst early and forced marriages certainly occur out- side conflict affected regions, such marriages within conflict affected regions have additional dimensions and complexities (Hutchinson, Waterhouse, March-McDonald, Neal, & Ingham, 2017). In Refugee settings birth rates have been estimated to be four times higher among refugee adolescents than in the rest of the populations (UNFPA, 2016). Studies done in various refugee settings have associated unwanted pregnancy with demographic, social and health system factors. Although these factors have been studied in other refugee settings, the findings have not been tested in Kakuma refugee camp. This study will seek to test these factors and find out if they are consistent with findings in other refugee camps.

Demographic factors have been found to influence unwanted pregnancy. In a Tanzania refugee study gender and age of young women were found to increase the risk of sexual violence and other poor sexual reproductive health outcomes (Hutchinson et al., 2017). Populations in which age at first intercourse is low tend to have early childbearing and subsequently give birth to more children, leading to high fertility rates which increased unwanted pregnancy (Monari, Orwa, & Agwanda, 2022). Attempts to address early marriages in Kakuma have yielded minimal results with one in three girls getting married before the age of 18 (World & Program, 2015).

Age of household head and sex of household head have been statistically associated with adolescent pregnancy. Movement of refugee women from one country to another may lead to separation of sexual partners (Abdi et al., 2024). Potentially, such women would end up as victims of unplanned sex while on transit or in the host country. Conflict can increase the protective role of families as young women tend to be at higher risk of rape, sexual exploitation and abuse when cut off from family structures. Absence of males from the household, through conflict mortality, imprisonment and military membership, can leave households vulnerable to poverty and result in the engagement of females in economic activities which increase the risk of poor sexual reproductive health (Mukwege & Nangini, 2009). Edmond et al. 2001 found out that household females engaged young adolescents' boys in sex because they had to fill the gap left by their adults' male partners who are either non-existent or always under the influence of drugs. This study is designed to explore how this practice has changed over time and how it is influencing unwanted pregnancy outcomes in Kakuma.

Factors such as occupation influence unwanted pregnancy (Amoran, Salami, & Oluwole, 2012). Conflict and natural disasters push individuals, and sometimes entire communities, into poverty as crises destroy livelihoods, result in the loss of property and separate people from their economic networks (Maclin, Kelly, Kabanga, & VanRooyen, 2015). In Kakuma Camp, Women in the camp are less likely to be entrepreneurs than men, and their businesses are more likely to be informal and have less invested in them (IFC, 2018).

In refugee settings, access to resources is often mediated through household structures, with the characteristics and control of the household head significantly influencing vulnerability, leaving individuals particularly women and those without strong family support at heightened risk of marginalization and limited access to livelihood assets (Kinyanjui, 2025; Kaaria & Murithi, 2025).In Kakuma for instance food assistance to most vulnerable households is at 57% leaving other vulnerable households to seek alternative coping mechanisms (IFC, 2018). Despite ongoing SRH interventions, Edmond et al 2001 found out that some male adolescents are involved in sex with female adults in exchange for food or money hence the need for more insights as well as understand changes over time (RHRC, 2003).

Accessing education, through schools, has been identified as a key determinant and protective factor in relation to most measures of sexual reproductive health (Pulerwitz et al., 2019). Education for girls' delays marriage and reduces desired family size due to aspirations of better standard of living and increased opportunity cost of each child born (Marphatia et al., 2019). Studies show that more educated males in refugee settings are more positive about the use of contraceptives compared to uneducated men (Okanlawon, Reeves, & Agbaje, 2010). Recent evidence indicates that educational deprivation remains high among female refugees in Kakuma, with approximately 66% of women having no formal education, highlighting persistent structural barriers to girls' education in the camp (UNHCR, 2024). This study is designed to explore how this high non-schooling rate affects unwanted pregnancy outcomes among refugee girls.

Religion has been shown to have an association with unwanted pregnancy. A study done in Kakuma to explore the concept of agency and intersectionality to interpret the interplay of forces that influence contraceptive use among Somali women refugees in Kakuma Camp indicated that there exists some beliefs that Islam is against condom use (AW, 2014). With the multireligious nature of the nationalities in the camp, it was useful to study more on the relationship between unwanted pregnancy and religion in Kakuma.

A study in Thailand attributed occurrence of adolescent pregnancy to a host of health system factors, including the availability of contraceptives and/or non-use of contraceptives alongside difficult access to health care and lack of sexual and reproductive health education which impacts sexual health knowledge (Parker et al., 2018). These findings highlight the vulnerability of refugee girls to unwanted pregnancies in refugee settings. It was useful to study how access to information, commodities and services affect adolescent pregnancy in Kakuma.

Unmet need for contraception is a major cause of unwanted pregnancy. In Kakuma for example the Contraceptive prevalence rate is 45% pointing to a great unmet need for family Planning. The continued arrival of new refugees from countries with weak health care systems may continuously influence knowledge and practice of safe sex hence affecting unwanted pregnancy in the camp. Various agencies work together to provide sexual reproductive health services in the camp. Despite the on-going work by humanitarian agencies, unwanted pregnancy persists in Kakuma. Earlier studies in Kakuma have not focused on the prevalence of unwanted pregnancy, social-demographic and Sexual Reproductive health factors. This study explored the social-demographic and Sexual Reproductive health factors and sexual health factors that are associated with unwanted pregnancy in Kakuma. Results from this study will be used to inform policy as well as in planning intervention strategies towards reducing unwanted pregnancy cases in the camp.

Methods

Study site and population

This cross-sectional study was conducted at the Kakuma refugee camp which is located in North-Western Kenya in Turkana County in Kenya. Kakuma refugee camp has an estimated 203,680 refugees of which approximately 12% represents adolescent girls aged 12–18 and it is the second largest refugee camp in Kenya with population diversity of over 10 nationalities. The study targeted approximately 16859 adolescent girls in Kakuma Refugee camp. This targeted a population of girls of age 12–18 years old registered as refugees by UNHCR in Kakuma since their sexual behavior makes them more vulnerable to unwanted pregnancies as opposed to younger adolescents. Patients who were mentally or critically ill were excluded from the study.

The ethical approval for the study was obtained from Maseno University Scientific Ethical Review Board. The authority to conduct the study was issued by the National Commission for Science, Technology, and Innovation. Further approval was sought from the Kakuma camp administration through the UNHCR office was sought and from the IRC to access and interact with the participants.

Data collection and procedures

Data was collected using a pretested structured questionnaire as the main instrument. Section one was a consent form to provide the participants with necessary information before recruitment into the study. Section two contained information on socio-demographic characteristics of the respondents. Section three addressed moderating factors perceived to influence the occurrence of unwanted pregnancy among refugee adolescent girls. Questionnaires was administered either in Kiswahili or English. A total of 431 girls were recruited from the sampled Households.

For qualitative data collection, 4 key informants within the camp were purposively picked for interviews. Interview sessions was scheduled at their convenience without interrupting service provision. Prior to the interview, participants were taken through the informed consent process and those who consent was requested to sign and retain a copy of the consent form.

Data analysis

Data were entered into Excel 2010, pre-coded then analysed using IBM SPSS Version 27.0.

Quantitative data collected using the questionnaires were checked for completeness, coded, entered and analyzed using SPSS version 27. Both descriptive and inferential statistics were used. For descriptive statistics, tables and percentages were used to summarize the results. Chi-square of independence was used to determine differences in proportions of pregnant and non-pregnant adolescents and to determine association of sociodemographic factors with pregnancy among adolescents. Statistically significant associations were further subjected to logistic regression. Statistical significance was set at $p \leq 0.05$. Qualitative data collected from the interviews with key informants were subjected to manual content thematic analysis and themes developed were presented in verbatim together with quantitative data.

Variable Description and Measurement

The variables on the socio-demographic factors were developed specifically for this study. See questionnaire attached below. The questions on pregnancy intention were adapted from the Kenya Demographic and Health Survey (KDHS) method of Pregnancy intention measurement. In the KDHS woman's questionnaire, pregnancy intention is measured by respondent's answer to the following question: "*When you got pregnant with (NAME), did you want to get pregnant at that time, did you want to wait until later, or did you not want to have any child at all?*"

https://www.knbs.or.ke/reports/kdhs-2022

Results

Demographic characteristics of adolescents girls ant Kakuma refugee camp

A total of 431 adolescent girls participated in the study with a response rate of 100%. The age of the respondents ranged from 12–18 years with 22.5% of the participants falling in the age bracket of 12–14 years while 77.5% of the participants falling in the age bracket of 15–18 years. Regarding marital status, 19.2% were married, 75.9% were single while 4.9% were divorced/separated. Within the four camp sections, 39.9%, 13.9%, 29.0% and 17.2% of the participants were from Kakuma 1, Kakuma 2, Kakuma 3 and Kakuma 4 respectively. 67.5% of the adolescents who participated in this study were in school while 32.5% were not. Majority of participants (74.7) were Christians, 23.9% were Muslims, 0.9% belonged to African Traditional Religion and 0.2% belonged to Bhai faith.

Household head of the participants varies from mother, father, spouse and other relatives as shown in Table 4.1. With respect to the current pregnancy status, 28.7% of the participants were pregnant while 71.3% were not. 42% of the participants were aware of family planning while 57.6% were not. Place of birth of the participants varied considerably (Table 1). The main reason why participants moved to Kenya included joining the family, marriage, work, going to school, escaping insecurity/ war/draught and other reasons. These general characteristics of the participants have been summarised in Table 4.1.

Table 4.1
General characteristics of the study participants

Variable	Category	Frequency	%
Age (Years)	12–14	97	22.5
	15–18	334	77.5
Marital status	Married	83	19.2
	Single	327	75.9
	Devorced/Separated	21	4.9
Camp section	Kakuma1	172	39.9
	Kakuma 2	60	13.9
	Kakuma 3	125	29.0
	Kakuma 4	74	17.2
School status	Out of school	140	32.5
	In school	291	67.5
Education level	Primary	177	41.1
	Secondary	105	24.4
	Vocational colleges	7	1.6
Religion	Christian	322	74.7
	Muslim	103	23.9
	Afrcan Traditional religion	4	0.9
	Other (Bhai faith)	1	0.2
Household head	Mother	269	62.4
	Father	83	19.3
	Spouse	16	3.7
	Others	43	10.0
The main reason for moving to Kenya	To join family	47	10.9
	Marriage	1	0.2
	work	2	0.5
	School	50	11.6
	Escape insecurity/war/draught	315	73.1
	Others	15	3.5
Place of birth	Burundi	24	5.6
	Dadaab	3	0.7
	DRC	34	7.9
	Ethiopia	16	3.7

Key: DRC; Democratic Republic of Congo

Variable	Category	Frequency	%
	Israel	1	0.2
	Kakuma	65	15.1
	Kenya	32	7.4
	Rwanda	7	1.6
	Somali	39	9.0
	South Sudan	160	37.2
	Sudan	34	7.9
	Tanzania	10	2.3
	Uganda	6	1.4
Key: DRC; Democratic Republic of Congo			

prevalence of unwanted pregnancies among adolescent girls in Kakuma refugee camp

The overall prevalence of unwanted pregnancy among adolescents in Kakuma refugee camp was 28.7% (124/431) while 71.3% (307/431) were have never been pregnant. With respect to adolescent pregnancy within the camp sections, 20.9%, 56.7%, 11.2% and 51.4% were pregnant in Kakuma 1, Kakuma 2, Kakuma 3 and Kakuma 4 respectively as shown in table 2.

Table 4.2
Prevalence of pregnancy per camp section

Camp section	Pregnacy Status	Frequency	Percent
Kakuma 1	Not pregnant	136	79.1
	Pregnant	36	20.9
	Total	172	100.0
Kakuma 2	Not pregnant	26	43.3
	Pregnant	34	56.7
	Total	60	100.0
Kakuma 3	Not pregnant	111	88.8
	Pregnant	14	11.2
	Total	125	100.0
Kakuma 4	Not pregnant	34	45.9
	Pregnant	40	54.1
	Total	74	100.0

Prevalence of pregnancy by country of origin

The study further assessed the prevalence of pregnancy among adolescents based in country of origin. 41% of adolescents from South Sudan were pregnant while 58.1% were not pregnant. In regard to other places of origin, 21% were pregnant while 79% were not pregnant (Table 3).

Table 4.3
Prevalence of pregnancy the country of origin

Country of origin	Not pregnacy n(%)	Pregnant n(%)	Total
South Sudan	93(58.1)	67(41.9)	160
Other	214(79.0)	57(21.0)	371
Total, n(%)	307(71.3)	124(28.7)	431

Focus group discussions (FDGs) and key informant interviews (KIIs) were analyzed and grouped into the following subthemes on unwanted pregnancy among adolescents: understanding of unwanted pregnancy, reasons for unwanted pregnancy and age at which someone should start having sex. Participants shared that adolescent pregnancy commonly occurs in Kakuma refugee camp. Participants discussed the understanding of unwanted pregnancy among adolescent girls in Kakuma refugee camp and the following quote was picked from them: "*It's a pregnancy that's abrupt /sudden, not accepted by society, viewed as a curse, one that disrupted your normal life as a child or a girl" FDG1.* This was also reported in KIIs where one of the respondents stated that *"It's more prevalent if not given safety sexual health education and it leads to increased criminal abortions that led to high mortality rates among teenagers"* KIIs 1. It was also reported that "*vulnerability in the camp leads to adolescent girls getting unwanted pregnancy and led the adolescents to engage in relationships so that they can get some income*" KIIs 2. While asked about the reason as to why adolescent pregnancy occur, participants reported lack of school fees and need to provide for their household as the major reasons. Some of the responses include: *"It's because of inadequate resources, i.e. feeding, fees and school items" FGD2, "Need to fit in i.e., have current fashion, fear of being labeled naïve" FGD 3 and "As the head of household, you need to provide for the siblings" FGD 4*

Socio-demographic factors associated with unwanted pregnancies among adolescent refugee girls in Kakuma refugee camp

Age is a very important intrinsic demographic factor that might be associated with unwanted pregnancy. The study therefore evaluated how it may be associated with unwanted pregnancy. In terms of qualitative analysis age also an important subtheme and opinion was sought regarding the exact age a lady should start having sex. Some of the responses from FDGs includes: "*20 years and above because at that time one is done with school and the body is ready to have the baby*" FDG 3. "*It's a societal appropriate age when one should get married and have a child"* FDG 4. The role of religion in addressing the issue of unwanted pregnancy among adolescents was also probed as a subtheme. Some of the important responses got includes: *"Unwanted pregnancy is a topic that's less spoken but during holiday youth activities in church mostly focus on abstinence"* FDG 6.

In quantitative analysis, age of the participants was significantly differed between non-pregnant and pregnant adolescents ($\chi^2_=$ 28.376, $p < 0.001$) with 35% of the pregnant adolescents falling within the bracket of 15–18 years. Marital status statistically differed between non-pregnant and pregnant adolescents ($\chi^2_=$ 56.019, $p < 0.001$). School attendance and education level was statistically different between non-pregnant and pregnant adolescents ($\chi^2 = 20.079$, $p < 0.001$) and ($\chi^2 = 8.541$, $p < 0.014$) respectively. Furthermore, religion, household head and camp section within the camp ($\chi^2 = 12.867$, $p < 0.050$), ($\chi^2 = 12.691$, $p < 0.013$ and ($\chi^2 = 69.858$, $p < 0.001$). On the other hand, involvement in income generating activity, enrolment in cash transfer or food assistance program were comparable between the two groups. Additionally, parental status, and reason for joining Kakuma refugee camp were also comparable between the two groups (see Table 4).

Table 4.4
Socio-demographic factors associated with unwanted pregnancies among adolescent refugee girls in Kakuma refugee camp

Variable	Category	Not pregnant	pregnant	χ^2	p value
Age (Years)	12–14	90(92.8)	7(7.2)		
	15–18	217(65.0)	117(35)	28.376	**< 0.001**
Marital status	Married	262(80.4)	64(19.6)		
	Single	34(41.0)	49(59.0)	56.019	**< 0.001**
	Devorced/Separated	10(47.6)	11(52.4)		
School attendance	Out of school	80(57.1)	60(42.9)		
	In school	227(78.0)	64(22.0)	20.079	**< 0.001**
Education level	Primary	148(83.6)	28(16.4)		
	Secondary	74(70.5)	31(29.5)	8.541	**0.014**
	Vocational colleges	4(57.1)	3(42.9)		
Religion	Christian	215(66.8)	107(33.2)		
	Muslim	86(83.5)	17(16.5)	12.687	**0.050**
	African Traditional religion	4(100.0)	0 (0.0)		
	Other (Bhai faith)	1(100)	0(0.0)		
Household head	Mother	191(71.0)	78(29.0)		
	Father	69(83.1)	14(16.9)		
	Spouse	8(50.0)	8(50.0)	12.619	**0.013**
	Others	28 (65.1)	15 (34.9)		
	Self	11(55.0)	9(45.0)		
Camp section	Kakuma 1	136(79.1)	36(20.9)		
	Kakuma 2	26(43.3)	34(56.7)	69.858	**< 0.001**
	Kakuma 3	111(88.8)	14(11.2)		
	Kakuma 4	34(45.9)	40(54.1)		
Income generating activity in the last 7 months					
	No	288(71.1)	117(28.9)		
	Yes	19(73.1)	7(26.9)	0.046	0.830
Have your EVER been enrolled in a cash transfer/food assistance program?					
	No	219(69.1)	88(30.9)		
	Yes	66(76.7)	20(23.3)	3.421	0.331
	Don't know	10(71.4)	4(28.6)		
Are you currently enrolled in any cash transfer /food assistance program?					
	No	277(72.1)	107(27.9)		
	Yes	18(62.1)	11(37.9)	1.524	0.467

Variable	Category	Not pregnant	pregnant	χ^2	p value
In the past 4 weeks, was there any day that you went without food in your household for a FULLY DAY because of lack of resources?					
	No	56(66.7)	28(33.3)		
	Yes	251(72.3)	96(27.7)	1.060	0.303
Parental status	Only mother is alive	104(65.0)	56(35.0)		
	Only father is alive	17(73.9)	6(26.1)		
	Both parents are alive	165(76.7)	23.3(40.7)	6.809	0.078
	Both parents passed away	21(65.6)	12(34.4)		
Reason for coming to the camp					
	To join family	36(76.6)	11(23.4)		
	marriage	0(0.0)	1(0.8)		
	Work	3 (100)	0(0.0)	6.458	0.264
	School	39 (78.0)	11(22.0)		
	Escape security/war/draught	217(68.9)	98(31.1)		
	Others	12(80.0)	3(20.0)		

Further analysis revealed that socio-demographic factors associated with unwanted pregnancy at multivariate logistic regression were as follows: Older adolescents (aged15-18 years) were 5.9 times more likely to get unwanted pregnancy [AOR = 5.9, CI= (1.70–22.9), p < 0.001]. Married adolescents were 1.72 time more likely to get pregnant [AOR = 1.2, CI= (0.18–5.89), p < 0.001] while divorced/separated adolescents were 0.23 times less likely to get unwanted pregnancy [AOR = 0.14, CI= (0.015–0.28), p < 0.001]. Adolescents not in school were 5.0 times more likely to get pregnant [AOR = 5.0, CI= (2.3–10.90), p < 0.001]. Among those in school, those in primary school were 0.172 times less likely to become pregnant [COR = 0.172, CI= (0.33–0.90), p = 0.038] however this was shown not to be significant after adjusting for sexual debut and duration of stay in the camp (Table 4.4). Adolescents belonging to other religion were 1.96 times more likely to become pregnant relative to Christian adolescents [AOR = 1.96, CI= (1.00-3.84), p = 0.049]. In terms of household head, adolescents in household headed by the father were 0.26 times less likely to get unwanted pregnancy [COR = 0.26, CI= (0.08–0.84), p = 0.038] however, this was watered down to be non-significant after adjusting for duration in the camp and other variables. Those adolescents in Kakuma 1 were 0.31 times less likely to get unwanted pregnancy [AOR = 0.31, CI= (0.16–0.58), p = < 0.001] while those in Kakuma 3 were 0.11 times less likely to get unwanted pregnancy [AOR = 0.11, CI= (0.05–0.24), p = < 0.001] (Table 5).

Table 4:5
Association between socio-demographic factors and unwanted pregnancy among adolescents

Variable	Category	COR(CI)	p value	AOR(CI)	p value
Age (Years)					
12–14		Ref.	-	-	
15–18		9.1(3.31–22.11)	**< 0.001**	5.9(1.70–22.9)	**< 0.001**
Marital status					
Single		Ref.			
Married		1.72(0.14–6.23)	**< 0.001**	1.20(0.18–5.89)	**< 0.001**
Devorced/Separated		0.23(0.16–0.26)	**< 0.001**	0.14(0.15–0.28)	**< 0.001**
School status currently					
In school		Ref	-	-	-
Not in school		14.6 (8.1–26.3)		5.0 (2.3–10.90)	**< 0.001**
Education level					
Primary		0.172(0.33–0.90)	**0.038**	0.299(0.55–1.62)	0.162
Secondary		0.39(0.07–0.204)	0.265	0.52(0.97–2.79)	0.445
Vocational colleges		Ref.		-	-
Religion					
Christians		Ref.	-	-	-
Other religions		1.71(1.02–2.86)	**0.04**	1.96(1.00-3.84)	**0.049**
Household head					
Mother		0.42(0.15–1.12)	0.990	0.44(0.15–1.35)	0.153
Father		0.26(0.08–0.84)	**0.025**	0.33(0.10–1.15)	0.081
Spouse		1.77(0.41–7.75)	0.448	1.63(0.34–7.65)	0.539
Others		0.464(0.14–1.57)	0.532	0.40(0.11–1.42)	0.156
Self				-	-
Camp section					
Kakuma 1		0.23(0.13–0.42)	< **0.001**	0.31(0.16–0.58)	**< 0.001**
Kakuma 2		1.09(0.54–2.19)	0.817	1.27(0.61–2.65)	0.521
Kakuma 3		0.10(0.05–0.20)	**< 0.001**	0.11(0.05–0.24)	**< 0.001**
Kakuma 4		Ref-	-	-	-
Values in bold are statistically significant					

Discussion

This study reveals high prevalence of pregnancy (28.7%) among adolescents in Kakuma refugee camp. This is higher than the national prevalence of 15.3% for girls aged 15–19 years according to the most recent official Kenya Demographic and Health Survey (18). We attribute this finding to vulnerability of adolescent girls to sexual reproductive health challenges within the

camp. Prevalence of adolescent pregnancy in a refugee camp has been shown to vary considerably from 21% to 41.2% depending on regions (19). This finding is consistent with findings from Benin (30.2%) (20), eastern Ethiopia (30%) (21) and in Kule refugee camp, Gambella Ethiopia (34.6%) (2). This finding further corroborates findings of studies done to evaluate modern contraceptive use among female refugee adolescents in northern Uganda (22). This reported resemblance could be due to similar socio-demographic and socio-economic characteristics in refugee settings as well as similarity in the heightened vulnerability of adolescent girls to sexual reproductive health challenges in refugee situations. This elevates their susceptibility to engage in unprotected sexual activity and subsequent pregnancies would therefore occur (22). A study conducted in norther Uganda for instance, revealed that more that 25% of teenage girls in the camp were sexually active (23). On the other hand, the current prevalence from this study is lower than that of studies done in Malawi (76%) (24), Chad (76.5%) (25), Cameroon (60.75%) (26) and some parts of Ethiopia (27). This discrepancy could be due to difference in sample size, study design, age of the study participants duration of the study. For instance, A study by Ahinkorah etal. (25) was a multicenter study in Sub-Saharan Africa done from 2010 to2018 whweres studies by Kaphagwani etal. (24) and Donatus et al. (26) were clinic- based study in which pregnant adolescents were easily accessed clinic-based study in which pregnant were easily accessed at antenatal clinc. The prevalence of adolescent pregnancy has been on the rise and has become a global concern (28). In the year 2022, it was it was globally estimated that 13% of adolescents and young women gave birth before the age of 18 years (29). Camp sections 2 and 4 had the highest prevalence of adolescent pregnancy. Most previous studies have not fully explored differences in prevalence within the camp sections. In the current study, this can be attributed to differences in socio-demographic and socio-economic characteristics of female adolescent within the camp sections as the study further demonstrated that camp sections the highest prevalence of adolescent pregnancy were from South Sudan as a place of origin (30). This finding has further been reinforced in this study by the results on results on adolescent pregnancy based on country of origin with South Sudan leading with 41.9%. On the other hand, factors associated with location within a camp, like access to healthcare, education and safety could be the determining factors (30). Various camp sections can have varying resources and different standards of service delivery which would create discrepancies in access to information, contraceptives, and safety that impact adolescent risk to pregnancy. Place of birth or a girls geographical location has been shown to be a strong indicator as it is mostly linked to cultural practices (31). Place of birth may also be associated with socioeconomic status, access to education and healthcare which may still influence the rate adolescent (31). For instance, a study in a regional hospital in Uganda evaluating prevalence and associated factors of teenage pregnancy demonstrated that teenagers from rural settings had a higher prevalence of teenage pregnancy which was attributed to limited access to services (31). In Kenya, specifically in Samburu County, the prevalence of adolescent pregnancy is at 50% which is higher than other counties in Kenya (18) showing that region may influence the prevalence of unwanted pregnancy.

The study revealed difference in age between pregnant and non-pregnant adolescents. Furthermore, adolescents of 15–18 years were more likely to became pregnant relative to those in age bracket of 12–14 years. This is in agreement with studies by Okello et al. in Uganda (19), Ivanova et al. in Uganda (32) and Adhena and Fire in Ethiopia (2) in refugee camps as well as a community based study in Uganda by Akol et al (33). This could be due to the fact that older adolescents are more likely to indulge in sexual relationships and risky sexual behaviors that led pregnancy. Nevertheless, younger adolescents might still be hesitant to indulge in risky sexual behaviors even if they are sexually active (34). This suggests that adolescents practice unsafe sex hence they are not protected from becoming pregnant hence there in need to create awareness relating safer sex practices amongst adolescents.

This study further showed that married adolescents were more likely to get pregnant. On the other hand, divorced/ separated adolescents were less likely to get pregnant. This finding is similar to that of a study conducted Kule refugee settlement camp in Ethiopia (2). This finding could be attributable to the cultural and societal norms expectations whereby married adolescents are expected to give birth to children. Besides, societal pressure together with psychological problems of pregnant girls may force them to marry to marry the father of the child (35). Furthermore, this is plausible by the fact that married adolescents are prone to frequent sexual activities with their sexual partners which enhance their chances of getting pregnant. divorced/ separated adolescents have reduced encounter in sexual activity relative to their married counterparts hence reduce their chances of becoming pregnant. It has also been reported that many married adolescent girls cannot access current FP services because their husbands or family do not approve due to traditional beliefs (36). This study showed that adolescents

who are not in school are more likely to become pregnant compared to those in school. This finding is in agreement with those of previous studies that showed that having children in school lowers the risk of unwanted pregnancy (19, 37, 38).

Adolescents belonging to other religions were less likely to get pregnant relative to their Christianity counterparts. Research shows that the association between adolescent pregnancy and religion in refugee camps is multifaceted and frequently indirect (39). It intertwines with environmental camp challenges and pre-existing cultural norms to influence adolescent sexuality, access to reproductive health services and access to reproductive services hence it does not operate in isolation (39). Therefore, the current finding in this study is attributable to cultural norms associated with other religions. However, Limited studies have focused on religion and pregnancy among adolescents

Adolescents from households headed by the father were less likely get pregnant. This is explainable by additional morals pertaining sexuality learnt from their fathers besides their mothers' teachings. It has been shown that having both parents involved in adolescent's life can deliver moral benefits by teaching them healthy relationship skills, various perspectives, and a strong sense of security (40). Shared parenting fosters emotional maturity, a strong self-esteem, and the ability to form healthy bonds with others in adulthood. The active presence of two involved parents also offers adolescents a comprehensive support system and a stable environment to navigate life's challenges (40). Camp section within a refugee camp may indirectly be associated with adolescent pregnancy. This could be attributed to a number of factors such as place of birth of the adolescents in a particular camp section, discrepancy in access to reproductive health services among different camp section among other factors.

Conclusions

There is high prevalence of unwanted pregnancy among adolescents in Kakuma refugee camp with higher proportion of pregnant women from South Sudan origin. Age, marital status, status of being in school, religion and camp section in a refugee camp are socio-demographic factors associated with unwanted pregnancies in Kakuma refugee camp.

Recommendations

Adolescent girls in refugee camps should be taught about their vulnerability to unwanted pregnancies and they should be adequately educated on sexual reproductive health services within each and every camp section. Adolescents' girls in refugee camps should be encouraged to be in school through girl child education and early marriages should be discouraged withing refugee camps to mitigate adolescent pregnancies.

Abbreviations

ANC; Antenatal Care, APHRC: Africa Population Health Research Centre, CDC; Center for Disease Control, DALYs; Disability-Adjusted Life years, DRA; Department for Refugee Affairs

FP; Family Planning, HDSS; Health and Demographic Surveillance, IRC; International Rescue Committee, LBW; Low Birth Weight, LMIC; Low- and Middle-Income Countries, LWF; Lutheran World Federation, MDGs; Millennium Development Goals, MMR; Maternal Mortality Ratio, MUERC; Maseno University Ethics and Research Committee, NCAPD: National Coordinating Agency for Population and Development. UNHCR; United Nations High Commissioner for Refugees, UNICEF; United Nations International Children's Fund, UN; United Nations, WHO; World Health Organization

Declarations

Data Availability Statement

The datasets generated and analyzed during the current study are not publicly available because they contain sensitive information collected from adolescent refugee girls on pregnancy intention and reproductive health. Given the vulnerability of

the study population and the Kakuma refugee setting, open access to individual level data could compromise participant privacy and confidentiality, including through deductive identification.

De-identified data supporting the findings of this study may be made available from the corresponding author upon reasonable request, subject to approval by the relevant ethics review committee, institutional data sharing requirements, and any applicable permissions from the refugee camp/implementing authorities. Data access will be limited to the minimum anonymized dataset required to verify the results reported in this article and will be governed by appropriate data-use and confidentiality agreements.

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Authors' contributions

Benson Simba, Louisa Ndunyu and Lilian Ogonda conceptualized the study and participated in all the areas. BS, LO and LN oversaw the study process. BS developed the manuscript. All the authors reviewed the final manuscript and approved it for submission.

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Availability of data and materials

The data are available upon reasonable request from the corresponding author.

Ethics approval and consent to participate

Ethical approval was obtained from Maseno University Scientific Ethical Review Committee (MUSERC, approval number MSU/DRPI/MUSERC/00809/19). Permission to conduct research granted by the National Commission for Science, Technology and Innovation (NACOSTI, approval number NACOSTI/P/25/416850). All study participants provided a written informed consent where applicable to participate in this study.

Consent for publication

Not applicable.

Competing interests

The authors have declared that no competing interests exist.

Clinical trial Number

Not applicable.

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