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**High burden of teenage pregnancy and low modern contraceptive methods uptake in refugee settlements of Northern Uganda in the post COVID-19 era Between 2020 and 2023**

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**High burden of teenage pregnancy and low modern contraceptive methods uptake in refugee settlements of Northern Uganda in the post COVID-19 era Between 2020 and 2023**

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**Keywords:** Teenage pregnancy., Modern contraceptives., Refugee Settlements., Adolescent Pregnancy,. Uganda.

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**Abstract**

**Background:** Following the COVID-19 pandemic, there was an increase in teenage pregnancies nationally, however, limited data exists regarding the same among girls living in refugee settlements.

**Objectives:** We evaluated the prevalence of teenage pregnancy and associated factors in Palorinya and Bidi Bidi refugee settlements in Obongi and Yumbe districts of Northern Uganda, in the post COVID-19 era.

**Design:** We conducted a cross sectional descriptive study.

**Setting:** Refugee settlements in northern Uganda.

**Participants:** We included 385 teenage girls aged 15 to 19 years

**Methods:** We used cluster sampling techniques between March and May, 2023. Prevalence of teenage pregnancy was assessed by self-reported pregnancies between January 2020 to May 2023 among participants. We performed modified Poisson regression analysis on variables with  $P < 0.2$  to assess associations. Level of significance was set at  $P < 0.05$ .

**Primary and Secondary Outcome Measures:** The primary outcome measure was the prevalence of teenage pregnancy, assessed through self-reported pregnancies among participants. Secondary outcome measures included factors associated with teenage pregnancy, such as living with a husband, lack of formal education, peer pressure, and history of sexual abuse. These factors were identified through modified Poisson regression analysis.

**Results:** Overall, the mean age of 17 (IQR: 15-18), sexual debut at 16 (IQR: 15-17) years. Lifetime modern contraceptive use was 13.8% (n= 53/385) and current use was 7.5% (n=29/385). Teenage pregnancy period prevalence was 34.0% (CI: 29.4% to 38.9%). Factors independently associated with teenage pregnancy were; living with a husband (aPR: 3.8, 95% CI: 2.51 to 5.84, P <0.001), lack of formal education (aPR: 2.3, 95% CI: 1.26 to 4.35, P = 0.007), peer pressure (aPR: 2.1, 95% CI: 1.54 to 2.86, P <0.001) and history of sexual abuse (aPR: 1.5, 95% CI: 1.07 to 1.99, P = 0.018).

**Conclusion:** Teenage pregnancy in Ugandan refugee settlements surpasses global and national rates, highlighting unmet contraceptive needs. Improving access to modern contraceptives, education, and targeted interventions against child marriage and abuse is essential.

## Article Summary

### Strengths and limitations of the Study

- The study's inclusion of only two refugee settlements may limit generalizability to all refugee settlements in Uganda, affecting external validity.
- Randomly selecting settlements and using a substantial sample size within each strengthens the statistical reliability of our conclusions.
- Conducting a cross-sectional analysis without pre-pandemic data prevents establishing causal relationships between variables.
- Future research could adopt longitudinal approaches to track changes over time and incorporate historical data for a comprehensive assessment of causal associations.

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**Background**

Teenage pregnancy is defined as a pregnancy in girls 13–19 years of age [1]. Teenage pregnancies can have negative consequences for the mother’s health such as unsafe abortion attempts leading to mortality, as well as economic and social outcomes, exacerbated by stigmatization, school dropout and isolation from family [2]. Complications from teenage pregnancy and childbirth are the leading cause of death of girls aged 15 to 19 years worldwide [3].

The incidence of teenage pregnancy is increasing and has become of a worldwide concern. It is estimated that about 16 million girls 15–19 years old give birth each year, contributing nearly 11% of all births worldwide [1]. Globally in 2022, an estimated 13 per cent of adolescent girls and young women give birth before age 18 [4]. In South Asia, one in ten (11%) teenage girls give birth before the age of 19 [5].

In Africa, more than 20% of women aged 15 to 19 have given birth to at least one child [1]. Sub-Saharan Africa is home to more than one million teenage girls with pregnancy [5]. Sub-Saharan Africa additionally experiences some of the highest rates of gender inequality in the world, resulting in unequal access to education and high rates of violence against girls, early pregnancy, and child marriage [6]. It is estimated that 608,000 girls are thought to be at risk of child marriage, and 542,000 additional girls at risk of early pregnancy [7].

The regional teenage birth rate in SSA is more than double the global average, with 101 births per 1,000 girls aged 15 to 19 – ranging from 39 births per 1,000 girls aged 15 to 19 in Rwanda to 184 births per 1,000 girls aged 15 to 19 in Nigeria [4]. Child marriage is

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81 widespread in West and Central Africa, where 42% of women are married as children, and in  
82 East and Southern Africa, where child marriage affects 37% of girls [8].

83 Despite Uganda's commitment to ending child, early and forced marriages and teenage  
84 pregnancy by year 2030 through co-sponsoring the 2013 and 2014 UN General Assembly  
85 and 2013 Human Rights Council resolutions on early and forced marriages [9], one in four  
86 (24%) teenage girls in Uganda report having given birth for the first time by the age of 18  
87 [10]. According to UNICEF (2021) estimates, a total of 354,736 teenage pregnancies were  
88 registered in 2020, and 196,499 in the first six months of 2021 amidst the COVID-19  
89 pandemic [11].

90 The COVID-19 pandemic wreaked unprecedented havoc on children, families, and  
91 communities around the globe, disrupting vital services like girl child education, and putting  
92 millions of lives at risk. The United Nations estimated that nearly 11 million primary and  
93 secondary school learners worldwide – 5.2 million of whom are girls – did not return to  
94 education following school closures amidst COVID-19 due to teenage pregnancy and related  
95 outcomes [12].

96 For the most vulnerable children, especially girls living in refugee settlements, accessing  
97 education and staying in school is hard enough. The pandemic caused additional,  
98 unanticipated disruption, compounding their vulnerability to teenage pregnancies by many  
99 folds [7]. Moreover, teenage girls living in refugee settlements face challenges accessing  
100 sexual and reproductive health services, including sex education and modern contraceptive  
101 methods [13]. Data on teenage pregnancies and associated factors among the teenage girls in  
102 refugee settlements is deficient. Additionally, statistics on modern contraceptive methods



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uptake among this population is unknown. We therefore aimed to estimate the prevalence and associated factors of teenage pregnancies in the post covid-19 era in Palorinya and Bidi Bidi refugee settlements of west Nile region, Northern Uganda.

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**Methods**

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**Study Design and Rationale**

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We conducted a community-based, cross-sectional, observational study, adopting quantitative techniques between March and May, 2023. We followed the Strengthening The Reporting of Observational Studies in Epidemiology (STROBE) guidelines to design this manuscript in order to ensure attention to detail [14].

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**Study Setting and Rationale**

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We conducted this study in Palorinya and Bidi Bidi refugee settlements of west Nile region, Northern Uganda. According to data from the Office of the Prime Minister (OPM) and United Nations Higher Commissioner for Refugees (UNHCR), Uganda is now home to 1,622,738 refugees living in 13 refugee settlements across the country, and almost half (6) of these are in the west Nile region [15]. This setting was chosen because it hosts the biggest number of refugee settlements, proposed to provide a big pool of potential respondents for sampling.

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**Study Population, Inclusion and Exclusion criteria.**

Our study targeted teenage girls living in the refugee settlements of Northern Uganda. We included only respondents between 15 to 19 years old, who provided written informed consent or had ascent obtained, and were living in the refugee settlements before the beginning of COVID-19. Those who did not provide informed consent or ascent were not included.

### **Sample size determination.**

We used the Kish and Lisle (1965) formula for calculation of sample size for an unknown population. At 95% confidence interval, we used an error of 5%, alpha risk expressed in z score of 1.96 and a conservative assumption of a 50% population proportion was made to ensure robustness. We obtained a sample size of 385. These choices were guided by standard practices, aiming to balance precision and practicability.

### **Sampling method.**

We used cluster sampling to randomly select Bidi Bidi and Palorinya refugee settlements that participated in the study. The refugee settlements in west Nile region, northern Uganda were listed down on small pieces of paper, with each settlement representing one cluster. Two pieces of paper were randomly picked (two clusters), from which the study was conducted. We used convenience sampling in each of the clusters to select study participants.

### **Research Instruments**

We developed a semi structured questionnaire including both open and closed ended questions. The data collection tool was developed in English and translated into three languages: *Acholi, Kuku, and Arabic*. We pretested the tool among respondents of similar

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characteristics outside the study area, after which we refined and fine-tuned the tool for reliability and validity. The tool was then exported into Kobotoolbox installed in mobile phone devices which was used for data collection. We asked about demographics, house hold characteristics, pregnancy history between January 2020 and May 2023 and intentions, marriage status, modern contraceptive use between January 2020 and May 2023, sex education, sexual and physical abuse among others.

**Data Collection Procedures**

We recruited research assistants, who were given a one-day training for acquaintance with the tool and were taken through research ethics and good clinical practice. The research assistants carried out the collection of data. They explained the purpose of the study to each of the respondents identified, and obtained informed consent, followed by administration of the questionnaire using an electronic form stored in Kobotoolbox mobile application, which is a free open-source tool for mobile data collection.

**Data management.**

The phone devices that were used to collect the data were fully charged at every moment the research team set off to collect data, and the data captured in the phone was regularly saved to avoid loss of data. We safely kept the devices under key and lock before and after data collection, and limited access. We exported the data into STATA version 15, where analysis was done from.

**Data analysis.**

Prevalence of teenage pregnancy was assessed by self-reported pregnancies from January 2020 to May 2023. We performed Pearson's chi square and Fisher's exact tests at bivariate analysis. Level of significance was set at  $P < 0.05$ . We then performed modified Poisson regression analysis on variables with  $P < 0.2$  to assess associations. Level of significance was set at  $P < 0.05$ . We considered variables with  $P < 0.2$  since their power of association is  $> \text{or} = 80\%$ .

The data was then computed in form of percentages and frequencies and finally presented on figures (pie chart, bar graph) and tables.

## Results

### Participant Characteristics

Table 1 summarizes the general characteristics of 385 teenage girls living in refugee settlements of west Nile region, northern Uganda. The mean age was 17 (IQR: 15 to 18), years, and 99.5% were Christians, 316 (82.1%) had attained primary education as the highest level, 85.6% were not working, median monthly income was 0 (IQR: 0 to 1,000), Uganda shillings, 56.1% did not live with both parents, 54.8% of household heads were female, and 22.1% of house hold leads were husband /spouse.

Overall, 178 (46.2%) were sexually active, and mean age of sex debut was 15.8 (SD: 1.44), years, sexual abuse was reported by 5.2% of respondents, of whom 75% were sexually abused by strangers, meanwhile physical abuse was reported by 21.6% of respondents, 37.1%

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183 of teenage girls experienced peer pressure and alcohol consumption was reported by 8.8% of  
184 respondents.

185 Figure 2 summarizes modern contraceptive methods used by teenage girls living in refugee  
186 settlements of west Nile region, northern Uganda. Some of the teenage girls; 13.8% had ever  
187 used modern contraceptives in their lifetime, meanwhile only 7.5% were currently using  
188 modern contraceptives, of whom only 13.2% reported to have ever used long term  
189 contraceptive methods, and 30.2% reported to have ever used multiple methods (including  
190 long term and short-term methods). Overall, 17.9% received contraceptive use counselling  
191 from home, and 36.1% received home sex education, meanwhile 55.1% had received sex  
192 education from school, 40.5% had received contraceptives use counselling from school, and  
193 64.7% had ever been health educated on the dangers of teenage pregnancy.

194 Some respondents, 5.7% had the intention of getting pregnant in the next 12 months, whereas  
195 52.0% had friends who are pregnant,24.9% were married, of whom 38.5% were forced /  
196 arranged. Up to 9.8% of the respondents had ever had an abortion, and 22.0% had had a  
197 caesarean section.

198  
199 **Fig 1: Prevalence of teenage pregnancy among 385 girls aged 15 to 19 living in**  
200 **Palorinya and Bidi Bidi refugee settlements of west Nile region, Northern Uganda.**

**Fig 2: The different contraceptive methods used by teenage girls living in Palorinya and Bidi Bidi refugee settlements of west Nile region, Northern Uganda (N=385; n=53)**

**Table 1: Individual characteristics of 385 teenage girls living in Palorinya and Bidi Bidi refugee settlements of west Nile region, northern Uganda**

Variable	Frequency	Percentage
Age, median (Interquartile range), years	17	15-18
<b>Occupation</b>		
Working	56	14.6
Not working	329	85.6
Average monthly income, median (Interquartile range), Ugx	0	0 – 1,000
<b>Education</b>		
No formal education	5	1.3
Primary	316	82.1
Secondary and beyond	64	16.6
<b>Media Exposure</b>		
Listens to Radio	60	15.6
Owens a mobile phone	71	18.4
Reads newspaper	11	2.9
Watch Television	3	0.8
Uses more than one Medium	65	16.9
None of the above	175	45.6
<b>Relationship to household head</b>		

Parent	251	65.2
Relative	49	12.7
Husband/Spouse	85	22.1
<b>Intention to get pregnant in 12 months</b>		
Yes	22	5.7
No	363	94.3
<b>Have friends who are pregnant</b>		
Yes	200	52.0
No	185	48.0
<b>Ever gotten pregnant</b>		
Yes	131	34.0
No	254	66.0
<b>Number of pregnancies, median (min, max), times</b>	1	1, 3
<b>Pregnancy Outcome</b>		
Live births	110	90.2
Abortions	7	5.7
Both	5	4.1
<b>Peer pressure</b>		
Yes	143	37.1
No	242	62.9
<b>Married</b>		
Yes	96	24.9
No	289	75.1
<b>Mode of Marriage</b>		
Arranged / Forced	37	38.5
Willingly	59	61.5
<b>History of Contraceptive Use</b>		
Yes	53	13.8
No	332	86.2
<b>Current contraceptive use</b>		
Yes	29	7.5
No	356	93.5
<b>Living with both Parents</b>		
Yes	169	43.9
No	216	56.1
<b>Home sex education</b>		
Yes	139	36.1
No	246	63.9
<b>Home contraceptive use counselling</b>		
Yes	69	17.9
No	316	82.1
<b>Received school sex education</b>		

Yes	212	55.1
No	173	44.9
<b>School contraceptive use counselling</b>		
Yes	156	40.5
No	229	59.5
<b>Health education on dangers of teenage pregnancy</b>		
Yes	249	64.7
No	136	35.3
<b>Sexual abuse</b>		
Yes	20	5.2
No	365	94.8
<b>Perpetrator (n=20)</b>		
Relative	5	25.0
Stranger	15	75.0
<b>Physical abuse</b>		
Yes	83	21.6
No	302	78.4
<b>Alcohol Consumption</b>		
Yes	34	8.8
No	351	91.2

## **Period prevalence of teenage pregnancy among 385 teenage girls living in Palorinya and Bidi Bidi refugee settlements of west Nile region, northern Uganda**

Figure 1 shows the prevalence of teenage pregnancy among 385 teenage girls living in refugee settlements of west Nile region, northern Uganda. We found out that up to 34.0% of respondents reported to have ever gotten pregnant between 2020 to 2023 (CI: 29.4% to 38.9%), the median number of pregnancies was 1, with a minimum of 1 and maximum of 3.

## **Predictors of teenage pregnancy among 385 teenage girls living in Palorinya and Bidi Bidi refugee settlements of west Nile region, northern Uganda**



Table 2 summarizes the factors associated with teenage pregnancy among 385 teenage girls living in refugee settlements of west Nile region, northern Uganda. At bivariate level, factors such as; lack of formal education (PR: 3.1, 95% CI: 2.64-3.64,  $p<0.001$ ), male house hold head (PR: 2.3, 95% CI: 1.72 – 3.13,  $p<0.001$ ), living with a husband / spouse (PR: 5.4, 95% CI: 4.11-7.17,  $P<0.001$ ), intention to get pregnant (PR: 1.1, 95% CI: 1.03 – 1.15,  $p= 0.003$ ), peer pressure (PR: 3.7, 95% CI: 2.73-5.05,  $P<0.001$ ), being married (PR: 6.6, 95% CI: 4.95 – 8.82,  $P<0.001$ ), history of contraceptive use (PR: 3.2, 95% CI: 2.55 – 3.94,  $P<0.001$ ), lack of home sex education (PR: 1.6, 95%CI: 1.16 – 2.24,  $P = 0.005$ ), health education on dangers of teenage pregnancy (PR: 1.8, 95% CI: 1.25 – 2.49,  $P = 0.001$ ), sexual abuse (PR: 2.7, 95% CI: 2.14 – 3.46,  $P<0.001$ ), physical abuse (PR: 2.3, 95% CI: 1.80 – 2.99,  $P<0.001$ ) and alcohol consumption (PR: 2.3, 95% CI: 1.77 – 3.03,  $P<0.001$ ), were positively associated to teenage pregnancy.

We then performed modified Poisson regression on all variables that had a P value  $< 0.2$ , while controlling for occupation, media exposure and living with both parents. Teenage girls with no formal education were 2.3 times more likely to be pregnant (aPR: 2.3, 95% CI: 1.26-4.35,  $P = 0.007$ ) as compared with those who had formal education; those who were living with a husband / spouse were 3.8 times more likely to be pregnant (aPR: 3.8, 95% CI: 2.51-5.84,  $P<0.001$ ) as compared with those who lived with their parents; teenage girls who experienced peer pressure were 2.1 times more likely to be pregnant (aPR: 2.1, 95% CI: 1.54-2.86,  $P<0.001$ ) as compared to those who didn't; those who had a history of contraceptive use were 1.8 times more likely to be pregnant (aPR: 1.8, 95% CI: 1.31-2.33,  $P<0.001$ ) as compared to those who did not have; and teenage girls who experienced sexual abuse were

245 1.5 times more likely to be pregnant (aPR: 1.5, 95% CI: 1.07-1.99, P = 0.018) as compared to  
 246 those who didn't.

247

248 **Table 2: Factors independently associated with teenage pregnancy among 385 teenage**  
 249 **girls living in Palorinya and Bidi Bidi refugee settlements of west Nile region, Northern**  
 250 **Uganda**

Variable	All (N=385) Freq (%)	Teenage Pregnancy		Crude PR (95% CI)	P value	Adjusted PR (95% CI)	P value
		Yes (n=131) Freq (%)	No (n=254) Freq (%)				
Occupation							
Working	56 (14.6)	29 (22.1)	27 (10.6)	1.7(1.24 – 2.56)	0.001	1.1(0.86-	0.346
Not working	329 (85.6)	102 (77.86)	227 (89.4)	Reference		1.54) Reference	
Education							
No education	5 (1.3)	5 (3.8)	0 (0.0)	3.1(2.64-3.64)	<0.001	2.3(1.26-	0.007
Primary	316 (82.1)	102 (77.9)	214 (84.3)	Reference		4.35)	
Secondary and beyond	64 (16.6)	24 (18.3)	40 (15.8)	1.2(9.81-1.66)	0.407	Reference 1.1(0.84- 1.51)	0.439
Media Exposure							
Listens to Radio	60 (15.6)	5 (3.8)	55 (21.6)	1 (1.00 – 1.00)	1.000	N/A	0.052
Owns a mobile phone	71 (18.4)	50 (38.2)	21 (8.3)	0.9 (0.80 – 0.98)	0.015	0.9 (0.80 – 1.00)	
Reads newspaper	11 (2.9)	1 (0.8)	10 (3.9)	1 (1.00 – 1.00)	1.000		
Watch Television	3 (0.8)	1 (0.8)	2 (0.8)	1 (1.00 – 1.00)	1.000		
Uses more than one Medium	65 (16.9)	39 (29.8)	26 (10.2)	0.9 (0.84 – 1.01)	0.085		
None of the above	175 (45.6)	35 (26.7)	140 (55.1)	Reference			
Relationship to household head							
Parent	251 (65.2)	43 (32.8)	208 (81.9)	Reference		Reference	
Relative	49 (12.73)	9 (6.9)	40 (15.8)	1.1(0.56-2.06)	0.834	0.9(0.47-	0.687
Husband/Spouse	85 (22.1)	79 (60.3)	6 (2.4)	5.4(4.11-7.17)	<0.001	1.64) 3.8(2.51-	<0.001

5.84)							
<b>Intention to get pregnant in 12 months</b>							
Yes	22 (5.7)	19 (14.5)	3 (1.2)	1.1 (1.03 – 1.15)	0.003	1.0 (0.97 – 1.1)	0.246
No	363 (94.3)	112 (85.5)	251 (98.8)	Reference		Reference	
<b>Have friends who are pregnant</b>							
Yes	200 (52.0)	116 (88.6)	84 (33.1)	1.1 (0.89 – 1.36)	0.421	N/A	
No	185 (48.0)	15 (11.4)	170 (66.9)	Reference			
<b>Peer pressure</b>							
Yes	143 (37.1)	90 (68.7)	53 (20.9)	3.7 (2.73-5.05)	<0.001	2.1(1.54-2.86)	<0.001
No	242 (62.9)	41(31.3)	201 (79.1)	Reference		Reference	
<b>Married</b>							
Yes	96 (24.9)	90 (68.7)	6 (2.4)	6.6 (4.95 – 8.82)	<0.001	1.1 (0.88 – 1.46)	0.337
No	289 (75.1)	41 (31.3)	248 (97.6)	Reference		Reference	
<b>Mode of Marriage</b>							
Arranged /	37 (38.5)	33 (36.7)	4 (66.7)	Reference		N/A	
Forced	59 (61.5)	57 (63.3)	2 (33.3)	1.0 (0.95 – 1.16)	0.347		
Willingly							
<b>History of Contraceptive Use</b>							
Yes	53 (13.8)	44 (33.6)	9 (3.5)	3.2(2.55 – 3.94)	<0.001	1.8(1.31-2.33)	<0.001
No	332 (86.2)	87 (66.4)	245 (96.5)	Reference		Reference	
<b>Living with both Parents</b>							
Yes	169 (43.9)	65 (49.6)	104 (40.9)	1.3(0.95 – 1.66)	0.104	1.1(0.88-1.40)	0.392
No	216 (56.1)	66 (50.4)	150 (59.1)	Reference		Reference	
<b>Home sex education</b>							
Yes	139 (36.1)	34 (26.0)	105 (41.3)	Reference		Reference	
No	246 (63.9)	97 (74.0)	149 (58.7)	1.6(1.16 – 2.24)	0.005	1.2(0.94-1.63)	0.127
<b>Home contraceptive use counselling</b>							
Yes	69 (17.9)	26 (19.8)	43 (16.9)	1.13(0.81 – 1.60)	0.471	N/A	
No	316 (82.1)	105 (80.2)	211 (83.1)	Reference			
<b>Received school sex education</b>							
Yes	212 (55.1)	67 (52.3)	145 (57.1)	1.0 (0.96 – 1.17)	0.265	N/A	
No	173 (44.9)	61 (47.7)	109 (42.9)	Reference			
<b>School contraceptive use counselling</b>							
Yes	156 (40.5)	56 (43.8)	100 (39.4)	1.0 (0.93 – 1.13)	0.573	N/A	
No	229 (59.5)	75 (56.2)	154 (60.6)	Reference			
<b>Health education on dangers of teenage pregnancy</b>							
Yes	249 (64.7)	100 (76.3)	149 (58.7)	1.8(1.25 – 2.49)	0.001	1.2(0.92-1.66)	0.167
No	136 (35.3)	31 (23.7)	105 (41.3)	Reference		Reference	

**Sexual abuse**

Yes	20 (5.2)	17 (13.0)	3 (1.2)	2.7(2.14 – 3.46)	<0.001	1.5(1.07-1.99)	0.018
No	365 (94.8)	114 (87.0)	251 (98.8)	Reference		Reference	

**Physical abuse**

Yes	83 (21.6)	51 (38.9)	32 (12.6)	2.3(1.80 – 2.99)	<0.001	1.1(0.82-1.36)	0.658
No	302 (78.4)	80 (61.1)	222 (87.4)	Reference		Reference	

**Alcohol Consumption**

Yes	34 (8.8)	24 (18.3)	10 (3.9)	2.3(1.77 – 3.03)	<0.001	0.9(0.64-1.20)	0.414
No	351 (91.2)	107 (81.7)	244 (96.1)	Reference		Reference	

**Discussion**

There is a high prevalence of teenage pregnancies (34.0%) among teenage girls living in refugee settlements of northern Uganda. It is notable that there is a gap in literature on sexual and reproductive health issues in refugee settings in general, and teenage pregnancy statistics in similar settings is not widely studied. The prevalence of teenage pregnancies in the current study surpasses national (24%) and global (11%) averages [1,5]. This could be because our study only considered teenage girls between 15 to 19 years old, meanwhile the other studies considered 13 to 19. Considering the close relationship between sexual abuse and teenage pregnancy, which was similarly observed in Malawi [16], relevant refugee authorities and government stakeholders need to develop strategies aimed at addressing this challenge among teenage girls living in refugee settings, to contribute towards addressing the bigger problem of maternal morbidity and mortality related to teenage pregnancy. There is also need to explore legal opportunities against the perpetrators of sexual abuse among teenage girls in

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267 refugee settings. Our study found out that up to 25% of the perpetrators of sexual abuse  
268 among the teenage girls are relatives. This makes it particularly hard to seek support from  
269 community and cultural leaders, necessitating the involvement of higher authorities. The  
270 ministry of health in conjunction with the office of the prime minister need to put in place  
271 favourable measures to deal with the perpetrators of sexual violence against teenage girls in  
272 the refugee context.

273 Several factors were independently associated to teenage pregnancies in our study.  
274 Importantly, living with a spouse / husband presented four-fold likelihood of teenage  
275 pregnancy compared to those who lived with their parents. Other studies agree to our findings  
276 [17]. Moreover, we also found out that most of the child marriages in the refugee context  
277 were forced (38.5%). Therefore, targeted measures are urgently needed to deal with the  
278 challenge of forced child marriages in the refugee situation. These measures could include,  
279 forming child and adolescent support groups, encouraging girl child education, involving  
280 relevant authorities in protecting the rights of the girl child living in refugee settlements, and  
281 creating awareness among the teenage girls in these settings on the legal opportunities  
282 available to deal with the perpetrators of sexual violence.

283 It is high time the government and civil society organizations come up with targeted  
284 measures to make the refugee settlements safer for the teenage girl. This will not only deal  
285 with the problem of sexual violence, but also the challenges brought about by teenage  
286 pregnancy such as maternal morbidity and mortality. Our study also found out that 9.8% of  
287 the respondents had ever had an abortion. The limitation is that our study did not explore  
288 whether this was induced or spontaneous. Furthermore, we do not know whether this abortion

289 was in the watch of a qualified health service provider. This poses a greater risk of severe  
290 morbidity and mortality among the teenage mothers in these settings.

291 Additionally, teenage girls without a formal education stood at a 2.3 times higher risk of  
292 teenage pregnancy compared to those with at least a primary education. Similarly, another  
293 study conducted in Malawi noted an inequality in teenage pregnancy which worsened to the  
294 disadvantage of the less educated [18]. Strengthening education access and acceptability  
295 among the teenage girls living in refugee settlements will go a long way in reducing the  
296 burden of teenage pregnancy in this vulnerable population. Moreover, keeping the girl child  
297 in school will also have a secondary benefit especially in the fight against HIV.

298 Another important predictor of teenage pregnancy in our study was peer pressure. This is  
299 related with another study carried out in Kibuku district, Uganda, that pointed out that bad  
300 peer groups were an outstanding cause of teenage pregnancy among the respondents [19].

301 Addressing the challenge of peer pressure requires a multi-sectoral collaboration.

302 Thoughtfully, fostering education among the teenage girls could be one way of dealing with  
303 this issue. Relevant stake holders need to come up with inclusive solutions to encourage girl  
304 child education and lower the challenge of peer pressure and consequently teenage  
305 pregnancy.

306 Paradoxically, our study found out that teenage girls who had a history of using modern  
307 contraceptives stood at 1.8 risk of teenage pregnancies as compared to those who did not.  
308 These findings were unlike those observed in Malawi [16], who otherwise found out that  
309 history of contraceptive use was a protective factor. Unfortunately, our study did not  
310 distinguish between the use of long term and short-term contraceptives, in relation to

pregnancy. Furthermore, much as we saw that 13.8% of teenage girls living in refugee settlements reported to have ever used a modern contraceptive method in their lifetime, and considering the relatively low age of sex debut (15.8) years, only 7.5% were currently using modern contraceptives, of whom only 13.2% reported to have ever used long term contraceptive methods. Noting the inconsistencies in the use of modern contraceptives among the study participants makes it possible that these inconsistencies contribute to the high prevalence of teenage pregnancy in this setting. Additionally, the proportion of respondents who had ever used long term methods is relatively low, leaving a wider window for teenage pregnancies in this setting. Strengthening the uptake of long-term contraceptive methods among the refugee teenage girls would go a long way in reducing the prevalence of teenage pregnancy in this setting.

**Conclusions**

Our study found out that about 1 in 3 adolescent girls in refugee settlement of Northern Uganda experienced pregnancy during the COVID-19 pandemic. This burden exceeds the global and national averages, revealing gaps in meeting contraceptive needs. However, only 1 in 13 of the adolescents was currently using modern methods of contraception. Therefore, enhancing accessibility and promoting modern contraceptive methods are crucial. Urgent action is required to address disparities in access to quality education, and implement targeted interventions against child marriages, peer pressure and sexual abuse, to mitigate challenges associated with teenage pregnancy in the refugee context.



## References

1. WHO. (2014). "teenage pregnancy fact sheet," 2014. View at: Google Scholar
2. Neema S, Musisi N and Kibombo R. (2014). teenage sexual and reproductive health in Uganda: a synthesis of research evidence. Occasional report No. 14. 2014.  
<http://www.guttmacher.org/pubs/2004/12/20/or14.pdf?q=uganda>.
3. WHO. (2020). teenage pregnancy. <https://www.who.int/news-room/fact-sheets/detail/teenage-pregnancy>.
4. UNICEF. (2024). *Top 10 Causes of Disability* (pp. 6–11). Source: [Early childbearing and teenage pregnancy rates by country - UNICEF DATA](#)
5. UNICEF (2019). Early childbearing. <https://data.unicef.org/topic/childbearing>
6. UNAIDS. (2022). The 'Education Plus' Initiative (2021-2025) - Empowerment of Adolescent Girls and Young Women in sub-Saharan Africa.  
<https://www.unaids.org/en/topics/education-plus>.
7. Humanities International. (2021). Girls at higher risk of child marriage and teenage pregnancy due to pandemic, Humanists International tells UN. Source: [Girls at higher risk of child marriage and teenage pregnancy due to pandemic, Humanists International tells UN](#)
8. Girls Not Brides. (2014). Ending child marriage in Africa: a brief by Girls Not Brides. *International Journal of Health Sciences and Research*, 12.  
<https://www.girlsnotbrides.org/wp-content/uploads/2015/02/Child-marriage-in-Africa-A-brief-by-Girls-Not-Brides.pdf>



9. UN. (2019). GIRLS NOT BRIDES. 2019. <https://www.girlsnotbrides.org/child-marriage/uganda/>.

10. UBOS (Uganda Bureau of Statistics). (2016). Uganda demographic and health survey 2016. Kampala, UBOS and Calverton: ICF International Inc; 2016. <https://dhsprogram.com/pubs/pdf/FR333/FR333.pdf>.

11. UNFPA Uganda | Addressing teenage pregnancy during the COVID-19 pandemic. (n.d.). <https://uganda.unfpa.org/en/news/addressing-teenage-pregnancy-during-covid-19-pandemic>

12. UNESCO (2020). COVID-19 Education Response: How many students are at risk of not returning to school? Source: <https://unesdoc.unesco.org/ark:/48223/pf0000373992>.

13. Inter-agency working group. (2019). Adolescent sexual and reproductive health needs in emergencies. *Inter-Agency Working Group, 2019*.

14. STROBE – strengthening the reporting of observational studies in epidemiology. Available from: <https://www.strobe-statement.org/>

15. Office of the Prime Minister (OPM) and United Nations Higher Commissioner for Refugees (UNHCR). (2023). *Uganda- Population Dashboard: Overview of Refugees and Asylum-seekers in Uganda. April 2023*, 0–1Parliament Of Uganda.

16. Kaphagawani NC, Kalipeni E. Sociocultural factors contributing to teenage pregnancy in Zomba district, Malawi. *Glob Public Health*. 2017 Jun;12(6):694-710. doi: 10.1080/17441692.2016.1229354. Epub 2016 Sep 30. PMID: 27687242.

17. Gwido V and Fekadu M.A. (2015). Factors contributing to, and effects of, teenage pregnancy in Juba. Juba College of Nursing and Midwifery. Source: [www.southsudanmedicaljournal.com/archive/](http://www.southsudanmedicaljournal.com/archive/)
18. Chirwa GC, Mazalale J, Likupe G, Nkhoma D, Chiwaula L and Chintsanya J (2019) An evolution of Socio-economic related inequality in teenage pregnancy and childbearing in Malawi. PLoS ONE 14(11): e0225374. <https://doi.org/10.1371/journal.pone.0225374>.
19. Manzi F, Ogwang J, Akankwatsa A, Wakoli O.C, Obba F, Yahaya G, et al. (2018). Factors Associated with Teenage Pregnancy and its Effects in Kibuku Town Council, Kibuku District, Eastern Uganda: A Cross Sectional Study. Source: DOI: 10.4172/2167-1079.1000298/

## Declarations

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## Author Statement

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407 Funding acquisition, Supervision, Writing – original draft, Writing – review & editing

408 **Consent for Publication**

409 Not applicable

410 **Conflicts of interest**

411 We declare no conflict of interest in this research work.

412 **Data Availability Statement**

413 All relevant data are within the manuscript and its supporting information files. Data are  
414 available upon reasonable request from the first author.

#### 415 **Ethical Considerations**

416 We obtained an ethical approval and clearance letter from Gulu University Research and  
417 Ethics Committee (GUREC), (approval number: GUREC-2022-291) which was presented to  
418 the district health offices (DHO) of the selected districts, to seek administrative clearance.  
419 We presented the introductory letter from the DHO to the refugee welfare council 2 (RWC2)  
420 of selected refugee settlements to seek entry into the community and commence data  
421 collection. A private and comfortable room was acquired and used during the process of data  
422 collection to ensure privacy and confidentiality. Written informed consent was obtained from  
423 respondents who were 18 or 19 years. For respondents below 18, a written informed ascent  
424 was obtained from a parent / guardian who also consented to allow their daughter participate  
425 in the study, and participation was free and voluntary. Participants were assured of their  
426 freedom to withdraw from the study at any time with no penalty. Confidentiality of the  
427 information collected was observed by using numbers and not names.

428

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431 Training at University of Michigan (CIRHT-UM).

432 **Word count: 3503**

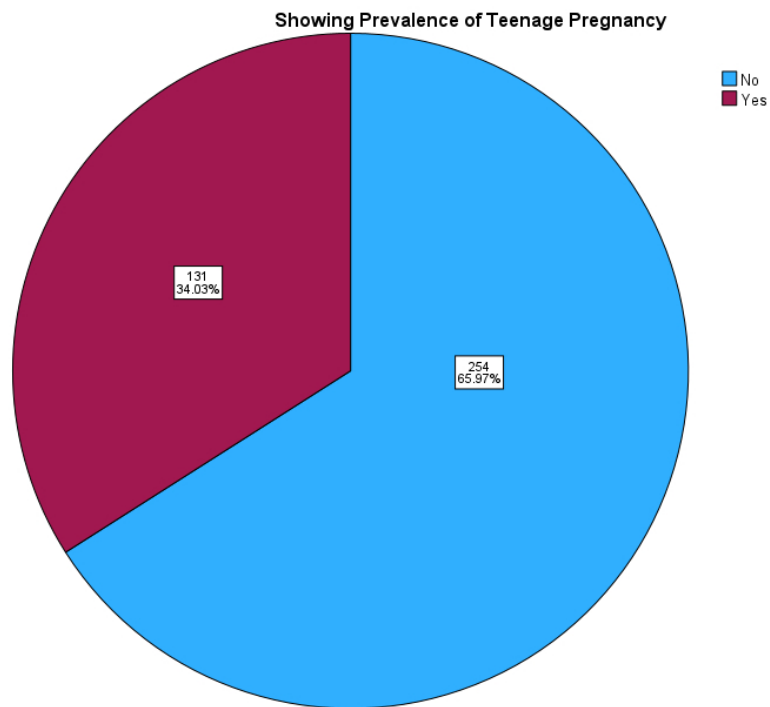


Fig 1: Prevalence of teenage pregnancy among 385 girls aged 15 to 19 living in Palorinya and Bidi Bidi refugee settlements of west Nile region, Northern Uganda.

299x218mm (72 x 72 DPI)

The Different Contraceptive Methods Used by Refugee Teenage Girls in Four Refugee Settlements of Northern Uganda (N=385; n=53)

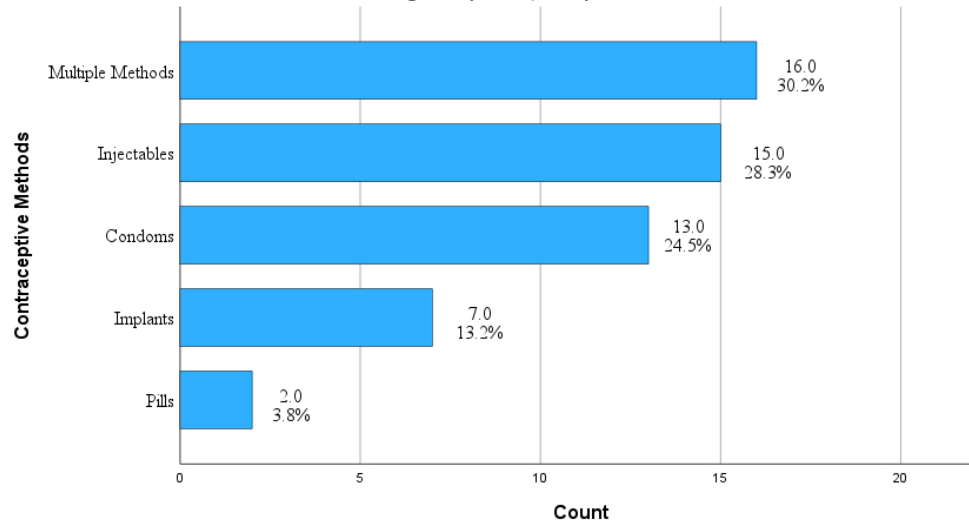


Fig 2: The different contraceptive methods used by teenage girls living in Palorinya and Bidi Bidi refugee settlements of west Nile region, Northern Uganda (N=385; n=53)

299x176mm (72 x 72 DPI)



**Factors Contributing to High Prevalence of Teenage Pregnancies in the Post COVID-19 Era in Refugee Settlements of West Nile Region, North Western Uganda**

**A research proposal submitted to Gulu University Research Ethics Committee (GUREC) for approval to carry out study**

**Investigators (Research Team):**

Name	Title	Role on research team	Affiliation
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Muzaki Ruth Mary	Ms.	Co-Principal Investigator	Gulu University
Lamwaka Beatrice Oweka	Ms.	Co-Principal Investigator	Gulu University

**Version: 3.0, January 30, 2023**



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Declaration

We hereby declare that this is our original research work and has never been submitted for publication.

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Date: October 18, 2022

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Date: October 18, 2022

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Date: October 18, 2022

(Co-Principal Investigator)

Lamwaka Beatrice Oweka

Signature:

Date: October 18, 2022

(Co-Principal Investigator)

## Definition of Key Terms

In order to avoid ambiguity, the following terms were operationally defined:

<b>Maternal mortality:</b>	Refers to deaths due to complications from pregnancy or childbirth.
<b>Miscarriage:</b>	The spontaneous or unplanned expulsion of a foetus from the womb before it is able to survive independently.
<b>Teenage pregnancy:</b>	A teenage girl, usually within the ages of 13-19, becoming pregnant.
<b>Teenager:</b>	A person aged between 13 and 19 years.

## List of Acronyms

**COVID-19:** Corona Virus Disease - 2019



<b>HMIS:</b>	Health Management Information Systems
<b>MoH:</b>	Ministry of Health
<b>SPSS:</b>	Statistical Package for Social Sciences
<b>UBOS:</b>	Uganda Bureau of Statistics
<b>UDHS:</b>	Uganda Demographic and Health Survey
<b>WHO:</b>	World Health Organization

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## Project Abstract

**Background:** Complications from teenage pregnancy and childbirth are the leading cause of death of girls aged 15 to 19 years worldwide.

Globally, prior to the COVID-19 crisis, 258 million children and youth of primary and secondary school age were already failing to access education.

One in four (25%) women aged 20 to 24 in Uganda report having given birth for the first time by the age of 18. West Nile region of Uganda has observed a peak of teenage pregnancies in the post – COVID-19 era.

**Specific Aims:** To find out the socio-economic factors contributing to high prevalence of teenage pregnancy in the post COVID-19 era in refugee settlements in West Nile region, North western Uganda.

To establish the individual factors contributing to high prevalence of teenage pregnancy in the post COVID-19 era in refugee settlements in West Nile region, North western Uganda.

**Research design/Methodology:** A cross-sectional descriptive study design will be used. The study will also adopt quantitative data collection techniques.

**Setting:** The study will be conducted in all the refugee settlements of West Nile region of Uganda.

**Participants:** The study will target all pregnant teenagers in the refugee settlements of West Nile region of Uganda.

**Data collection measures:** The researcher will obtain an introductory letter from Gulu University Research and Ethics Committee (GUREC). The letter will then be presented to the



refugee welfare council 2 (RWC2) of selected refugee settlements, and the purpose of the study will be explained to each of the respondents prior to data collection.

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## Chapter One: Introduction

The proposed study will assess the factors Contributing to high prevalence of teenage pregnancies in the post COVID-19 era in refugee settlements of West Nile region, north western Uganda, and will be presented in three chapters. The first chapter (introduction) will have the background of the study, the problem statement, purpose of the study and specific objectives. It will also cover research questions, significance and justification for the study.

### 1.1 Background of the Study

Teenage pregnancy is defined as a pregnancy in girls 13–19 years of age (WHO, 2014). Teenage pregnancies can have negative consequences for the mother's health as well as economic and social outcomes. Complications from teenage pregnancy and childbirth are the leading cause of death of girls aged 15 to 19 years worldwide (WHO, 2020). Teenagers often face a higher risk of maternal mortality and miscarriage due to limited access to pre- and postnatal care (Irinoye et al., 2014). Teenage mothers are also more likely to drop out of school, leading to poorer economic outcomes and social isolation (Save the Children, 2020). The risks to young mothers of poor maternal/child health, may be exacerbated by stigmatization, isolation from family and unsafe abortion attempts (Neema, Musisi & Kibombo, 2014).

The COVID-19 pandemic has wreaked unprecedented havoc on children, families and communities around the globe, disrupting vital services and putting millions of lives at risk. Since march, attempts to avert the global health crisis have seen nationwide school closures in 194 countries, affecting nearly 1.6 billion learners – over 90 per cent of the world's school-going population (UNESCO, 2020a).

For the most vulnerable children, especially refugee girls, accessing education and staying in school is hard enough. The pandemic has caused additional, unanticipated disruption, and the likelihood of vulnerable children being able to continue their education has dropped. According to Save the Children's Global Girlhood Report, 2020 risks being a year of irreversible setbacks for an entire generation of girls (Save the Children, 2020).

Globally, prior to the COVID-19 crisis, 258 million children and youth of primary and secondary school age were already failing to access education. Teenage pregnancies, among other risk factors, are adding to the



1 number of girls who are not in school. Even before Covid-19, there were 98 million teenage girls in Africa  
2  
3 who were not in school and research suggests the pandemic could add an additional 20 million (GLOW,  
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5 2021).  
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7  
8 On top of that, the United Nations now estimates that nearly 11 million primary and secondary school learners  
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10 worldwide – 5.2 million of whom are girls – are at risk of not returning to education following school closures  
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12 due to COVID-19 due to teenage pregnancy and related outcomes (UNESCO, 2020b). In 2018, the estimated  
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14 global teenage birth rate was 42 births per 1,000 girls aged 15 to 19 (World Bank, 2020).  
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17  
18 The incidence of teenage pregnancy is increasing and has become of a worldwide concern. It is estimated  
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20 that about 16 million girls 15–19 years old give birth each year, contributing nearly 11% of all births  
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22 worldwide (WHO, 2014). Among the developed countries, the United States of America (USA) has  
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24 approximately 850,000 teenagers who become pregnant each year (Realini, 2014). In 2010, the UK had the  
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26 highest rate of teenagers’ pregnancies. About 38,690 girls under the age of 18 became pregnant and 44.8% of  
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28 those pregnancies resulted in legal abortions; 7,617 of those conceptions were under 16 years, and 54.5% of  
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30 conceptions ended in legal abortions (Linda, 2013).  
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35 In Africa, more than 20% of women aged 15 to 19 have given birth to at least one child (WHO, 2014). Sub-  
36  
37 Saharan Africa is home to more out-of-school children than any other region in the world, with nearly 97  
38  
39 million (38%), of these children, teenagers and youth (UNESCO, 2020c). World Vision estimates that as  
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41 many as one million girls across sub-Saharan Africa may be blocked from returning to school due to  
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43 pregnancy during COVID-19 school closures (UNICEF, 2019). Sub-Saharan Africa experiences some of the  
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45 highest rates of gender inequality in the world, resulting in unequal access to education and high rates of  
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47 violence against girls, early pregnancy, and child marriage (UNDP, 2020). It is estimated that 608,000 girls  
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49 are thought to be at risk of child marriage, and 542,000 additional girls at risk of early pregnancy (Save the  
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51 children, 2020).  
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56 The regional teenage birth rate in SSA is more than double the global average, with 101 births per 1,000 girls  
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58 aged 15 to 19 – ranging from 39 births per 1,000 girls aged 15 to 19 in Rwanda to 184 births per 1,000 girls  
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aged 15 to 19 in Nigeria (World Bank, 2020). In countries such as Nigeria, Mauritania and Sudan, more than 15% of the girls have given birth before age 15 (NCCDPH, 2019).

One in four (25%) women aged 20 to 24 in Uganda report having given birth for the first time by the age of 18, compared to one in ten (11%) in South Asia (UNICEF, 2019). The teenage pregnancy rate of 25% in Uganda is worrying, and according to UNICEF (2021) estimates, A total of 354,736 teenage pregnancies were registered in 2020, and 196,499 in the first six months of 2021. The high rates of teenage pregnancy can be attributed to disruption to programs that support access to sexual reproductive health information and services to schoolgirls (Wamajji, 2021).

## 1.2 Problem Statement

Uganda is committed to ending child, early and forced marriages and teenage pregnancy by year 2030 through: co-sponsoring the 2013 and 2014 UN General Assembly and 2013 Human Rights Council resolutions on early and forced marriages (UN, 2019). According to WHO (2013), several interventions must be combined and integrated for effectiveness (WHO/UNFPA, 2013). Uganda also set the age of marriage at 18, and in 2015, the same country launched the African Union Campaign to end child marriage and pregnancy (UN, 2019). Policies, strategies, campaigns and sensitization by the Ministry of Gender, Labor and Social Development in conjunction with organizations under the “Girls Not Brides” partnership and UN agencies all aim at ending early marriages and child bearing (UN, 2019).

However, refugee settlements in the West Nile region of Uganda have observed a peak of teenage pregnancies in the post – COVID-19 era. Trends of first Antenatal Care visits show a spike in teenage pregnancies in the region. Data on contraceptive uptake is deficient, suggesting limited access and unmet needs. Socio-economic and individual-level influences provide an important contribution in this gap, emanating to teenage pregnancies. This study will therefore help to determine the same.

## 1.3 Purpose of the Study

The purpose of the study is to assess the Factors Contributing to High Prevalence of Teenage Pregnancy in the Post COVID-19 Era in Refugee Settlements of West Nile Region, North Western Uganda, with a view of reducing the morbidity and mortality related to teenage pregnancies.

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**1.4 Specific Objectives**

1. To find out the Socio-economic Factors Contributing to High Prevalence of Teenage Pregnancies in the Post COVID-19 Era in Refugee Settlements of West Nile Region, North Western Uganda.
2. To establish the individual-level Factors Contributing to High Prevalence of Teenage Pregnancies in the Post COVID-19 Era in Refugee Settlements of West Nile Region, North Western Uganda.

**1.5 Research Questions**

1. What are the Socio-economic Factors Contributing to High Prevalence of Teenage Pregnancies in the Post COVID-19 Era in Refugee Settlements of West Nile Region, North Western Uganda?
2. What are the individual-level Factors Contributing to High Prevalence of Teenage Pregnancies in the Post COVID-19 Era in Refugee Settlements of West Nile Region, North Western Uganda?

**1.6 Justification for the Study**

World Vision estimates that as many as one million girls across sub-Saharan Africa may be blocked from returning to school due to pregnancy during COVID-19 school closures (UNICEF, 2019). With school closures related to COVID-19 threatening to lead to an increase in teenage pregnancy, Sub-saharan Africa is self-assured for a further crisis in girls’ education unless governments and partners act now.

School closures during crises can lead to increases in teenage pregnancy by as much as 65 per cent, as closures result in girls spending more time with men and boys than they would were they to be in school, leading to greater likelihood of engagement in risky sexual behavior and increased risk of sexual violence and exploitation. This generally endangers the life of the teenage girl and necessitates developing strategies to reduce the high incidence rate.

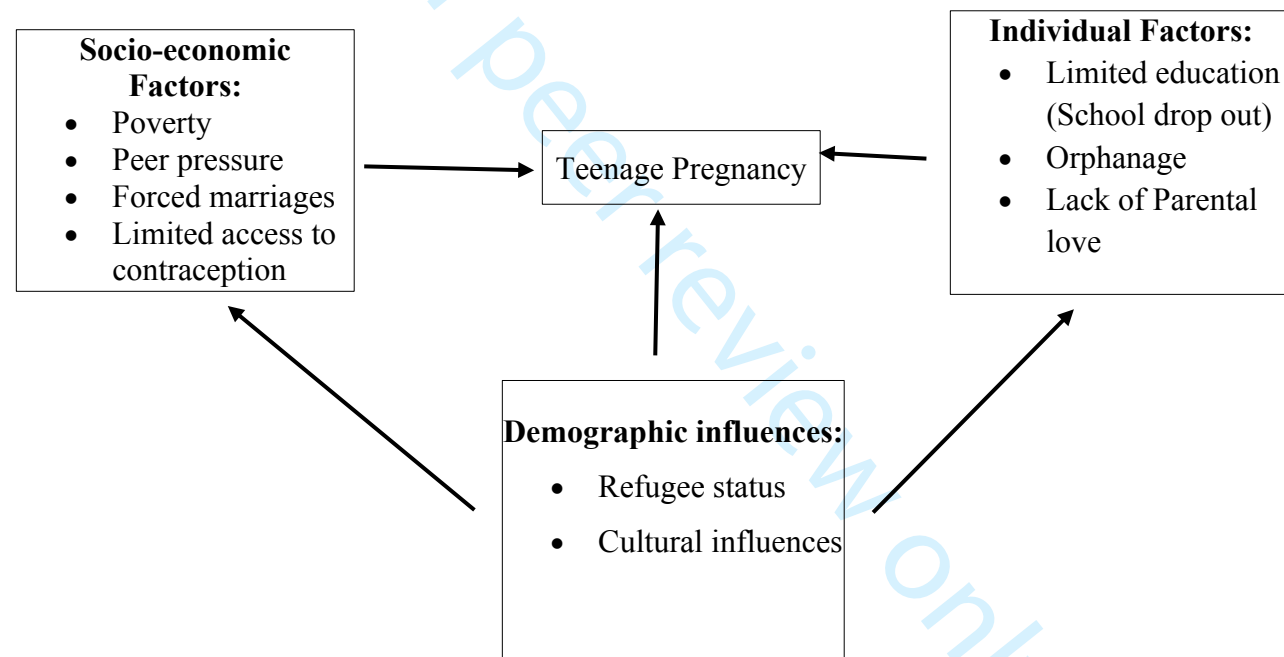
Increasing access and uptake of contraceptive methods are solely adequate to reducing teenage pregnancies.

Unmet family planning / contraceptive use provides a favorable gap for teenage pregnancies in the refugee settlements.

With increases in teenage pregnancies looming and policies and practices that ban pregnant girls and young mothers from school, an estimated one million girls in sub-Saharan Africa may be blocked from returning to school once they reopen after closures due to COVID-19.

A lost education is catastrophic to young mothers, their children, and their communities. If countries across sub-Saharan Africa fail to ensure the continued education of teenage mothers, the region could see its economy suffer from a further US\$10 billion loss in GDP above and beyond the immediate, crippling effects of COVID-19.

### 1.7 Conceptual Framework



The study highlighted two key players to teenage pregnancy. Socio-economic factors like poverty, peer pressure, forced marriages and limited access to contraception were projected to directly influence teenage pregnancy. Individual factors that were proposed to play a determinant role in teenage pregnancy included limited education (school drop out), orphanage, and lack of parental love. These factors force teenage girls to engage in risky sexual behaviors, hence unwanted pregnancies.

1 Demographic influences were postulated to affect teenage pregnancies in a wider perspective. Factors such  
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3 as refugee status and cultural influences were thought to affect teenage pregnancies directly, or indirectly by  
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5 affecting Socio-economic and individual-level factors.  
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8 Socio-economically, refugee status alone impacts greatly on the level of income. Cultural influences have  
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10 been widely seen to affect girl child education, proposing school drop out, as well as forced marriages among  
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12 some communities. All these independently lead to teenage pregnancies.  
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16 An interplay of these factors, coupled with the challenges set by the COVID-19 situation therefore puts a  
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18 huge burden on the refugee teenage girl, fueling school drop out, peer pressure, engagement in risky sexual  
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20 behaviors, and ultimately teenage pregnancy.  
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## Chapter Two: Literature Review

### 2.0 Introduction

This chapter reviews literature available on the same topic, studied by other researchers. Various studies were conducted and have been reviewed in this chapter from Google scholar, pub med, Wikipedia and Hinari, following the chronology of the study objectives.

### 2.1 Socio-economic Factors Contributing to High Prevalence of Teenage Pregnancy in The Face of COVID-19

School closures and higher poverty rates caused by the COVID-19 pandemic are predicted to increase rates of child marriage and teenage pregnancies around the world. One particular vulnerability that is known to be exacerbated by school closures in times of crisis and risks the continued education of vulnerable children is teenage pregnancy. Additionally, poverty has led to some parents to marry off their daughters in order to make money to survive. This was highlighted by a study conducted to understand the factors that contribute to teenage pregnancy during covid-19 in Bugiri municipal council, Bugiri district, Uganda. The study used a cross sectional research design with both qualitative and quantitative research methods. The sample size of the study was 66 and six members who participated in a key informant interview were selected using purposive sampling method. The study findings highlighted that the outbreak of the corona virus pandemic is largely responsible for the dramatic increase in the numbers of teenage pregnancy in Bugiri town. This is coupled with the harsh economic stress, anxiety as well as lack of access to family planning services including idleness (Namukasa, 2021).

Similarly, a study by UBOS (2016) pointed out socio-economic factors contributing to increased teenage pregnancies in Uganda as being high fertility rates, risky sexual behaviors, peer pressure into early sex, child marriages, lack of education, lack of family support, low socio-economic status, low education levels and low use of contraceptives. School closures during crises is independently suggested to result in girls spending more time with men and boys than they would were they to be in school, leading to greater likelihood of engagement in risky sexual behaviour and increased risk of sexual violence and exploitation. In support, Gwido and Fekadu (2015) conducted a study to explore the factors contributing to, and effecting, pregnancy among teenagers in Juba. This descriptive cross-sectional study was conducted in Juba Teaching Hospital



1 among 50 randomly sampled pregnant teenagers in 2015. Socio-economic factors contributing to teenage  
2 pregnancy included: lack of school fees, lack of parental care, communication and supervision, poverty, peer  
3 pressure, non-use of contraceptives, desire for a child, forced marriage, low educational level and need for  
4 dowries (Gwido & Fekadu, 2015).  
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10 Another study that explored sociocultural factors associated with unplanned teenage pregnancy was carried  
11 out in Zomba district of Malawi and the results were closely comparable. Data were obtained from 505  
12 participants under the age of 20 years using a questionnaire administered through face-to-face interviews held  
13 at five antenatal clinics. Over 76% of the teenage respondents in the study had experienced unplanned  
14 pregnancy. Among the prominent factors that stood out in the analysis for this high rate of teenage pregnancy  
15 were early sex and marriage (46%), low contraceptive use (53%), low educational levels (41%), low socio-  
16 economic status (76%), lack of knowledge of reproductive and sexual health (72%), gender inequity (50%),  
17 and physical/sexual violence (33%) (Nanzen & Ezekiel, 2016).  
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29 In Ghana, teenage pregnancy is linked to lack of sexual and reproductive health education and services, child  
30 marriage, health and well-being risks, and increased poverty and insecurity. A cross-sectional survey  
31 involving 820 teenage girls aged 15–19 years was carried out in Accra, Ghana. The main focus of this study  
32 was to examine how social capital, economic capital, cultural capital and symbolic capital contributed to the  
33 development of competencies of teenagers to deal with the threat of teenage pregnancy and childbirth. Out of  
34 820 teenagers interviewed, 128 (16 %) were pregnant or mothers. teenagers in both groups (62 % never  
35 pregnant girls and 68 % pregnant / young mothers) had access to social support, especially from their parents.  
36 Parents were taking the place of aunts and grandmothers in providing sexual education to their teenage girls  
37 due to changing social structures where extended families no longer resided together in most cases. More (79  
38 %) pregnant girls and young mothers compared to never pregnant girls (38 %) had access to economic support  
39 (P = <0.001). This study determined that access to social, economic and cultural capitals were associated with  
40 high competence to either prevent or deal with pregnancy among teenage girls (Collins, Constanze & Brigit,  
41 2015).  
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## 2.2 Individual-level Factors Contributing to High Prevalence of Teenage Pregnancy in The Face of COVID-19

In as much as the COVID-19 situation is hugely blamed for fueling teenage pregnancies in most parts of the globe, a number of individual characteristics make girls particularly vulnerable to the effects of school closure during the pandemic, for which teenage pregnancy is viewed as the most detrimental to the girl child. The contributions of individual factors in aggravating teenage pregnancies during the COVID-19 state of affairs has been demonstrated by several schools of thought. A study that used data from the 2016 Ethiopian Demographic and Health Survey (EDHS) involving a total of 3381 teenagers aged 15– 19 years obtained using a two-stage stratified cluster approach. Multilevel mixed effect logistic regression was used to identify factors affecting teenage pregnancy. Being 17, 18 and 19 years old, uneducated, primary educated, being married were predictors of teenage pregnancy. This study concluded that age, educational status, and marital status formed individual-level factors predicting teenage pregnancy (Bereket et al., 2020).

Correspondingly, in a related literature, Chirwa et al. (2019) conducted another study using the 2014 and 2015–16 series of nationally representative Malawi Demographic Health Survey covering 12,719 women. The teenage pregnancy and childbearing rate averaged 29% ( $p<0.01$ ) between 2014 and 2015–16. Trends showed a “u-shape” in teenage pregnancy and childbearing rates, albeit a small one (34.1%;  $p<0.01$ ) in 2014: (25.6%;  $p<0.01$ ) in 2015, and (29%;  $p<0.01$ ) in 2016. The calculated concentration indices indicated that inequality in teenage pregnancy and childbearing worsened to the disadvantage of the less educated in the country. Additionally, the decomposition exercise suggested that the primary drivers to inequality in teenage pregnancy and child bearing were, early sexual debut (15.5%), being married (50%), and education status (13.8%) (Chirwa et al., 2019).

In Uganda, the contribution of individual factors in teenage pregnancy is not any different. A research was set out to determine the factors associated with teenage pregnancy and its effects in Kibuku Town Council, Kibuku District. The research used a cross sectional study that employed both quantitative and qualitative methods. Researcher administered questionnaires were given to 180 teenagers in three randomly selected secondary schools in Kibuku Town Council while oral interviews were conducted to 40 pregnant teenagers and teenage mothers attending antenatal clinic at Kibuku Health Centre IV. There was a big knowledge gap



1 about reproductive health as 75% of school going teenagers believed the minimum age of conception was  
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3 above 14 years. Bad peer groups were an outstanding cause of teenage pregnancy while school dropout at  
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5 48%, was recorded as its major effects (Manzi et al., 2018).  
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8 In another study, it was noted that women exposed to abuse, domestic violence and family strife in child hood  
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10 were more likely to become pregnant as teenages and the risk of becoming pregnant as an teenage increased  
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12 with the number of adverse child hood experiences (Jacks, 2014). Studies have also found that girls whose  
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14 father left the family early in their lives had the highest rates on early sexual activity and teenage pregnant  
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16 girls whose fathers left at a later age had a lower chance of early sexual activity and the lowest rates are found  
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18 in girls fathers were present through their child hood (Allen, 2013).  
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## Chapter Three: Methodology

### 3.0 Introduction

This chapter deals with the description of the methodology that the researcher will use in data collection. It will involve the description of study, study setting and rationale, study population, sample size determination, sampling procedure, inclusion criteria, definition of variables, research instruments, data collection procedure, data management, ethical considerations, limitations of the study and how results will be disseminated.

### 3.1 Study Design and Rationale

A cross-sectional descriptive study design will be used since data will be collected at one point in time, and that the findings will also be presented as they were observed from the field. The study will also adopt quantitative data collection techniques. This technique will be preferred as findings will be presented in numbers and percentages. These designs will be suitable for the study since they will be cost effective and feasible for the researcher.

### 3.2 Study Setting and Rationale

The study will be conducted in the West Nile region, Northwestern Uganda. According to World Vision (2016), this region is now home to more than 500,000 refugees from South Sudan, living in 48 refugee settlements in 5 districts; Adjumani, Arua, Koboko, Obongi and Yumbe districts. Adjumani and Arua districts both have 17 refugee settlements each, Koboko has 8 while Yumbe has 6. The part of the country hosts the biggest number of refugee settlements, proposed to provide a big pool of potential respondents for sampling.

### 3.3 Study Population

The study will target pregnant refugee teenage girls of the refugee settlements of West Nile region of Uganda.

#### 3.3.1 Sample size determination.

Using Kish and Lisle (1965),

$$n = \frac{Z^2 \times P (1-P)}{d^2}$$

$$d^2$$

At a confidence interval of 95%, a sample size of 385 will be used. This sample size is projected to give accurate and generalizable results.

**3.3.2 Sampling method.**

Multi-stage sampling will be used to randomly select two districts within the West Nile region, where the study will be conducted. The five districts; Adjumani, Arua, Koboko, Obongi and Yumbe will be listed in small pieces of paper, put together, mixed, and two will be randomly picked out.

Cluster sampling will be used to randomly identify refugee settlements within the sampled districts that will participate in the study. The refugee settlements will be listed down on small pieces of paper, with each settlement representing one cluster. Two pieces of paper will be randomly picked, which will represent two clusters from which the study will be conducted.

Snow balling Sampling will be used in particular refugee settlements to recruit potential participants. Respondents will be sampled one after another from the refugee settlement. After identifying one respondent, she will be requested to direct the data collectors to any other potential respondent that she may be knowing since they are peers and are most likely expected to be knowing each other.

**3.3.3 Inclusion criteria.**

- Only respondents between 15 to 19 years old will be included in the study.
- Only those who will consent to study will be included in the study.

**3.3.4 Exclusion criteria.**

- Respondents who will not consent to the study will not be included.

**3.4 Research Instruments**

The researcher will develop a semi structured questionnaire including both open and closed ended questions. The tool will be pretested among respondents of similar characteristics outside the study area. The tool will then be refined and fine-tuned by the Principal Investigator (PI) for reliability and validity. The tool ~~and~~ will then be ~~exported~~ converted into Kobotoolbox which is technological application that will be installed in mobile phone devices and used for data collection. The application is effective in data collection as it minimizes errors during data collection, and enjoy faster turnaround time for data cleaning. This is

technological application that has been used before in similar and bigger studies with great success. Wayan et al (2020) stated that with KoboCollect/toolbox, researchers quickly find out the results of the research. Similarly, Poloku et al (2022) also noted in their study that Kobo toolbox has better advantages compared to different data collection tools.

### 3.5 Data Collection Procedures

The Principal Investigator will obtain an ethical approval and clearance letter from Gulu University Research and Ethics Committee (GUREC). The letter will be presented to the district health offices (DHO) of the selected districts, to seek administrative clearance.

The PI will then proceed to recruit research assistants, who will be given a one day training for acquaintance with the tool, and will be taken through research ethics and good clinical practice.

The PI together with the team of trained data collectors will present the introductory letter from the DHO to the refugee welfare council 2 (RWC2) of selected refugee settlements to seek entry into the community, and commence data collection.

A private and comfortable room will be acquired and used during the process of data collection in order to ensure privacy and confidentiality.

The research assistants (data collectors) will carry out the collection of data. They will explain the purpose of the study to each of the respondents identified, and informed Consent will then be obtained, followed by administration of the questionnaire using an electronic form stored in Kobotoolbox mobile application.

#### 3.5.1 Data management.

The phone devices that will be used to collect the data will be fully charged at every moment the research team set off to collect data, and the data captured in the phone will be regularly saved to avoid loss of data.

The devices will be safely kept under key and lock before and after data collection, and only accessible by the PI. Data captured in the Kobotoolbox application installed in the phone devices will be protected using a password only known by the principal investigator. Data will then be exported into Statistical Package of Social Sciences (SPSS) version 23.0, where they will be analyzed. The data will then be computed in form

1 of percentages and frequencies and finally presented on figures (pie charts, bar graphs and tables) and  
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3 narratives.  
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6 **3.6 Ethical Considerations**  
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8 Ethical approval will be obtained from Gulu University Research Ethics Committee (GUREC).  
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10 Administrative clearance will be sought from the office of the District Health Officer (DHO) of the  
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12 selected districts. Informed consent will be obtained from all respondents and participation will be free and  
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14 voluntary. Participants will be free to withdraw from the study at any time with no penalty. Privacy will be  
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16 observed by interviewing the study participants in a private and comfortable room.  
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18 Access to data will be limited to the study team. Electronic data will be password protected.  
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21 Confidentiality of the information collected will be observed by using numbers and not names. Participants  
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23 shall not be traced back to their study variables.  
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28 **3.7 Anticipated Limitations of the Study**  
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30 Since this study will include only two refugee settlements of West Nile region, findings may not be very  
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32 representative of all the many refugee settlements in Uganda, therefore may have a limitation in external  
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34 validity of the results obtained. However, the strength is the relatively large sample size we shall recruit.  
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37 Secondly, this study is a cross-sectional investigation and will not compare the results with those before the  
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39 COVID-19 pandemic. Therefore, we do not know whether the associations will be causal.  
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43 **3.8 Dissemination plan**  
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45 Preliminary findings will be communicated to the study participants.  
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48 Final research project report will be presented to Faculty of Medicine of Gulu University and at different  
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50 community meetings.  
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52 Copy of the report will be given to the District Health Officers and the refugee administration. Copies of  
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54 the final report will also be given to the Library of Gulu University and Department of Public Health.  
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56 Presentation will be made at the Gulu university annual dissemination conference and other scientific  
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58 conferences.  
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1 We intend to have this research project published in a peer-reviewed journal.

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4 Findings will also be disseminated to the local refugee authorities and stake holders.

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For peer review only

References

Allen, C. (2013). Peer Pressure and Psychology; briefly discussion on Annual Meeting, USA Washington DC.

Bereket K,Melaku Y, Yitayish D and Bezawit A. (2020). A Multilevel Analysis of Factors Associated with Teenage Pregnancy in Ethiopia. Source: DOI <https://doi.org/10.2147/IJWH.S265201>

Chirwa GC, Mazalale J, Likupe G, Nkhoma D, Chiwaula L and Chintsanya J (2019) An evolution of Socio-economic related inequality in teenage pregnancy and childbearing in Malawi. PLoS ONE 14(11): e0225374. <https://doi.org/10.1371/journal.pone.0225374>.

Collins K.A, Constanze P and Brigit O. (2015). Socio-cultural and economic factors influencing teenagers' resilience against the threat of teenage pregnancy: a cross-sectional survey in Accra, Ghana. Source: <https://reproductive-health-journal.biomedcentral.com/articles/>

Girls Leading Our World (GLOW). (2021). The Consequences of Covid-19 for Girls in Uganda. Retrieved from <https://globalgirlsglow.org/>

Gwido V and Fekadu M.A. (2015). Factors contributing to, and effects of, teenage pregnancy in Juba. Juba College of Nursing and Midwifery. Source: [www.southsudanmedicaljournal.com/archive/](http://www.southsudanmedicaljournal.com/archive/)

Irinoye, O. O., Oyeleye, B. A., Adeyemi, B. A. & Tope-Ojo, V. A. (2014). Analysis of parents' and teenagers' concerns and prescriptions for the prevention and management of teenage pregnancy in Nigeria, African Journal of Nursing and Midwifery, 6(1), 25-32.

Jacks, J. (2014). Assessment of Level of Knowledge, Attitude and Sexual behavior of University Students Concerning HIV/AIDS in Tanzania. Unpublished dissertation, Sokoine University of Agriculture, Morogoro, Tanzania.

Linda, H. (2013). Teenage pregnancy: prevention and intervention. Citation, 26(9), 1- 10.

Manzi F, Ogwang J, Akankwatsa A...and Yahaya G. (2018). Factors Associated with Teenage Pregnancy and its Effects in Kibuku Town Council, Kibuku District, Eastern Uganda: A Cross Sectional Study. Source: DOI: 10.4172/2167-1079.1000298



- Namukasa S. (2021). Factors that contribute to teenage pregnancy during covid-19 in Uganda: a study of Bugiri Municipal Council in Bugiri District. Retrived from <http://hdl.handle.net/20.500.12281/9492/>
- Nanzen C.K and Ezekiel K. (2016). Sociocultural factors contributing to teenage pregnancy in Zomba district, Malawi. Retrieved from DOI: 10.1080/17441692.2016.1229354/
- National Center for Chronic Diseases' Prevention and Health Promotion. (2019). Family planning methods and practice: Africa. 2nd Ed., Atlanta: US Department of Human Health Services.
- Neema S, Musisi N, Kibombo R. (2014). teenage sexual and reproductive health in Uganda: a synthesis of research evidence. Occasional report No. 14. 2014. <http://www.guttmacher.org/pubs/2004/12/20/or14.pdf?q=uganda>.
- Parliament Of Uganda.
- Poloju K.K., Naidu R.V., Rollakanti R.C., Machiryal R.K., Joe A. (2022). New Method of data collection using Kobo toolbox. Journal of positive psychology. Source: <https://www.journalppw.com/index.php/jpsp/article/view/3305>
- UBOS (Uganda Bureau of Statistics). (2016). Uganda demographic and health survey 2016. Kampala, UBOS and Calverton: ICF International Inc; 2016. <https://dhsprogram.com/pubs/pdf/FR333/FR333.pdf>.
- UN. (2019). GIRLS NOT BRIDES. 2019. <https://www.girlsnotbrides.org/child-marriage/uganda/>.
- UNESCO (2020a). COVID-19 Impact on Education. Includes pre-primary through tertiary. Retrieved from <https://en.unesco.org/covid19/educationresponse>.
- UNESCO (2020b). COVID-19 Education Response: How many students are at risk of not returning to school? Source: <https://unesdoc.unesco.org/ark:/48223/pf0000373992>.
- UNESCO (2020d). UNESCO eAtlas of Out-of-School Children. <https://tellmaps.com/uis/oosc/#!/tellmap/-528275754>. South Sudan (62%), Equatorial Guinea (55%), Eritrea (47%), Mali (41%), Sudan (38%), Niger (34%), Nigeria (34%), Djibouti (33%), Central African Republic (33%), Syrian Arab Republic (28%).



1 UNESCO Institute for Statistics (2020c). Database. <http://data.uis.unesco.org/>.  
2  
3  
4 UNICEF (2019). Early childbearing. <https://data.unicef.org/topic/childbearing>  
5  
6  
7 Wamajji R. (2021). *The impact of COVID-19 on women and girls*. Policy brief presented to the  
8  
9  
10 Wayan N., Mudita I., Kaho R.N. (2020). The KoboCollect for research data collection and management (An  
11  
12 experience in researching the socio-economic impact of blood disease in banana). Source:  
13  
14 <https://www.researchgate.net/publication/>  
15  
16  
17 WHO. (2014). “teenage pregnancy fact sheet,” 2014. View at: Google Scholar  
18  
19  
20 WHO. (2020). teenage pregnancy. <https://www.who.int/news-room/fact-sheets/detail/teenage-pregnancy>.  
21  
22  
23 WHO/UNFPA. (2013). teenage pregnancy: a review of the evidence. New York;  
24  
25 <http://www.unfpa.org/publications/teenage-pregnancy>.  
26  
27  
28 World Vision (2016). West Nile refugee response at a glance: World Vision Uganda. Retrieved from West  
29  
30 Nile refugee response at a glance: World Vision Uganda | Uganda | World Vision International  
31  
32 (wvi.org)  
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# BMJ Open

## High burden of teenage pregnancy and low modern contraceptive methods uptake in refugee settlements of Northern Uganda in the post COVID-19 era Between 2020 and 2023

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2024-089361.R1
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Date Submitted by the Author:	15-Oct-2024
Complete List of Authors:	Donald, Otika; Gulu University Odongo, George; Gulu University Muzaki, Ruth Mary; Gulu University Lamwaka, Beatrice Oweka; Gulu University Bongomin, Felix; Gulu University Pebolo, Francis; Gulu University, Reproductive Health
<b>Primary Subject Heading</b>:	Reproductive medicine
Secondary Subject Heading:	Obstetrics and gynaecology, Reproductive medicine, Sexual health
Keywords:	Adolescents < Adolescent, Pregnancy, Cross-Sectional Studies

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**High burden of teenage pregnancy and low modern contraceptive methods uptake in refugee settlements of Northern Uganda in the post COVID-19 era Between 2020 and 2023**

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**Abstract**

**Background:** Following the COVID-19 pandemic, there was an increase in teenage pregnancies nationally, however, limited data exists regarding the same among girls living in refugee settlements.

**Objectives:** We evaluated the prevalence of teenage pregnancy and associated factors in Palorinya and Bidi Bidi refugee settlements in Obongi and Yumbe districts of Northern Uganda, in the post COVID-19 era.

**Design:** We conducted a cross sectional descriptive study.

**Setting:** Refugee settlements in northern Uganda.

**Participants:** We included 385 teenage girls aged 15 to 19 years

**Methods:** We used cluster sampling techniques between March and May, 2023. Prevalence of teenage pregnancy was assessed by self-reported pregnancies between January 2020 to May 2023 among participants. We performed modified Poisson regression analysis on variables with  $P < 0.2$  to assess associations. Level of significance was set at  $P < 0.05$ .

**Primary and Secondary Outcome Measures:** The primary outcome measure was the prevalence of teenage pregnancy, assessed through self-reported pregnancies among participants. Secondary outcome measures included factors associated with teenage pregnancy, such as living with a husband, lack of formal education, peer pressure, and history of sexual abuse. These factors were identified through modified Poisson regression analysis.

**Results:** Overall, the mean age of 17 (IQR: 15-18), sexual debut at 16 (IQR: 15-17) years. Lifetime modern contraceptive use was 13.8% (n= 53/385) and current use was 7.5% (n=29/385). Teenage pregnancy period prevalence was 34.0% (CI: 29.4% to 38.9%). Factors independently associated with teenage pregnancy were; living with a husband (aPR: 3.8, 95% CI: 2.51 to 5.84, P <0.001), lack of formal education (aPR: 2.3, 95% CI: 1.26 to 4.35, P = 0.007), peer pressure (aPR: 2.1, 95% CI: 1.54 to 2.86, P <0.001) and history of sexual abuse (aPR: 1.5, 95% CI: 1.07 to 1.99, P = 0.018).

**Conclusion:** Teenage pregnancy in Ugandan refugee settlements surpasses global and national rates, highlighting unmet contraceptive needs. Improving access to modern contraceptives, education, and targeted interventions against child marriage and abuse is essential.

## Article Summary

### Strengths and limitations of the Study

- The study's inclusion of only two refugee settlements may limit generalizability to all refugee settlements in Uganda, affecting external validity.
- Randomly selecting settlements and using a substantial sample size within each strengthens the statistical reliability of our conclusions.
- Conducting a cross-sectional analysis without pre-pandemic data prevents establishing causal relationships between variables.
- Future research could adopt longitudinal approaches to track changes over time and incorporate historical data for a comprehensive assessment of causal associations.

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**Background**

Teenage pregnancy is defined as a pregnancy in girls 13–19 years of age [1]. Teenage pregnancies can have negative consequences for the mother’s health such as unsafe abortion attempts leading to mortality, as well as economic and social outcomes, exacerbated by stigmatization, school dropout and isolation from family [2]. Complications from teenage pregnancy and childbirth are the leading cause of death of girls aged 15 to 19 years worldwide [3].

The incidence of teenage pregnancy is increasing and has become of a worldwide concern. It is estimated that about 16 million girls 15–19 years old give birth each year, contributing nearly 11% of all births worldwide [1]. Globally in 2022, an estimated 13 per cent of adolescent girls and young women give birth before age 18 [4]. In South Asia, one in ten (11%) teenage girls give birth before the age of 19 [5].

In Africa, more than 20% of women aged 15 to 19 have given birth to at least one child [1]. Sub-Saharan Africa is home to more than one million teenage girls with pregnancy [5]. Sub-Saharan Africa additionally experiences some of the highest rates of gender inequality in the world, resulting in unequal access to education and high rates of violence against girls, early pregnancy, and child marriage [6]. It is estimated that 608,000 girls are thought to be at risk of child marriage, and 542,000 additional girls at risk of early pregnancy [7].

The regional teenage birth rate in SSA is more than double the global average, with 101 births per 1,000 girls aged 15 to 19 – ranging from 39 births per 1,000 girls aged 15 to 19 in Rwanda to 184 births per 1,000 girls aged 15 to 19 in Nigeria [4]. Child marriage is

widespread in West and Central Africa, where 42% of women are married as children, and in East and Southern Africa, where child marriage affects 37% of girls [8].

Despite Uganda's commitment to ending child, early and forced marriages and teenage pregnancy by year 2030 through co-sponsoring the 2013 and 2014 UN General Assembly and 2013 Human Rights Council resolutions on early and forced marriages [9], one in four (24%) teenage girls in Uganda report having given birth for the first time by the age of 18 [10]. According to UNICEF (2021) estimates, a total of 354,736 teenage pregnancies were registered in 2020, and 196,499 in the first six months of 2021 amidst the COVID-19 pandemic [11].

The COVID-19 pandemic wreaked unprecedented havoc on children, families, and communities around the globe, disrupting vital services like girl child education, and putting millions of lives at risk. The United Nations estimated that nearly 11 million primary and secondary school learners worldwide – 5.2 million of whom are girls – did not return to education following school closures amidst COVID-19 due to teenage pregnancy and related outcomes [12].

For the most vulnerable children, especially girls living in refugee settlements, accessing education and staying in school is hard enough. The pandemic caused additional, unanticipated disruption, compounding their vulnerability to teenage pregnancies by many folds [7]. Moreover, teenage girls living in refugee settlements face challenges accessing sexual and reproductive health services, including sex education and modern contraceptive methods [13]. Data on teenage pregnancies and associated factors among the teenage girls in refugee settlements is deficient. Additionally, statistics on modern contraceptive methods



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uptake among this population is unknown. We therefore aimed to estimate the prevalence and associated factors of teenage pregnancies in the post covid-19 era in Palorinya and Bidi Bidi refugee settlements of west Nile region, Northern Uganda.

**Methods**

**Study Design and Rationale**

We conducted a community-based, cross-sectional, observational study, adopting quantitative techniques between March and May, 2023. We followed the Strengthening The Reporting of Observational Studies in Epidemiology (STROBE) guidelines to design this manuscript in order to ensure attention to detail [14].

**Study Setting and Rationale**

We conducted this study in Palorinya and Bidi Bidi refugee settlements of west Nile region, Northern Uganda. According to data from the Office of the Prime Minister (OPM) and United Nations Higher Commissioner for Refugees (UNHCR), Uganda is now home to 1,622,738 refugees living in 13 refugee settlements across the country, and almost half (6) of these are in the west Nile region [15]. This setting was chosen because it hosts the biggest number of refugee settlements, proposed to provide a big pool of potential respondents for sampling.

**Study Population, Inclusion and Exclusion criteria.**

Our study targeted teenage girls living in the refugee settlements of Northern Uganda. We included only respondents between 15 to 19 years old, who provided written informed consent or had ascent obtained, and were living in the refugee settlements before the beginning of COVID-19. Those who did not provide informed consent or ascent were not included.

### **Sample size determination.**

We used the Kish and Lisle (1965) formula for calculation of sample size for an unknown population. At 95% confidence interval, we used an error of 5%, alpha risk expressed in z score of 1.96 and a conservative assumption of a 50% population proportion was made to ensure robustness. We obtained a sample size of 385. These choices were guided by standard practices, aiming to balance precision and practicability.

### **Sampling method.**

We used cluster sampling to randomly select Bidi Bidi and Palorinya refugee settlements that participated in the study. The refugee settlements in west Nile region, northern Uganda were listed down on small pieces of paper, with each settlement representing one cluster. Two pieces of paper were randomly picked (two clusters), from which the study was conducted. We used convenience sampling in each of the clusters to select study participants.

### **Research Instruments**

We developed a semi structured questionnaire including both open and closed ended questions. The data collection tool was developed in English and translated into three languages: *Acholi, Kuku, and Arabic*. We pretested the tool among respondents of similar

characteristics outside the study area, after which we refined and fine-tuned the tool for reliability and validity. The tool was then exported into Kobotoolbox installed in mobile phone devices which was used for data collection. We asked about demographics, house hold characteristics, pregnancy history between January 2020 and May 2023 and intentions, marriage status, modern contraceptive use between January 2020 and May 2023, sex education, sexual and physical abuse among others.

**Data Collection Procedures**

We recruited research assistants, who were given a one-day training for acquaintance with the tool and were taken through research ethics and good clinical practice. The research assistants carried out the collection of data. They explained the purpose of the study to each of the respondents identified, and obtained informed consent, followed by administration of the questionnaire using an electronic form stored in Kobotoolbox mobile application, which is a free open-source tool for mobile data collection.

**Data management.**

The phone devices that were used to collect the data were fully charged at every moment the research team set off to collect data, and the data captured in the phone was regularly saved to avoid loss of data. We safely kept the devices under key and lock before and after data collection, and limited access. We exported the data into STATA version 15, where analysis was done from.

**Data analysis.**

163 Prevalence of teenage pregnancy was assessed by self-reported pregnancies from January  
164 2020 to May 2023. We performed Pearson's chi square and Fisher's exact tests at bivariate  
165 analysis. Level of significance was set at  $P < 0.05$ . We then performed modified Poisson  
166 regression analysis on variables with  $P < 0.2$  to assess associations. Level of significance was  
167 set at  $P < 0.05$ . We considered variables with  $P < 0.2$  since their power of association is  $> \text{or} =$   
168 80%.

169 The data was then computed in form of percentages and frequencies and finally presented on  
170 figures (pie chart, bar graph) and tables.

## 171 **Patient and Public Involvement**

172 Dissemination of findings was made to the key stakeholders.

## 174 **Results**

### 175 **Participant Characteristics**

176 Table 1 summarizes the general characteristics of 385 teenage girls living in refugee  
177 settlements of west Nile region, northern Uganda. The mean age was 17 (IQR: 15 to 18),  
178 years, and 99.5% were Christians, 316 (82.1%) had attained primary education as the highest  
179 level, 85.6% were not working, median monthly income was 0 (IQR: 0 to 1,000), Uganda  
180 shillings, 56.1% did not live with both parents, 54.8% of household heads were female, and  
181 22.1% of house hold leads were husband /spouse.

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Overall, 178 (46.2%) were sexually active, and mean age of sex debut was 15.8 (SD: 1.44), years, sexual abuse was reported by 5.2% of respondents, of whom 75% were sexually abused by strangers, meanwhile physical abuse was reported by 21.6% of respondents, 37.1% of teenage girls experienced peer pressure and alcohol consumption was reported by 8.8% of respondents.

Figure 2 summarizes modern contraceptive methods used by teenage girls living in refugee settlements of west Nile region, northern Uganda. Some of the teenage girls; 13.8% had ever used modern contraceptives in their lifetime, meanwhile only 7.5% were currently using modern contraceptives, of whom only 13.2% reported to have ever used long term contraceptive methods, and 30.2% reported to have ever used multiple methods (including long term and short-term methods). Overall, 17.9% received contraceptive use counselling from home, and 36.1% received home sex education, meanwhile 55.1% had received sex education from school, 40.5% had received contraceptives use counselling from school, and 64.7% had ever been health educated on the dangers of teenage pregnancy.

Some respondents, 5.7% had the intention of getting pregnant in the next 12 months, whereas 52.0% had friends who are pregnant,24.9% were married, of whom 38.5% were forced / arranged. Up to 9.8% of the respondents had ever had an abortion, and 22.0% had had a caesarean section.

**Fig 1: Prevalence of teenage pregnancy among 385 girls aged 15 to 19 living in Palorinya and Bidi Bidi refugee settlements of west Nile region, Northern Uganda.**

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**Fig 2: The different contraceptive methods used by teenage girls living in Palorinya and Bidi Bidi refugee settlements of west Nile region, Northern Uganda (N=385; n=53)**

**Table 1: Individual characteristics of 385 teenage girls living in Palorinya and Bidi Bidi refugee settlements of west Nile region, northern Uganda**

Variable	Frequency	Percentage
Age, median (Interquartile range), years	17	15-18
<b>Occupation</b>		
Working	56	14.6
Not working	329	85.6
Average monthly income, median (Interquartile range), Ugx	0	0 – 1,000
<b>Education</b>		
No formal education	5	1.3
Primary	316	82.1
Secondary and beyond	64	16.6
<b>Media Exposure</b>		
Listens to Radio	60	15.6

Owns a mobile phone	71	18.4
Reads newspaper	11	2.9
Watch Television	3	0.8
Uses more than one Medium	65	16.9
None of the above	175	45.6
<b>Relationship to household head</b>		
Parent	251	65.2
Relative	49	12.7
Husband/Spouse	85	22.1
<b>Intention to get pregnant in 12 months</b>		
Yes	22	5.7
No	363	94.3
<b>Have friends who are pregnant</b>		
Yes	200	52.0
No	185	48.0
<b>Ever gotten pregnant</b>		
Yes	131	34.0
No	254	66.0
<b>Number of pregnancies, median (min, max), times</b>	1	1, 3
<b>Pregnancy Outcome</b>		
Live births	110	90.2
Abortions	7	5.7
Both	5	4.1
<b>Peer pressure</b>		
Yes	143	37.1
No	242	62.9
<b>Married</b>		
Yes	96	24.9
No	289	75.1
<b>Mode of Marriage</b>		
Arranged / Forced	37	38.5
Willingly	59	61.5
<b>History of Contraceptive Use</b>		
Yes	53	13.8
No	332	86.2
<b>Current contraceptive use</b>		
Yes	29	7.5
No	356	93.5
<b>Living with both Parents</b>		
Yes	169	43.9
No	216	56.1
<b>Home sex education</b>		

Yes	139	36.1
No	246	63.9
<b>Home contraceptive use counselling</b>		
Yes	69	17.9
No	316	82.1
<b>Received school sex education</b>		
Yes	212	55.1
No	173	44.9
<b>School contraceptive use counselling</b>		
Yes	156	40.5
No	229	59.5
<b>Health education on dangers of teenage pregnancy</b>		
Yes	249	64.7
No	136	35.3
<b>Sexual abuse</b>		
Yes	20	5.2
No	365	94.8
<b>Perpetrator (n=20)</b>		
Relative	5	25.0
Stranger	15	75.0
<b>Physical abuse</b>		
Yes	83	21.6
No	302	78.4
<b>Alcohol Consumption</b>		
Yes	34	8.8
No	351	91.2

## Period prevalence of teenage pregnancy among 385 teenage girls living in Palorinya and Bidi Bidi refugee settlements of west Nile region, northern Uganda

Figure 1 shows the prevalence of teenage pregnancy among 385 teenage girls living in refugee settlements of west Nile region, northern Uganda. We found out that up to 34.0% of respondents reported to have ever gotten pregnant between 2020 to 2023 (CI: 29.4% to 38.9%), the median number of pregnancies was 1, with a minimum of 1 and maximum of 3.



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223 **Predictors of teenage pregnancy among 385 teenage girls living in Palorinya and Bidi**  
224 **Bidi refugee settlements of west Nile region, northern Uganda**

225 Table 2 summarizes the factors associated with teenage pregnancy among 385 teenage girls  
226 living in refugee settlements of west Nile region, northern Uganda. At bivariate level, factors  
227 such as; lack of formal education (PR: 3.1, 95% CI: 2.64-3.64, p<0.001), male house hold  
228 head (PR: 2.3, 95% CI: 1.72 – 3.13, p<0.001), living with a husband / spouse (PR: 5.4, 95%  
229 CI: 4.11-7.17, P<0.001), intention to get pregnant (PR: 1.1, 95% CI: 1.03 – 1.15, p= 0.003),  
230 peer pressure (PR: 3.7, 95% CI: 2.73-5.05, P<0.001), being married (PR: 6.6, 95% CI: 4.95 –  
231 8.82, P<0.001), history of contraceptive use (PR: 3.2, 95% CI: 2.55 – 3.94, P<0.001), lack of  
232 home sex education (PR: 1.6, 95%CI: 1.16 – 2.24, P = 0.005), health education on dangers of  
233 teenage pregnancy (PR: 1.8, 95% CI: 1.25 – 2.49, P = 0.001), sexual abuse (PR: 2.7, 95% CI:  
234 2.14 – 3.46, P<0.001), physical abuse (PR: 2.3, 95% CI: 1.80 – 2.99, P<0.001) and alcohol  
235 consumption (PR: 2.3, 95% CI: 1.77 – 3.03, P<0.001), were positively associated to teenage  
236 pregnancy.

237 We then performed modified Poisson regression on all variables that had a P value < 0.2,  
238 while controlling for occupation, media exposure and living with both parents. Teenage girls  
239 with no formal education were 2.3 times more likely to be pregnant (aPR: 2.3, 95% CI: 1.26-  
240 4.35, P = 0.007) as compared with those who had formal education; those who were living  
241 with a husband / spouse were 3.8 times more likely to be pregnant (aPR: 3.8, 95% CI: 2.51-  
242 5.84, P<0.001) as compared with those who lived with their parents; teenage girls who  
243 experienced peer pressure were 2.1 times more likely to be pregnant (aPR: 2.1, 95% CI: 1.54-

244 2.86,  $P < 0.001$ ) as compared to those who didn't; those who had a history of contraceptive use  
 245 were 1.8 times more likely to be pregnant (aPR: 1.8, 95% CI: 1.31-2.33,  $P < 0.001$ ) as  
 246 compared to those who did not have; and teenage girls who experienced sexual abuse were  
 247 1.5 times more likely to be pregnant (aPR: 1.5, 95% CI: 1.07-1.99,  $P = 0.018$ ) as compared to  
 248 those who didn't.

249 **Table 2: Factors independently associated with teenage pregnancy among 385 teenage**  
 250 **girls living in Palorinya and Bidi Bidi refugee settlements of west Nile region, Northern**  
 251 **Uganda**

Variable	All (N=385) Freq (%)	Teenage Pregnancy		Crude PR (95% CI)	P value	Adjusted PR (95% CI)	P value
		Yes (n=131) Freq (%)	No (n=254) Freq (%)				
Occupation							
Working	56 (14.6)	29 (22.1)	27 (10.6)	1.7(1.24 – 2.56)	0.001	1.1(0.86-1.54)	0.346
Not working	329 (85.6)	102 (77.86)	227 (89.4)	Reference		Reference	
Education							
No education	5 (1.3)	5 (3.8)	0 (0.0)	3.1(2.64-3.64)	<0.001	2.3(1.26-4.35)	0.007
Primary	316 (82.1)	102 (77.9)	214 (84.3)	Reference		Reference	0.439
Secondary and beyond	64 (16.6)	24 (18.3)	40 (15.8)	1.2(9.81-1.66)	0.407	1.1(0.84-1.51)	
Media Exposure							
Listens to Radio	60 (15.6)	5 (3.8)	55 (21.6)	1 (1.00 – 1.00)	1.000	N/A	0.052
Owns a mobile phone	71 (18.4)	50 (38.2)	21 (8.3)	0.9 (0.80 – 0.98)	0.015	0.9 (0.80 – 1.00)	
Reads newspaper	11 (2.9)	1 (0.8)	10 (3.9)	1 (1.00 – 1.00)	1.000		
Watch Television	3 (0.8)	1 (0.8)	2 (0.8)	1 (1.00 – 1.00)	1.000		
Uses more than one Medium	65 (16.9)	39 (29.8)	26 (10.2)	0.9 (0.84 – 1.01)	0.085		
None of the above	175 (45.6)	35 (26.7)	140 (55.1)	Reference			
Relationship to household head							

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Parent	251 (65.2)	43 (32.8)	208 (81.9)	Reference		Reference	
Relative	49 (12.73)	9 (6.9)	40 (15.8)	1.1(0.56-2.06)	0.834	0.9(0.47-1.64)	0.687
Husband/Spouse	85 (22.1)	79 (60.3)	6 (2.4)	5.4(4.11-7.17)	<0.001	3.8(2.51-5.84)	<0.001
<b>Intention to get pregnant in 12 months</b>							
Yes	22 (5.7)	19 (14.5)	3 (1.2)	1.1 (1.03 – 1.15)	0.003	1.0 (0.97 – 1.1)	0.246
No	363 (94.3)	112 (85.5)	251 (98.8)	Reference		Reference	
<b>Have friends who are pregnant</b>							
Yes	200 (52.0)	116 (88.6)	84 (33.1)	1.1 (0.89 – 1.36)	0.421	N/A	
No	185 (48.0)	15 (11.4)	170 (66.9)	Reference			
<b>Peer pressure</b>							
Yes	143 (37.1)	90 (68.7)	53 (20.9)	3.7 (2.73-5.05)	<0.001	2.1(1.54-2.86)	<0.001
No	242 (62.9)	41(31.3)	201 (79.1)	Reference		Reference	
<b>Married</b>							
Yes	96 (24.9)	90 (68.7)	6 (2.4)	6.6 (4.95 – 8.82)	<0.001	1.1 (0.88 – 1.46)	0.337
No	289 (75.1)	41 (31.3)	248 (97.6)	Reference		Reference	
<b>Mode of Marriage</b>							
Arranged / Forced	37 (38.5)	33 (36.7)	4 (66.7)	Reference		N/A	
Willingly	59 (61.5)	57 (63.3)	2 (33.3)	1.0 (0.95 – 1.16)	0.347		
<b>History of Contraceptive Use</b>							
Yes	53 (13.8)	44 (33.6)	9 (3.5)	3.2(2.55 – 3.94)	<0.001	1.8(1.31-2.33)	<0.001
No	332 (86.2)	87 (66.4)	245 (96.5)	Reference		Reference	
<b>Living with both Parents</b>							
Yes	169 (43.9)	65 (49.6)	104 (40.9)	1.3(0.95 – 1.66)	0.104	1.1(0.88-1.40)	0.392
No	216 (56.1)	66 (50.4)	150 (59.1)	Reference		Reference	
<b>Home sex education</b>							
Yes	139 (36.1)	34 (26.0)	105 (41.3)	Reference		Reference	
No	246 (63.9)	97 (74.0)	149 (58.7)	1.6(1.16 – 2.24)	0.005	1.2(0.94-1.63)	0.127
<b>Home contraceptive use counselling</b>							
Yes	69 (17.9)	26 (19.8)	43 (16.9)	1.13(0.81 – 1.60)	0.471	N/A	
No	316 (82.1)	105 (80.2)	211 (83.1)	Reference			
<b>Received school sex education</b>							
Yes	212 (55.1)	67 (52.3)	145 (57.1)	1.0 (0.96 – 1.17)	0.265	N/A	
No	173 (44.9)	61 (47.7)	109 (42.9)	Reference			
<b>School contraceptive use counselling</b>							
Yes	156 (40.5)	56 (43.8)	100 (39.4)	1.0 (0.93 – 1.13)	0.573	N/A	
No	229 (59.5)	75 (56.2)	154 (60.6)	Reference			

**Health education on dangers of teenage pregnancy**

Yes	249 (64.7)	100 (76.3)	149 (58.7)	1.8(1.25 – 2.49)	0.001	1.2(0.92-1.66)	0.167
No	136 (35.3)	31 (23.7)	105 (41.3)	Reference		Reference	

**Sexual abuse**

Yes	20 (5.2)	17 (13.0)	3 (1.2)	2.7(2.14 – 3.46)	<0.001	1.5(1.07-1.99)	0.018
No	365 (94.8)	114 (87.0)	251 (98.8)	Reference		Reference	

**Physical abuse**

Yes	83 (21.6)	51 (38.9)	32 (12.6)	2.3(1.80 – 2.99)	<0.001	1.1(0.82-1.36)	0.658
No	302 (78.4)	80 (61.1)	222 (87.4)	Reference		Reference	

**Alcohol Consumption**

Yes	34 (8.8)	24 (18.3)	10 (3.9)	2.3(1.77 – 3.03)	<0.001	0.9(0.64-1.20)	0.414
No	351 (91.2)	107 (81.7)	244 (96.1)	Reference		Reference	

253

254

**Discussion**

256 There is a high prevalence of teenage pregnancies (34.0%) among teenage girls living in  
 257 refugee settlements of northern Uganda. It is notable that there is a gap in literature on sexual  
 258 and reproductive health issues in refugee settings in general, and teenage pregnancy statistics  
 259 in similar settings is not widely studied. The prevalence of teenage pregnancies in the current  
 260 study surpasses national (24%) and global (11%) averages [1,5]. This could be because our  
 261 study only considered teenage girls between 15 to 19 years old, meanwhile the other studies  
 262 considered 13 to 19. Considering the close relationship between sexual abuse and teenage  
 263 pregnancy, which was similarly observed in Malawi [16], relevant refugee authorities and  
 264 government stakeholders need to develop strategies aimed at addressing this challenge among  
 265 teenage girls living in refugee settings, to contribute towards addressing the bigger problem

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266 of maternal morbidity and mortality related to teenage pregnancy. There is also need to  
267 explore legal opportunities against the perpetrators of sexual abuse among teenage girls in  
268 refugee settings. Our study found out that up to 25% of the perpetrators of sexual abuse  
269 among the teenage girls are relatives. This makes it particularly hard to seek support from  
270 community and cultural leaders, necessitating the involvement of higher authorities. The  
271 ministry of health in conjunction with the office of the prime minister need to put in place  
272 favourable measures to deal with the perpetrators of sexual violence against teenage girls in  
273 the refugee context.

274 Several factors were independently associated to teenage pregnancies in our study.  
275 Importantly, living with a spouse / husband presented four-fold likelihood of teenage  
276 pregnancy compared to those who lived with their parents. Other studies agree to our findings  
277 [17]. Moreover, we also found out that most of the child marriages in the refugee context  
278 were forced (38.5%). Therefore, targeted measures are urgently needed to deal with the  
279 challenge of forced child marriages in the refugee situation. These measures could include,  
280 forming child and adolescent support groups, encouraging girl child education, involving  
281 relevant authorities in protecting the rights of the girl child living in refugee settlements, and  
282 creating awareness among the teenage girls in these settings on the legal opportunities  
283 available to deal with the perpetrators of sexual violence.

284 It is high time the government and civil society organizations come up with targeted  
285 measures to make the refugee settlements safer for the teenage girl. This will not only deal  
286 with the problem of sexual violence, but also the challenges brought about by teenage  
287 pregnancy such as maternal morbidity and mortality. Our study also found out that 9.8% of  
288 the respondents had ever had an abortion. The limitation is that our study did not explore

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whether this was induced or spontaneous. Furthermore, we do not know whether this abortion was in the watch of a qualified health service provider. This poses a greater risk of severe morbidity and mortality among the teenage mothers in these settings.

Additionally, teenage girls without a formal education stood at a 2.3 times higher risk of teenage pregnancy compared to those with at least a primary education. Similarly, another study conducted in Malawi noted an inequality in teenage pregnancy which worsened to the disadvantage of the less educated [18]. Strengthening education access and acceptability among the teenage girls living in refugee settlements will go a long way in reducing the burden of teenage pregnancy in this vulnerable population. Moreover, keeping the girl child in school will also have a secondary benefit especially in the fight against HIV.

Another important predictor of teenage pregnancy in our study was peer pressure. This is related with another study carried out in Kibuku district, Uganda, that pointed out that bad peer groups were an outstanding cause of teenage pregnancy among the respondents [19].

Addressing the challenge of peer pressure requires a multi-sectoral collaboration.

Thoughtfully, fostering education among the teenage girls could be one way of dealing with this issue. Relevant stake holders need to come up with inclusive solutions to encourage girl child education and lower the challenge of peer pressure and consequently teenage pregnancy.

Paradoxically, our study found out that teenage girls who had a history of using modern contraceptives stood at 1.8 risk of teenage pregnancies as compared to those who did not. These findings were unlike those observed in Malawi [16], who otherwise found out that history of contraceptive use was a protective factor. Unfortunately, our study did not

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distinguish between the use of long term and short-term contraceptives, in relation to pregnancy. Furthermore, much as we saw that 13.8% of teenage girls living in refugee settlements reported to have ever used a modern contraceptive method in their lifetime, and considering the relatively low age of sex debut (15.8) years, only 7.5% were currently using modern contraceptives, of whom only 13.2% reported to have ever used long term contraceptive methods. Noting the inconsistencies in the use of modern contraceptives among the study participants makes it possible that these inconsistencies contribute to the high prevalence of teenage pregnancy in this setting. Additionally, the proportion of respondents who had ever used long term methods is relatively low, leaving a wider window for teenage pregnancies in this setting. Strengthening the uptake of long-term contraceptive methods among the refugee teenage girls would go a long way in reducing the prevalence of teenage pregnancy in this setting.

**Conclusions**

Our study found out that about 1 in 3 adolescent girls in refugee settlement of Northern Uganda experienced pregnancy during the COVID-19 pandemic. This burden exceeds the global and national averages, revealing gaps in meeting contraceptive needs. However, only 1 in 13 of the adolescents was currently using modern methods of contraception. Therefore, enhancing accessibility and promoting modern contraceptive methods are crucial. Urgent action is required to address disparities in access to quality education, and implement targeted interventions against child marriages, peer pressure and sexual abuse, to mitigate challenges associated with teenage pregnancy in the refugee context.



## References

1. WHO. (2014). "teenage pregnancy fact sheet," 2014. View at: Google Scholar
2. Neema S, Musisi N and Kibombo R. (2014). teenage sexual and reproductive health in Uganda: a synthesis of research evidence. Occasional report No. 14. 2014.  
<http://www.guttmacher.org/pubs/2004/12/20/or14.pdf?q=uganda>.
3. WHO. (2020). teenage pregnancy. <https://www.who.int/news-room/fact-sheets/detail/teenage-pregnancy>.
4. UNICEF. (2024). *Top 10 Causes of Disability* (pp. 6–11). Source: [Early childbearing and teenage pregnancy rates by country - UNICEF DATA](#)
5. UNICEF (2019). Early childbearing. <https://data.unicef.org/topic/childbearing>
6. UNAIDS. (2022). The 'Education Plus' Initiative (2021-2025) - Empowerment of Adolescent Girls and Young Women in sub-Saharan Africa.  
<https://www.unaids.org/en/topics/education-plus>.
7. Humanities International. (2021). Girls at higher risk of child marriage and teenage pregnancy due to pandemic, Humanists International tells UN. Source: [Girls at higher risk of child marriage and teenage pregnancy due to pandemic, Humanists International tells UN](#)
8. Girls Not Brides. (2014). Ending child marriage in Africa: a brief by Girls Not Brides. *International Journal of Health Sciences and Research*, 12.  
<https://www.girlsnotbrides.org/wp-content/uploads/2015/02/Child-marriage-in-Africa-A-brief-by-Girls-Not-Brides.pdf>



9. UN. (2019). GIRLS NOT BRIDES. 2019. <https://www.girlsnotbrides.org/child-marriage/uganda/>.

10. UBOS (Uganda Bureau of Statistics). (2016). Uganda demographic and health survey 2016. Kampala, UBOS and Calverton: ICF International Inc; 2016. <https://dhsprogram.com/pubs/pdf/FR333/FR333.pdf>.

11. UNFPA Uganda | Addressing teenage pregnancy during the COVID-19 pandemic. (n.d.). <https://uganda.unfpa.org/en/news/addressing-teenage-pregnancy-during-covid-19-pandemic>

12. UNESCO (2020). COVID-19 Education Response: How many students are at risk of not returning to school? Source: <https://unesdoc.unesco.org/ark:/48223/pf0000373992>.

13. Inter-agency working group. (2019). Adolescent sexual and reproductive health needs in emergencies. *Inter-Agency Working Group, 2019*.

14. STROBE – strengthening the reporting of observational studies in epidemiology. Available from: <https://www.strobe-statement.org/>

15. Office of the Prime Minister (OPM) and United Nations Higher Commissioner for Refugees (UNHCR). (2023). *Uganda- Population Dashboard: Overview of Refugees and Asylum-seekers in Uganda. April 2023*, 0–1Parliament Of Uganda.

16. Kaphagawani NC, Kalipeni E. Sociocultural factors contributing to teenage pregnancy in Zomba district, Malawi. *Glob Public Health*. 2017 Jun;12(6):694-710. doi: 10.1080/17441692.2016.1229354. Epub 2016 Sep 30. PMID: 27687242.

Protected by copyright, including for uses related to text and data mining, AI training, and similar technologies. Ensignement Supérieur (ABES).

17. Gwido V and Fekadu M.A. (2015). Factors contributing to, and effects of, teenage pregnancy in Juba. Juba College of Nursing and Midwifery. Source: [www.southsudanmedicaljournal.com/archive/](http://www.southsudanmedicaljournal.com/archive/)

18. Chirwa GC, Mazalale J, Likupe G, Nkhoma D, Chiwaula L and Chintsanya J (2019) An evolution of Socio-economic related inequality in teenage pregnancy and childbearing in Malawi. PLoS ONE 14(11): e0225374. <https://doi.org/10.1371/journal.pone.0225374>.

19. Manzi F, Ogwang J, Akankwatsa A, Wakoli O.C, Obba F, Yahaya G, et al. (2018). Factors Associated with Teenage Pregnancy and its Effects in Kibuku Town Council, Kibuku District, Eastern Uganda: A Cross Sectional Study. Source: DOI: 10.4172/2167-1079.1000298/

## Declarations

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## Author Statement

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408 Funding acquisition, Supervision, Writing – original draft, Writing – review & editing

409 Donald Otika is the guarantor

410 **Consent for Publication**

411 Not applicable

412 **Conflicts of interest**

413 We declare no conflict of interest in this research work.

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## 414 **Data Availability Statement**

415 All relevant data are within the manuscript and its supporting information files. Data are  
416 available upon reasonable request from the first author.

## 417 **Ethical Considerations**

418 We obtained an ethical approval and clearance letter from Gulu University Research and  
419 Ethics Committee (GUREC), (approval number: GUREC-2022-291) which was presented to  
420 the district health offices (DHO) of the selected districts, to seek administrative clearance.  
421 We presented the introductory letter from the DHO to the refugee welfare council 2 (RWC2)  
422 of selected refugee settlements to seek entry into the community and commence data  
423 collection. A private and comfortable room was acquired and used during the process of data  
424 collection to ensure privacy and confidentiality. Written informed consent was obtained from  
425 respondents who were 18 or 19 years. For respondents below 18, a written informed ascent  
426 was obtained from a parent / guardian who also consented to allow their daughter participate  
427 in the study, and participation was free and voluntary. Participants were assured of their  
428 freedom to withdraw from the study at any time with no penalty. Confidentiality of the  
429 information collected was observed by using numbers and not names.

430

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433 Training at University of Michigan (CIRHT-UM).

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434      **Word count: 3507**

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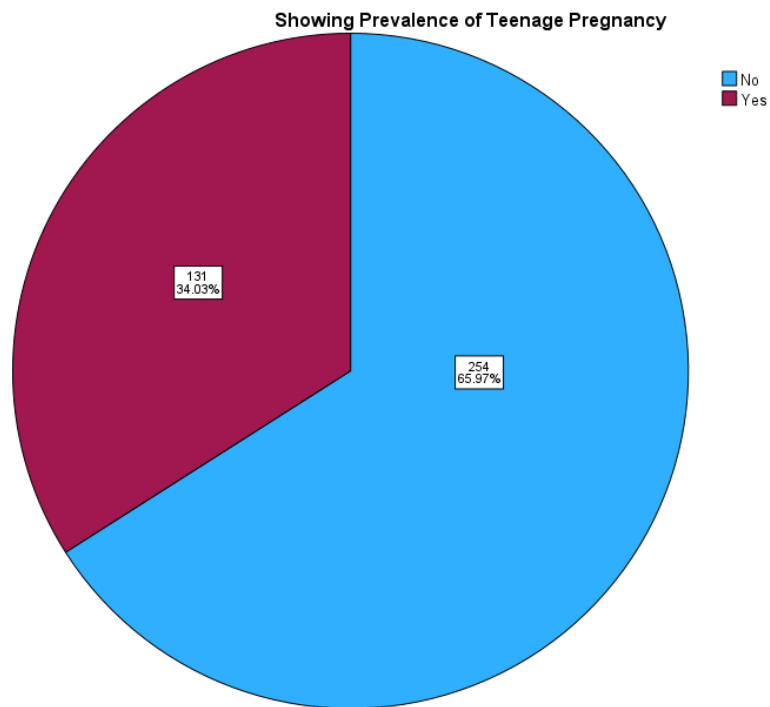


Fig 1: Prevalence of teenage pregnancy among 385 girls aged 15 to 19 living in Palorinya and Bidi Bidi refugee settlements of west Nile region, Northern Uganda.

299x218mm (72 x 72 DPI)

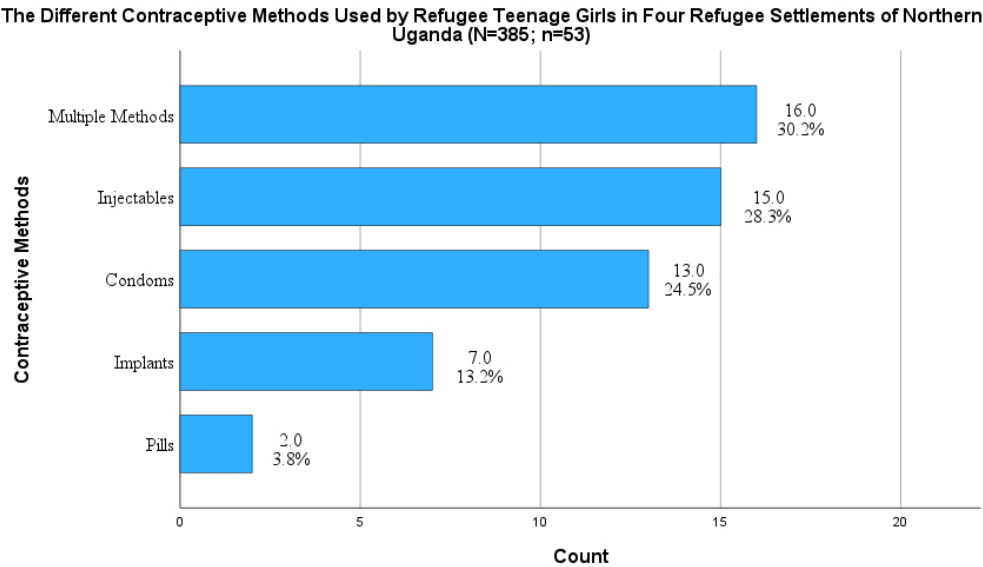


Fig 2: The different contraceptive methods used by teenage girls living in Palorinya and Bidi Bidi refugee settlements of west Nile region, Northern Uganda (N=385; n=53)

299x176mm (72 x 72 DPI)

# BMJ Open

## High burden of teenage pregnancy and low modern contraceptive methods uptake in refugee settlements of Northern Uganda in the post COVID-19 era Between 2020 and 2023

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Manuscript ID	bmjopen-2024-089361.R2
Article Type:	Original research
Date Submitted by the Author:	17-Nov-2024
Complete List of Authors:	Donald, Otika; Gulu University; Uganda Cancer Institute, Northern Uganda Regional Cancer Center Odongo, George; Uganda Cancer Institute, Northern Uganda Regional Cancer Center Muzaki, Ruth Mary; Gulu University Lamwaka, Beatrice Oweka; Gulu University Bongomin, Felix; Gulu University Pebolo, Francis; Gulu University, Reproductive Health
<b>Primary Subject Heading</b>:	Reproductive medicine
Secondary Subject Heading:	Obstetrics and gynaecology, Reproductive medicine, Sexual health
Keywords:	Adolescents < Adolescent, Pregnancy, Cross-Sectional Studies

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**Prevalence and factors associated with teenage pregnancy in refugee settlements of northern Uganda post-COVID-19 (2020-2023): A cross-sectional study**

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**Keywords:** Teenage pregnancy., Modern contraceptives., Refugee Settlements., Adolescent Pregnancy., Uganda.

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20   **Abstract**

21   **Background:** Following the COVID-19 pandemic, there was an increase in teenage

22   pregnancies nationally, however, limited data exists regarding the same among girls living in

23   refugee settlements.

24   **Objectives:** We evaluated the prevalence of teenage pregnancy and associated factors in

25   Palorinya and Bidi Bidi refugee settlements in Obongi and Yumbe districts of Northern Uganda,

26   in the post-COVID-19 era.

27   **Design:** We conducted a cross-sectional study.

28   **Setting:** Refugee settlements in northern Uganda.

29   **Participants:** We included 385 teenage girls aged 15 to 19 years

30   **Methods:** We used convenience sampling techniques between March and May 2023.

31   Prevalence of teenage pregnancy was assessed by self-reported pregnancies between January

32   2020 and May 2023 among participants. We conducted Pearson’s chi-square and Fisher’s

33   exact tests for bivariate analysis. All variables with a P-value <0.2 at bivariate analysis were

34   included in multivariable regression. We applied a modified Poisson regression model at

35   multivariable level to evaluate independent associations. The level of statistical significance

36   was set at P < 0.05.

37   **Primary and Secondary Outcome Measures:** The primary outcome measure was the

38   prevalence of teenage pregnancy, assessed through self-reported pregnancies among

39   participants. Secondary outcome measures included factors associated with teenage

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pregnancy, such as living with a husband, lack of formal education, peer pressure, and history of sexual abuse.

**Results:** Overall, the mean age of 17 (IQR: 15-18), and sexual debut at 16 (IQR: 15-17) years. Lifetime modern contraceptive use was 13.8% (n= 53/385) and current use was 7.5% (n=29/385). Teenage pregnancy period prevalence was 34.0% (CI: 29.4% to 38.9%). Factors independently associated with teenage pregnancy were; living with a husband (aPR: 3.8, 95% CI: 2.51 to 5.84, P <0.001), lack of formal education (aPR: 2.3, 95% CI: 1.26 to 4.35, P = 0.007), peer pressure (aPR: 2.1, 95% CI: 1.54 to 2.86, P <0.001) and history of sexual abuse (aPR: 1.5, 95% CI: 1.07 to 1.99, P = 0.018).

**Conclusion:** Our study revealed that around 1 in 3 adolescent girls in Northern Uganda's refugee settlements experienced pregnancy during the COVID-19 pandemic, with only 1 in 13 currently using modern contraceptives. To address this, targeted strategies by relevant authorities are crucial, including legal actions against sexual abuse, promoting girl child education, and enhancing access to long-term contraception, to reduce teenage pregnancy and associated health risks in these settings.

## Article Summary

### Strengths and Limitations of the Study

- The study's inclusion of only two refugee settlements may limit generalizability to all refugee settlements in Uganda, affecting external validity.
- Randomly selecting settlements and using a substantial sample size within each strengthens the statistical reliability of our conclusions.

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61       • Conducting a cross-sectional analysis without pre-pandemic data prevents  
62       establishing causal relationships between variables.  
63       • Future research could adopt longitudinal approaches to track changes over time and  
64       incorporate historical data for a comprehensive assessment of causal associations.

65   **Background**

66   Teenage pregnancy is defined as a pregnancy in girls 13–19 years of age [1]. Teenage  
67   pregnancies can have negative consequences for the mother’s health such as unsafe abortion  
68   attempts leading to mortality, as well as economic and social outcomes, exacerbated by  
69   stigmatization, school dropout and isolation from family [2]. Complications from teenage  
70   pregnancy and childbirth are the leading cause of death in girls aged 15 to 19 years  
71   worldwide [3].

72   The incidence of teenage pregnancy is increasing and has become a worldwide concern. It is  
73   estimated that about 16 million girls 15–19 years old give birth each year, contributing nearly  
74   11% of all births worldwide [1]. Globally in 2022, an estimated 13 per cent of adolescent  
75   girls and young women give birth before the age of 18 [4, 5]

76   In Africa, more than 20% of women aged 15 to 19 have given birth to at least one child [1].  
77   Sub-Saharan Africa is home to more than one million teenage girls with pregnancy [5]. Sub-  
78   Saharan Africa additionally experiences some of the highest rates of gender inequality in the  
79   world, resulting in unequal access to education and high rates of violence against girls, early  
80   pregnancy, and child marriage [6]. It is estimated that 608,000 girls are thought to be at risk  
81   of child marriage, and 542,000 additional girls are at risk of early pregnancy [7].

4

82 The regional teenage birth rate in SSA is more than double the global average, with 101  
83 births per 1,000 girls aged 15 to 19 – ranging from 39 births per 1,000 girls aged 15 to 19 in  
84 Rwanda to 184 births per 1,000 girls aged 15 to 19 in Nigeria [4]. Child marriage is  
85 widespread in West and Central Africa, where 42% of women are married as children, and in  
86 East and Southern Africa, where child marriage affects 37% of girls [8].

87 Despite Uganda's commitment to ending child, early and forced marriages and teenage  
88 pregnancy by the year 2030 through co-sponsoring the 2013 and 2014 UN General Assembly  
89 and 2013 Human Rights Council resolutions on early and forced marriages [9], one in four  
90 (24%) teenage girls in Uganda report having given birth for the first time by the age of 18  
91 [10]. According to UNICEF (2021) estimates, a total of 354,736 teenage pregnancies were  
92 registered in 2020, and 196,499 in the first six months of 2021 amidst the COVID-19  
93 pandemic [11].

94 The COVID-19 pandemic wreaked unprecedented havoc on children, families, and  
95 communities around the globe, disrupting vital services like girl-child education, and putting  
96 millions of lives at risk. The United Nations estimated that nearly 11 million primary and  
97 secondary school learners worldwide – 5.2 million of whom are girls – did not return to  
98 education following school closures amidst COVID-19 due to teenage pregnancy and related  
99 outcomes [12].

100 For the most vulnerable children, especially girls living in refugee settlements, accessing  
101 education and staying in school is hard enough. The pandemic caused additional,  
102 unanticipated disruption, compounding their vulnerability to teenage pregnancies by many  
103 folds [7]. Moreover, teenage girls living in refugee settlements face challenges accessing

sexual and reproductive health services, including sex education and modern contraceptive methods [13]. These girls are at a significantly higher risk of early pregnancy, a situation that worsened due to the COVID-19 pandemic. According to a recent study by the Forum for African Women Educationalists (Uganda Chapter), the rate of teenage pregnancy among girls in refugee settlements rose from 3.3% to 4.1% during the pandemic. In one Palabek settlement, the proportion of refugee girls who reported being pregnant during the COVID-19 period reached 4.8%, compared to the national average of 1.8% [14]. Additionally, statistics on modern contraceptive methods uptake among this population are unknown.

Teen pregnancies in refugee and humanitarian settings are influenced by several factors including poverty, lack of education, cultural norms, etc., further driven by limited access to health care, lack of social support and increased risk of sexual violence [15–17]. Addressing these issues requires targeted interventions that consider the unique challenges faced by teenage girls in these settings.

We therefore aimed to estimate the prevalence and associated factors of teenage pregnancies in the post-COVID-19 era in Palorinya and Bidi Bidi refugee settlements of the west Nile region, Northern Uganda.

121 **Methods**122 **Study Design and Rationale**

123 We conducted a community-based, cross-sectional study between March and May, 2023. We  
124 followed the Strengthening The Reporting of Observational Studies in Epidemiology  
125 (STROBE) guidelines to design this manuscript in order to ensure attention to detail [18].

## 126 **Study Setting and Rationale**

127 We conducted this study in Palorinya and Bidi Bidi refugee settlements of the west Nile  
128 region, Northern Uganda. According to data from the Office of the Prime Minister (OPM)  
129 and United Nations Higher Commissioner for Refugees (UNHCR), Uganda is now home to  
130 1,622,738 refugees living in 13 refugee settlements across the country, and almost half (6) of  
131 these are in the west Nile region [19]. Women and girls constitute over 80% of this  
132 population, and the settlements are arranged in blocks and zones. Palorinya refugee  
133 settlement has 4 zones, and 9 level 3 health centers, meanwhile Bidi Bidi has 6 zones and 16  
134 level 3 health centers. None of the refugee settlements has a higher-level health center,  
135 however, there are several referral sites e.g., Yumbe Health Center IV, Midigo Health Center  
136 IV and Yumbe Regional Referral Hospital. All these facilities provide family planning  
137 services to adolescents. This setting was chosen because it hosts the biggest number of  
138 refugee settlements, proposed to provide a big pool of potential respondents for sampling.

## 139 **Study Population, Inclusion and Exclusion Criteria.**

140 Our study targeted teenage girls living in the refugee settlements of Northern Uganda. We  
141 included only respondents between 15 to 19 years old, who provided written informed  
142 consent or had ascent obtained, and were living in the refugee settlements before the  
143 beginning of COVID-19. Those who did not provide informed consent or assent were not  
144 included.



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**Sample size determination.**

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We used the Kish Lisle (1965) formula for the calculation of sample size for an unknown population. At 95% confidence interval, we used an error of 5%, alpha risk expressed in z score of 1.96 and a conservative assumption of a 50% population proportion was made to ensure robustness. We obtained a sample size of 385. These choices were guided by standard practices, aiming to balance precision and practicability.

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**Sampling method.**

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We used convenience sampling to select study participants from Bidi Bidi and Palorinya refugee settlements. Convenience sampling in our study involved selecting participants who were readily available and willing to participate in the study. We approached individuals in many community spaces, targeting various times and days to ensure diversity. The participation acceptance rate was 100%, with no declines. This method allowed us to gather data from a broad participant base.

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**Research Instruments**

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We developed a semi-structured questionnaire including both open and closed-ended questions. The data collection tool was developed in English and translated into three languages: *Acholi, Kuku, and Arabic*. We pretested the tool among respondents of similar characteristics outside the study area, after which we refined and fine-tuned the tool for reliability and validity. The tool was then exported into Kobotoolbox installed on mobile phone devices which was used for data collection. We asked about demographics, household characteristics, pregnancy history between January 2020 and May 2023 and intentions,

166 marriage status, modern contraceptive use between January 2020 and May 2023, sex  
167 education, and sexual and physical abuse among others. Abuse was measured by asking  
168 'Have you ever experienced physical abuse?' and 'Have you ever experienced sexual abuse?'  
169 with timeframes specified as 'in the past 12 months' and 'in your lifetime,' respectively.  
170 Contraception use was assessed by asking 'Have you ever used any form of contraception?'.  
171 Those who had ever used were further asked to specify the method of contraception used.  
172 Peer pressure was measured by asking 'Have you ever experienced any form of peer pressure  
173 to get pregnant?' Alcohol consumption was assessed by asking 'Do you take alcohol?'. These  
174 responses were recorded as binary outcomes (yes/no). The tool was developed de novo,  
175 adhering to established guidelines and drawing from relevant literature. This tool had not  
176 been previously used in this setting, and it was tailored specifically for this study. **Data**  
177 **Collection Procedures** A private and comfortable room was acquired and used during the  
178 process of data collection to ensure a private and confidential environment for respondents.  
179 We recruited research assistants, who were given a one-day training for acquaintance with the  
180 tool and were taken through research ethics and good clinical practice. The research assistants  
181 carried out the collection of data. Although gender matching between participants and data  
182 collectors was not implemented, all research assistants underwent comprehensive training on  
183 ethical principles. This training highlighted the importance of maintaining privacy and  
184 confidentiality, especially when handling sensitive information related to abuse. They  
185 explained the purpose of the study to each of the respondents identified, and obtained  
186 informed consent, followed by administration of the questionnaire using an electronic form  
187 stored in the Kobo toolbox mobile application, which is a free open-source tool for mobile  
188 data collection.

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**Data management.**

The phone devices that were used to collect the data were fully charged at every moment the research team set off to collect data, and the data captured in the phone was regularly saved to avoid loss of data. We safely kept the devices under key and lock before and after data collection, and limited access. We exported the data into STATA version 15, where analysis was done from.

**Data analysis.**

The prevalence of teenage pregnancy was assessed by self-reported pregnancies from January 2020 to May 2023. We conducted Pearson’s chi-square and Fisher’s exact tests for bivariate analysis. The level of statistical significance was set at  $P < 0.05$ . Variables with a P-value  $< 0.2$  from these tests were included in the multivariable analysis. We applied a modified Poisson regression model at the multivariable level to evaluate independent associations. The level of statistical significance was set at  $P < 0.05$ . Modified Poisson regression was chosen over logistic regression because the outcome was common (i.e., the prevalence rate was high), because in such cases, the odds ratio from logistic regression can significantly overestimate the relative risk. We considered variables with  $P < 0.2$  from bivariate analysis to be included in the multivariable regression since their power of association is  $\geq 80\%$ .

The research questions tested in statistical analysis were, ‘what is the prevalence of teenage pregnancies in the study population?’ and ‘what are the associated factors of teenage pregnancies in the study population?’

209 The data was then computed in percentages and frequencies and finally presented in figures  
210 (pie chart, bar graph) and tables.

### 211 **Patient and Public Involvement**

212 The public was involved in this study. Dissemination of findings was done to key  
213 stakeholders.

## 215 **Results**

### 216 **Participant Characteristics**

217 Table 1 summarizes the general characteristics of 385 teenage girls living in refugee  
218 settlements of the West Nile region, in northern Uganda. The mean age was 17 (IQR: 15 to  
219 18), years, and 99.5% were Christians, 316 (82.1%) had attained primary education as the  
220 highest level, 85.6% were not working, median monthly income was 0 (IQR: 0 to 1,000),  
221 Uganda shillings, 56.1% did not live with both parents, 54.8% of household heads were  
222 female, and 22.1% of household leads were husband /spouse.

223 Overall, 178 (46.2%) were sexually active, and the mean age of sex debut was 15.8 (SD:  
224 1.44), years, sexual abuse was reported by 5.2% of respondents, of whom 75% were sexually  
225 abused by strangers, meanwhile physical abuse was reported by 21.6% of respondents, 37.1%  
226 of teenage girls experienced peer pressure and alcohol consumption was reported by 8.8% of  
227 respondents.

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Figure 2 summarizes modern contraceptive methods used by teenage girls living in refugee settlements of the west Nile region, in northern Uganda. Some of the teenage girls; 13.8% had ever used modern contraceptives in their lifetime, meanwhile only 7.5% were currently using modern contraceptives, of whom only 13.2% reported to have ever used long term contraceptive methods, and 30.2% reported to have ever used multiple methods (including long term and short-term methods). Overall, 17.9% received contraceptive use counselling from home, and 36.1% received home sex education, meanwhile 55.1% had received sex education from school, 40.5% had received contraceptives use counselling from school, and 64.7% had ever been health educated on the dangers of teenage pregnancy.

Some respondents, 5.7% had the intention of getting pregnant in the next 12 months, whereas 52.0% had friends who are pregnant, 24.9% were married, of whom 38.5% were forced / arranged. Up to 9.8% of the respondents had ever had an abortion, and 22.0% had had a caesarean section.

**Fig 1: Prevalence of teenage pregnancy among 385 girls aged 15 to 19 living in Palorinya and Bidi Bidi refugee settlements of west Nile region, Northern Uganda.**

**Fig 2: The different contraceptive methods used by teenage girls living in Palorinya and Bidi Bidi refugee settlements of west Nile region, Northern Uganda (N=385; n=53)**

**Table 1: Individual characteristics of 385 teenage girls living in Palorinya and Bidi Bidi refugee settlements of west Nile region, northern Uganda**

Variable	Frequency	Percentage
Age, median (Interquartile range), years	17	15-18
<b>Occupation</b>		
Working	56	14.6
Not working	329	85.6
Average monthly income, median (Interquartile range), Ugx	0	0 – 1,000
<b>Education</b>		
No formal education	5	1.3
Primary	316	82.1
Secondary and beyond	64	16.6
<b>Media Exposure</b>		
Listens to Radio	60	15.6
Owens a mobile phone	71	18.4
Reads newspaper	11	2.9
Watch Television	3	0.8
Uses more than one Medium	65	16.9
None of the above	175	45.6
<b>Relationship to household head</b>		
Parent	251	65.2
Relative	49	12.7
Husband/Spouse	85	22.1
<b>Intention to get pregnant in 12 months</b>		

Yes	22	5.7
No	363	94.3
<b>Have friends who are pregnant</b>		
Yes	200	52.0
No	185	48.0
<b>Ever gotten pregnant</b>		
Yes	131	34.0
No	254	66.0
<b>Number of pregnancies, median (min, max), times</b>	1	1, 3
<b>Pregnancy Outcome</b>		
Live births	110	90.2
Abortions	7	5.7
Both	5	4.1
<b>Peer pressure</b>		
Yes	143	37.1
No	242	62.9
<b>Married</b>		
Yes	96	24.9
No	289	75.1
<b>Mode of Marriage</b>		
Arranged / Forced	37	38.5
Willingly	59	61.5
<b>History of Contraceptive Use</b>		
Yes	53	13.8
No	332	86.2
<b>Current contraceptive use</b>		
Yes	29	7.5
No	356	93.5
<b>Living with both Parents</b>		
Yes	169	43.9
No	216	56.1
<b>Home sex education</b>		
Yes	139	36.1
No	246	63.9
<b>Home contraceptive use counselling</b>		
Yes	69	17.9
No	316	82.1
<b>Received school sex education</b>		
Yes	212	55.1
No	173	44.9
<b>School contraceptive use counselling</b>		

Yes	156	40.5
No	229	59.5
<b>Health education on dangers of teenage pregnancy</b>		
Yes	249	64.7
No	136	35.3
<b>Sexual abuse</b>		
Yes	20	5.2
No	365	94.8
<b>Perpetrator (n=20)</b>		
Relative	5	25.0
Stranger	15	75.0
<b>Physical abuse</b>		
Yes	83	21.6
No	302	78.4
<b>Alcohol Consumption</b>		
Yes	34	8.8
No	351	91.2

## Period prevalence of teenage pregnancy among 385 teenage girls living in Palorinya and Bidi Bidi refugee settlements of west Nile region, northern Uganda

Figure 1 shows the prevalence of teenage pregnancy among 385 teenage girls living in refugee settlements of west Nile region, northern Uganda. We found out that up to 34.0% of respondents reported to have ever gotten pregnant between 2020 to 2023 (CI: 29.4% to 38.9%), the median number of pregnancies was 1, with a minimum of 1 and maximum of 3.

## Predictors of teenage pregnancy among 385 teenage girls living in Palorinya and Bidi Bidi refugee settlements of west Nile region, northern Uganda



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Table 2 summarizes the factors associated with teenage pregnancy among 385 teenage girls living in refugee settlements of west Nile region, northern Uganda. At bivariate level, factors such as; lack of formal education (PR: 3.1, 95% CI: 2.64-3.64,  $p<0.001$ ), male house hold head (PR: 2.3, 95% CI: 1.72 – 3.13,  $p<0.001$ ), living with a husband / spouse (PR: 5.4, 95% CI: 4.11-7.17,  $P<0.001$ ), intention to get pregnant (PR: 1.1, 95% CI: 1.03 – 1.15,  $p= 0.003$ ), peer pressure (PR: 3.7, 95% CI: 2.73-5.05,  $P<0.001$ ), being married (PR: 6.6, 95% CI: 4.95 – 8.82,  $P<0.001$ ), history of contraceptive use (PR: 3.2, 95% CI: 2.55 – 3.94,  $P<0.001$ ), lack of home sex education (PR: 1.6, 95%CI: 1.16 – 2.24,  $P = 0.005$ ), health education on dangers of teenage pregnancy (PR: 1.8, 95% CI: 1.25 – 2.49,  $P = 0.001$ ), sexual abuse (PR: 2.7, 95% CI: 2.14 – 3.46,  $P<0.001$ ), physical abuse (PR: 2.3, 95% CI: 1.80 – 2.99,  $P<0.001$ ) and alcohol consumption (PR: 2.3, 95% CI: 1.77 – 3.03,  $P<0.001$ ), were positively associated to teenage pregnancy.

We then performed modified Poisson regression on all variables that had a P value  $< 0.2$ , while controlling for occupation, media exposure and living with both parents. Teenage girls with no formal education were 2.3 times more likely to be pregnant (aPR: 2.3, 95% CI: 1.26-4.35,  $P = 0.007$ ) as compared with those who had formal education; those who were living with a husband / spouse were 3.8 times more likely to be pregnant (aPR: 3.8, 95% CI: 2.51-5.84,  $P<0.001$ ) as compared with those who lived with their parents; teenage girls who experienced peer pressure were 2.1 times more likely to be pregnant (aPR: 2.1, 95% CI: 1.54-2.86,  $P<0.001$ ) as compared to those who didn't; those who had a history of contraceptive use were 1.8 times more likely to be pregnant (aPR: 1.8, 95% CI: 1.31-2.33,  $P<0.001$ ) as compared to those who did not have; and teenage girls who experienced sexual abuse were

1.5 times more likely to be pregnant (aPR: 1.5, 95% CI: 1.07-1.99, P = 0.018) as compared to those who didn't.

**Table 2: Factors independently associated with teenage pregnancy among 385 teenage girls living in Palorinya and Bidi Bidi refugee settlements of west Nile region, Northern Uganda**

Variable	All (N=385) Freq (%)	Teenage Pregnancy		Crude PR (95% CI)	P value	Adjusted PR (95% CI)	P value
		Yes (n=131) Freq (%)	No (n=254) Freq (%)				
<b>Occupation</b>							
Working	56 (14.6)	29 (22.1)	27 (10.6)	1.7(1.24 – 2.56)	0.001	1.1(0.86-1.54)	0.346
Not working	329 (85.6)	102 (77.86)	227 (89.4)	Reference		Reference	
<b>Education</b>							
No education	5 (1.3)	5 (3.8)	0 (0.0)	3.1(2.64-3.64)	<0.001	2.3(1.26-4.35)	0.007
Primary	316 (82.1)	102 (77.9)	214 (84.3)	Reference		Reference	
Secondary and beyond	64 (16.6)	24 (18.3)	40 (15.8)	1.2(9.81-1.66)	0.407	1.1(0.84-1.51)	0.439
<b>Media Exposure</b>							
Listens to Radio	60 (15.6)	5 (3.8)	55 (21.6)	1 (1.00 – 1.00)	1.000	N/A	0.052
Owns a mobile phone	71 (18.4)	50 (38.2)	21 (8.3)	0.9 (0.80 – 0.98)	0.015	0.9 (0.80 – 1.00)	
Reads newspaper	11 (2.9)	1 (0.8)	10 (3.9)	1 (1.00 – 1.00)	1.000		
Watch Television	3 (0.8)	1 (0.8)	2 (0.8)	1 (1.00 – 1.00)	1.000		
Uses more than one Medium	65 (16.9)	39 (29.8)	26 (10.2)	0.9 (0.84 – 1.01)	0.085		
None of the above	175 (45.6)	35 (26.7)	140 (55.1)	Reference			
<b>Relationship to household head</b>							
Parent	251 (65.2)	43 (32.8)	208 (81.9)	Reference		Reference	
Relative	49 (12.73)	9 (6.9)	40 (15.8)	1.1(0.56-2.06)	0.834	0.9(0.47-1.64)	0.687
Husband/Spouse	85 (22.1)	79 (60.3)	6 (2.4)	5.4(4.11-7.17)	<0.001	3.8(2.51-	<0.001

5.84)							
<b>Intention to get pregnant in 12 months</b>							
Yes	22 (5.7)	19 (14.5)	3 (1.2)	1.1 (1.03 – 1.15)	0.003	1.0 (0.97 – 1.1)	0.246
No	363 (94.3)	112 (85.5)	251 (98.8)	Reference		Reference	
<b>Have friends who are pregnant</b>							
Yes	200 (52.0)	116 (88.6)	84 (33.1)	1.1 (0.89 – 1.36)	0.421	N/A	
No	185 (48.0)	15 (11.4)	170 (66.9)	Reference			
<b>Peer pressure</b>							
Yes	143 (37.1)	90 (68.7)	53 (20.9)	3.7 (2.73-5.05)	<0.001	2.1(1.54-2.86)	<0.001
No	242 (62.9)	41(31.3)	201 (79.1)	Reference		Reference	
<b>Married</b>							
Yes	96 (24.9)	90 (68.7)	6 (2.4)	6.6 (4.95 – 8.82)	<0.001	1.1 (0.88 – 1.46)	0.337
No	289 (75.1)	41 (31.3)	248 (97.6)	Reference		Reference	
<b>Mode of Marriage</b>							
Arranged /	37 (38.5)	33 (36.7)	4 (66.7)	Reference		N/A	
Forced	59 (61.5)	57 (63.3)	2 (33.3)	1.0 (0.95 – 1.16)	0.347		
Willingly							
<b>History of Contraceptive Use</b>							
Yes	53 (13.8)	44 (33.6)	9 (3.5)	3.2(2.55 – 3.94)	<0.001	1.8(1.31-2.33)	<0.001
No	332 (86.2)	87 (66.4)	245 (96.5)	Reference		Reference	
<b>Living with both Parents</b>							
Yes	169 (43.9)	65 (49.6)	104 (40.9)	1.3(0.95 – 1.66)	0.104	1.1(0.88-1.40)	0.392
No	216 (56.1)	66 (50.4)	150 (59.1)	Reference		Reference	
<b>Home sex education</b>							
Yes	139 (36.1)	34 (26.0)	105 (41.3)	Reference		Reference	
No	246 (63.9)	97 (74.0)	149 (58.7)	1.6(1.16 – 2.24)	0.005	1.2(0.94-1.63)	0.127
<b>Home contraceptive use counselling</b>							
Yes	69 (17.9)	26 (19.8)	43 (16.9)	1.13(0.81 – 1.60)	0.471	N/A	
No	316 (82.1)	105 (80.2)	211 (83.1)	Reference			
<b>Received school sex education</b>							
Yes	212 (55.1)	67 (52.3)	145 (57.1)	1.0 (0.96 – 1.17)	0.265	N/A	
No	173 (44.9)	61 (47.7)	109 (42.9)	Reference			
<b>School contraceptive use counselling</b>							
Yes	156 (40.5)	56 (43.8)	100 (39.4)	1.0 (0.93 – 1.13)	0.573	N/A	
No	229 (59.5)	75 (56.2)	154 (60.6)	Reference			
<b>Health education on dangers of teenage pregnancy</b>							
Yes	249 (64.7)	100 (76.3)	149 (58.7)	1.8(1.25 – 2.49)	0.001	1.2(0.92-1.66)	0.167
No	136 (35.3)	31 (23.7)	105 (41.3)	Reference		Reference	

**Sexual abuse**

Yes	20 (5.2)	17 (13.0)	3 (1.2)	2.7(2.14 – 3.46)	<0.001	1.5(1.07-1.99)	0.018
No	365 (94.8)	114 (87.0)	251 (98.8)	Reference		Reference	

**Physical abuse**

Yes	83 (21.6)	51 (38.9)	32 (12.6)	2.3(1.80 – 2.99)	<0.001	1.1(0.82-1.36)	0.658
No	302 (78.4)	80 (61.1)	222 (87.4)	Reference		Reference	

**Alcohol Consumption**

Yes	34 (8.8)	24 (18.3)	10 (3.9)	2.3(1.77 – 3.03)	<0.001	0.9(0.64-1.20)	0.414
No	351 (91.2)	107 (81.7)	244 (96.1)	Reference		Reference	

**Discussion**

This study reveals a high prevalence of teenage pregnancies (34.0%) among teenage girls living in refugee settlements in northern Uganda. Several factors were independently associated with teenage pregnancies in this context, including living with a spouse or husband, lack of formal education, peer pressure, and inconsistent use of modern contraceptives. Additionally, 9.8% of the respondents had experienced an abortion, highlighting the potential risks of maternal morbidity and mortality in this vulnerable population. Furthermore, the study identified concerning levels of sexual abuse, with 25% of the perpetrators being relatives, emphasizing the challenges faced by these girls in seeking support and justice.

Notably, there is a gap in the literature on sexual and reproductive health issues in humanitarian settings in general, and teenage pregnancy statistics in similar settings are not

widely studied. Our study reveals a comparatively higher prevalence of teenage pregnancy in the refugee settings of northern Uganda, way higher than that in other studies. The high prevalence of teenage pregnancy in our study could be because our study only considered teenage girls between 15 to 19 years old, meanwhile the other studies considered 13 to 19. We found a close relationship between sexual abuse and teenage pregnancy, which was similarly observed in Malawi [20]. Our study found that up to 25% of the perpetrators of sexual abuse among teenage girls are relatives. This makes it particularly hard to seek support from community and cultural leaders, necessitating the involvement of higher authorities. Several factors were independently associated with teenage pregnancies in our study. Importantly, living with a spouse/husband presented four-fold likelihood of teenage pregnancy compared to those who lived with their parents. Other studies agree with our findings [21]. Moreover, we also found out that most of the child marriages in the refugee context were forced (38.5%), similarly observed in different studies [21]. Forced and early/child marriage in Bidi Bidi refugee settlement and among Ugandan refugees is a complex issue driven by various factors such as poverty and economic hardship, gender norms and cultural practices, stigma and social pressure [22]. Providing education and vocational training for girls, engaging community leaders and members in dialogue and strengthening and enforcing laws against child marriage can provide a legal deterrent, meanwhile offering comprehensive sexual and reproductive health services and support for survivors of child and / or forced marriages can mitigate some of the adverse effects [22]. Our study also found that 9.8% of the respondents had ever had an abortion. The limitation is that our study did not explore whether this was induced or spontaneous. Furthermore, we do not know whether this abortion was in the watch of a qualified health service provider. This

332 poses a greater risk of severe morbidity and mortality among teenage mothers in these  
333 settings.

334 Additionally, teenage girls without a formal education stood at a 2.3 times higher risk of  
335 teenage pregnancy compared to those with at least a primary education. Similarly, another  
336 study conducted in Malawi noted an inequality in teenage pregnancy which worsened to the  
337 disadvantage of the less educated [23]. Another important predictor of teenage pregnancy in  
338 our study was peer pressure. This is related to another study carried out in Kibuku district,  
339 Uganda, that pointed out that bad peer groups were an outstanding cause of teenage  
340 pregnancy among the respondents [24]. Addressing the challenge of peer pressure requires a  
341 multi-sectoral collaboration, involving the Ministry of Health, and education among other  
342 ministries.

343 Paradoxically, our study found out that teenage girls who had a history of using modern  
344 contraceptives stood at 1.8 risk of teenage pregnancies as compared to those who did not.  
345 These findings were unlike those observed in Malawi [17], which otherwise found that  
346 history of contraceptive use was a protective factor. Unfortunately, our study did not  
347 distinguish between the use of long-term and short-term contraceptives, in relation to  
348 pregnancy. We observed that 13.8% of teenage girls living in refugee settlements reported  
349 having ever used a modern contraceptive method in their lifetime. Despite this, given the  
350 relatively low average age of sexual debut (15.8 years), only 7.5% were currently using  
351 modern contraceptives, with just 13.2% having ever used long-term contraceptive methods.  
352 Noting the inconsistencies in the use of modern contraceptives among the study participants  
353 makes it possible that these inconsistencies contribute to the high prevalence of teenage  
354 pregnancy in this setting. Additionally, the proportion of respondents who had ever used

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355 long-term methods is relatively low, leaving a wider window for teenage pregnancies in this  
356 setting.

357 **Conclusions and Recommendations**

358 Our study found out that about 1 in 3 adolescent girls in refugee settlement of Northern  
359 Uganda experienced pregnancy during the COVID-19 pandemic. Only 1 in 13 of the  
360 adolescents was currently using modern methods of contraception.

361 Relevant refugee authorities and government stakeholders must develop targeted strategies to  
362 address teenage pregnancy in refugee settings, which contributes to the broader issue of  
363 maternal morbidity and mortality. This includes exploring legal actions against perpetrators  
364 of sexual abuse and implementing measures to combat forced child marriages, such as  
365 forming support groups, promoting girl child education, and protecting the rights of girls in  
366 refugee settlements.

367 The Ministry of Health, in collaboration with the Office of the Prime Minister, should  
368 implement measures to combat sexual violence against teenage girls in refugee contexts. This  
369 could include enhancing education access for girls, which not only reduces teenage  
370 pregnancy but also helps in the fight against HIV. Encouraging the uptake of long-term  
371 contraceptive methods and fostering inclusive education solutions will help lower the  
372 incidence of teenage pregnancy and address associated challenges.

373 In as much as this study provides important insights into the SRH challenges faced by  
374 adolescent girls in the Bidi Bidi refugee settlement, the findings must be interpreted within  
375 the context of the study’s limitations. Future research should aim to include a larger, more



diverse sample to further validate these findings and explore the broader applicability of the results.

## References

1. WHO. (2014). "teenage pregnancy fact sheet," 2014. View at: Google Scholar
2. Neema S, Musisi N and Kibombo R. (2014). teenage sexual and reproductive health in Uganda: a synthesis of research evidence. Occasional report No. 14. 2014.  
<http://www.guttmacher.org/pubs/2004/12/20/or14.pdf?q=uganda>.
3. WHO. (2020). teenage pregnancy. <https://www.who.int/news-room/fact-sheets/detail/teenage-pregnancy>.
4. UNICEF. (2024). *Top 10 Causes of Disability* (pp. 6–11). Source: [Early childbearing and teenage pregnancy rates by country - UNICEF DATA](#)
5. UNICEF (2019). Early childbearing. <https://data.unicef.org/topic/childbearing>
6. UNAIDS. (2022). The 'Education Plus' Initiative (2021-2025) - Empowerment of Adolescent Girls and Young Women in sub-Saharan Africa.  
<https://www.unaids.org/en/topics/education-plus>.
7. Humanities International. (2021). Girls at higher risk of child marriage and teenage pregnancy due to pandemic, Humanists International tells UN. Source: [Girls at higher risk of child marriage and teenage pregnancy due to pandemic, Humanists International tells UN](#)



8. UN. (2019). GIRLS NOT BRIDES. 2019. <https://www.girlsnotbrides.org/child-marriage/uganda/>.

9. UBOS (Uganda Bureau of Statistics). (2016). Uganda demographic and health survey 2016. Kampala, UBOS and Calverton: ICF International Inc; 2016. <https://dhsprogram.com/pubs/pdf/FR333/FR333.pdf>.

10. UNFPA Uganda | Addressing teenage pregnancy during the COVID-19 pandemic. (n.d.). <https://uganda.unfpa.org/en/news/addressing-teenage-pregnancy-during-covid-19-pandemic>

11. UNESCO (2020). COVID-19 Education Response: How many students are at risk of not returning to school? Source: <https://unesdoc.unesco.org/ark:/48223/pf0000373992>.

12. Inter-agency working group. (2019). Adolescent sexual and reproductive health needs in emergencies. *Inter-Agency Working Group, 2019*.

13. *Post-COVID school reentry for pregnant girls and young mothers in Ugandan refugee communities\_ A reality or myth\_ \_ Brookings*. (n.d.).

14. *Post-COVID school reentry for pregnant girls and young mothers in Ugandan refugee communities\_ A reality or myth\_ \_ Brookings* n.d.

15. *Post-COVID school reentry for pregnant girls and young mothers in Ugandan refugee communities\_ A reality or myth\_ \_ Brookings* n.d.

16. Bol KN, Negera E, Gedefa AG. Pregnancy among adolescent girls in humanitarian settings: a case in refugee camp of Gambella regional state, community-based cross-sectional study, Southwest Ethiopia, 2021. *BMJ Open* 2022;12:e064732. <https://doi.org/10.1136/bmjopen-2022-064732>.

17. *Post-COVID school reentry for pregnant girls and young mothers in Ugandan refugee communities\_ A reality or myth\_ \_ Brookings* n.d.

18. Bol KN, Negera E, Gedefa AG. Pregnancy among adolescent girls in humanitarian

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- settings: a case in refugee camp of Gambella regional state, community-based cross-sectional study, Southwest Ethiopia, 2021. *BMJ Open* 2022;12:e064732. <https://doi.org/10.1136/bmjopen-2022-064732>.
19. Adhena G, Fikre A. Teenage pregnancy matters in refugee setup: early pregnancy among adolescent girls in Kule refugee camp, Gambella, Ethiopia. *BMC Pregnancy Childbirth* 2023;23:861. <https://doi.org/10.1186/s12884-023-06178-0>.
20. Soeiro RE, de Siqueira Guida JP, da-Costa-Santos J, Costa ML. Sexual and reproductive health (SRH) needs for forcibly displaced adolescent girls and young women (10–24 years old) in humanitarian settings: a mixed-methods systematic review. *Reprod Health* 2023;20:174. <https://doi.org/10.1186/s12978-023-01715-8>.
21. STROBE – strengthening the reporting of observational studies in epidemiology. Available from: <https://www.strobe-statement.org/>
22. Loutet, M. G., Logie, C. H., Okumu, M., Berry, I., Lukone, S. O., Kisubi, N., McAlpine, A., Mwima, S., & Kyambadde, P. (2022). Sexual and reproductive health factors associated with child, early and forced marriage and partnerships among refugee youth in a humanitarian setting in Uganda: Mixed methods findings. *African Journal of Reproductive Health / La Revue Africaine de La Santé Reproductive*, 26(12), 66–77. <https://www.jstor.org/stable/27231849>
23. Office of the Prime Minister (OPM) and United Nations Higher Commissioner for Refugees (UNHCR). (2023). *Uganda- Population Dashboard: Overview of Refugees and Asylum-seekers in Uganda. April 2023*, 0–1Parliament Of Uganda.
24. Kaphagawani NC, Kalipeni E. Sociocultural factors contributing to teenage pregnancy in Zomba district, Malawi. *Glob Public Health*. 2017 Jun;12(6):694-710. doi: 10.1080/17441692.2016.1229354. Epub 2016 Sep 30. PMID: 27687242.
25. Gwido V and Fekadu M.A. (2015). Factors contributing to, and effects of, teenage pregnancy in Juba. Juba College of Nursing and Midwifery. Source: [www.southsudanmedicaljournal.com/archive/](http://www.southsudanmedicaljournal.com/archive/)

26. Chirwa GC, Mazalale J, Likupe G, Nkhoma D, Chiwaula L and Chintsanya J (2019)  
An evolution of Socio-economic related inequality in teenage pregnancy and  
childbearing in Malawi. PLoS ONE 14(11): e0225374.  
<https://doi.org/10.1371/journal.pone.0225374>.

27. Manzi F, Ogwang J, Akankwatsa A, Wakoli O.C, Obba F, Yahaya G, et al. (2018).  
Factors Associated with Teenage Pregnancy and its Effects in Kibuku Town Council,  
Kibuku District, Eastern Uganda: A Cross Sectional Study. Source: DOI:  
10.4172/2167-1079.1000298/

**Declarations**

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Donald Otika (*Corresponding Author*) is the guarantor.

471 Conceptualization, Formal analysis, Funding acquisition, Investigation, Methodology, Project  
472 administration, Writing – original draft, Writing – review & editing.

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#### 483 **Consent for Publication**

484 Not applicable

#### 485 **Conflicts of interest**

486 We declare no conflict of interest in this research work.

#### 487 **Data Availability Statement**

488 All relevant data are within the manuscript and its supporting information files. Data are  
489 available upon reasonable request from the first author.

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**Ethical Considerations**

We obtained an ethical approval and clearance letter from Gulu University Research and Ethics Committee (GUREC) (approval number: GUREC-2022-291), which was presented to the district health offices (DHO) of the selected districts, to seek administrative clearance. We presented the introductory letter from the DHO to the refugee welfare council 2 (RWC2) of selected refugee settlements to seek entry into the community and commence data collection. A private and comfortable room was acquired and used during the process of data collection to ensure privacy and confidentiality. Written informed consent was obtained from respondents who were 18 or 19 years. For respondents below 18, a written informed assent was obtained from a parent/guardian who also consented to allow their daughter to participate in the study, and participation was free and voluntary. Participants were assured of their freedom to withdraw from the study at any time with no penalty. Confidentiality of the information collected was observed by using numbers and not names.

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- Supplementary file 1: Data collection tool
- Supplementary file 2: STROBE checklist
- Supplementary file 3: Supplemental Material for Editors only

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Supplementary file 4: Response to Reviewer Comments

**Word count: 3503**

**Figure legends**

Fig 1: Prevalence of teenage pregnancy among 385 girls aged 15 to 19 living in Palorinya and Bidi Bidi refugee settlements of west Nile region, Northern Uganda.

Fig 2: The different contraceptive methods used by teenage girls living in Palorinya and Bidi Bidi refugee settlements of west Nile region, Northern Uganda (N=385; n=53)

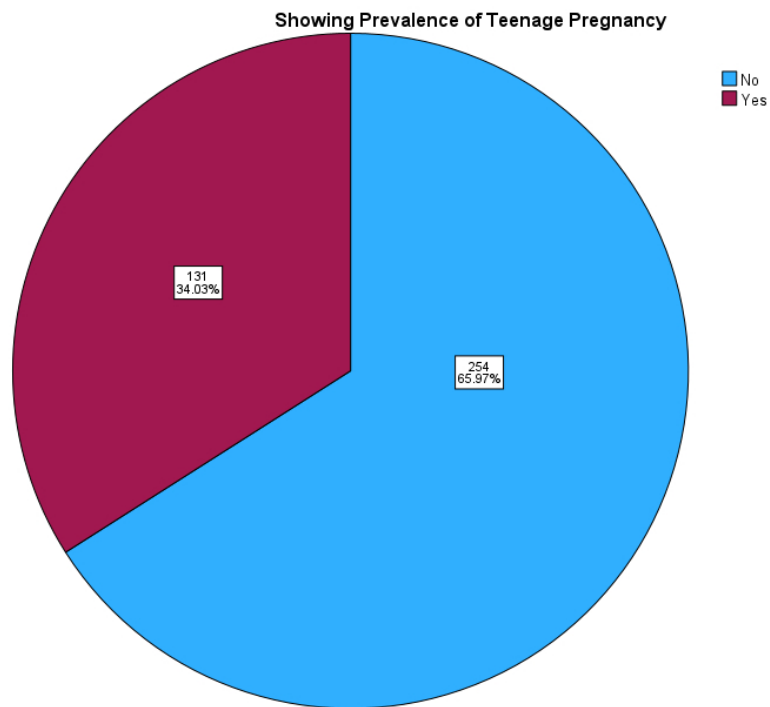


Fig 1: Prevalence of teenage pregnancy among 385 girls aged 15 to 19 living in Palorinya and Bidi Bidi refugee settlements of west Nile region, Northern Uganda.

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The Different Contraceptive Methods Used by Refugee Teenage Girls in Four Refugee Settlements of Northern Uganda (N=385; n=53)

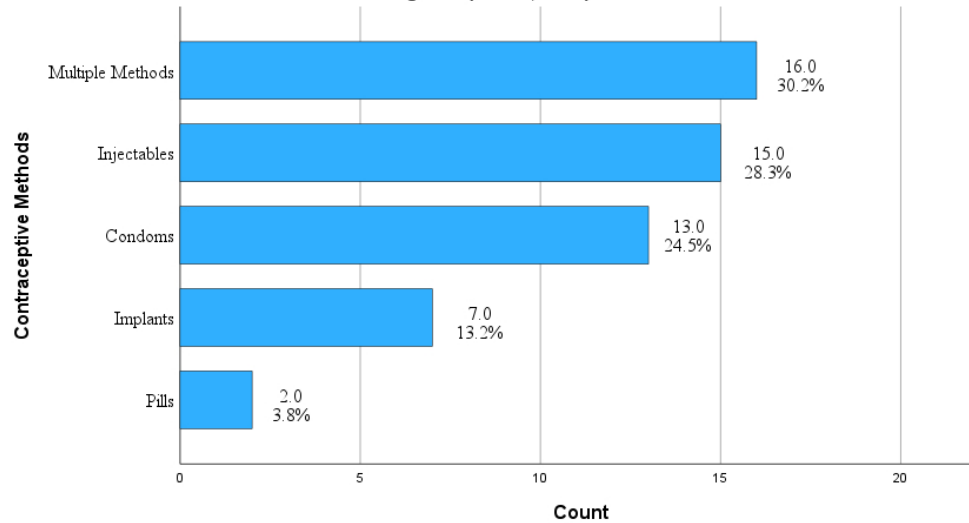


Fig 2: The different contraceptive methods used by teenage girls living in Palorinya and Bidi Bidi refugee settlements of west Nile region, Northern Uganda (N=385; n=53)

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**Appendix VIII: Questionnaire - English**

**Version: 2.0, October 18, 2022**

Instructions: Tick in the box provided on the left only answers of the respondent’s choice that apply and not more than one option can be chosen. Additional answers may be added in the spaces provided.

**Section A: Socio Demographic Data**

- 1. Age \_\_\_\_\_[Years]
- 2. Which religion are you?
  - a) Christian
  - b) Muslim
- 3. What is your country of Origin?  
.....
- 4. What is your tribe?  
.....
- 5. What is your education level?
  - a) No education
  - b) Primary
  - c) Secondary and beyond
- 6. What is your occupation?
  - a) Not working
  - b) Working
- 7. What is your average monthly income? \_\_\_\_\_[UGX/Month]

8. Do you have any media exposure? (tick all that apply)

- a) Reads newspaper.
- b) Listens to radio.
- c) Watch television.
- d) Owns a mobile phone.
- e) None of the above

9. What is the sex of household lead?

- a) Male
- b) Female

10. What is your relation to household lead?

- a) Husband / Spouse
- b) Parent
- c) Relative

11. Have you ever had sex?

- a) Yes
- b) No

12. If yes, what was your age at first sex debut \_\_\_\_\_ [Age in years]

### Section B: Pregnancy

13. Do you have the Intention-to-get pregnant in the next 12 months.

- a) Yes
- b) No

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14. Do you have friends within the same age bracket who are pregnant?
- a) Yes
- b) No
15. Have you ever got peer pressure to get pregnant?
- a) Yes
- b) No
16. Have you ever gotten pregnant?
- a) Yes
- b) No
17. If yes, How many times? \_\_\_\_\_ [Number of pregnancies]
18. What was the outcome of pregnancy (tick all that apply)
- a) Live births [      ]
- b) Abortions [      ]
- c) Still birth [      ]
- d) Ectopic [      ]
19. If births, what was the mode of delivery? (tick all that apply)
- a) SVD
- b) C/S
20. If live births, did your baby get any neonatal complications?
- a) Yes
- b) No
21. If Yes, \_\_\_\_\_ [specify]

### Section C: Marriage

22. Do you have friends within the same age bracket who are married?

c) Yes

d) No

23. Have you ever got peer pressure to get married?

a) Yes

b) No

24. What is your marital status?

a) Married

b) Unmarried

25. If married, what was your mode of marriage?

a) Forced / Arranged.

b) Willingly

### Section D: Contraception

26. Have you ever used modern contraceptive methods

a) Yes

b) No

27. If Yes, which one (select all that applies)

a) Pills

i. Emergency pills

ii. Combined oral contraceptive pills

b) Condoms

- c) Implants
- d) Injectables
- e) IUDs
- f) Others \_\_\_\_\_ [specify]

28. Are you currently using modern contraceptive methods (within the last 3 months)

- a) Yes
- b) No

29. If yes, which one (select all that applies)

- a) Pills
  - i. Emergency pills
  - ii. Combined oral contraceptive pills
- b) Condoms
- c) Implants
- d) Injectables
- e) IUDs
- f) Others \_\_\_\_\_ [specify]

**Section D: Other factors**

30. Do you have both parents?

- a) Yes
- b) No

31. Have you ever received sex education from home (parents)?

a) Yes

b) No

32. Have you ever received contraceptives use training from home (parents)?

a) Yes

b) No

33. Have you ever received sex education from school (teachers)?

a) Yes

b) No

34. Have you ever received contraceptives use training from school (teachers)?

a) Yes

b) No

35. Have you ever been health educated about the dangers of teenage pregnancies?

a) Yes

b) No

36. Have you ever been sexually abused?

a) Yes

b) No

37. If Yes, who was the perpetrator?

a) Parents

b) Relatives

c) Strangers

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38. Have you ever been physically abused?

- a) Yes
- b) No

39. Do you take alcohol?

- a) Yes
- b) No

For peer review only

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## Depression Screening

### PHQ-9 modified for Adolescents (age 12-17)

Over the last 2 weeks, how often have you been bothered by any of the following:

	Not at all	Several days	More than half the days	Nearly every day				
1. Little interest or pleasure in doing things?	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>				
2. Feeling down, depressed, irritable or hopeless?	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>				
3. Trouble falling asleep, staying asleep, or sleeping too much?	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>				
4. Feeling tired or having little energy?	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>				
5. Poor appetite, weight loss or overeating?	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>				
6. Feeling bad about yourself—or feeling that you are a failure, or that you have let yourself or your family down?	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>				
7. Trouble concentrating on things like school work, reading or watching TV?	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>				
8. Moving or speaking so slowly that other people could have noticed? Or the opposite—being so fidgety or restless that you were moving around a lot more than usual?	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>				
9. Thoughts that you would be better off dead or of hurting yourself in some way?	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>				
If response to question 9 is in shaded squares, answer question 10 below. If response to question 9 is 0 → STOP.								
10. Have you had thoughts of actually hurting yourself?	<input type="text" value="YES"/>		<input type="text" value="NO"/>					
<b>Staff:</b> Add score for 9 questions. Enter all information in PHQ-9 doc flowsheet. If question 10 response if YES, a P4 ASSESSMENT IS NEEDED.								
<b>Additional Questions</b>								
In the past year have you felt sad or depressed most days, even if you felt okay sometimes	<input type="text" value="YES"/>		<input type="text" value="NO"/>					
If you are experiencing any of the problems listed on this form, how <b>difficult</b> have these problems made it for you to do your work, take care of things at home or get along with other people?	<input type="text" value="Not difficult at all"/>	<input type="text" value="Somewhat difficult"/>	<input type="text" value="Very difficult"/>	<input type="text" value="Extremely difficult"/>				
Has there been a time in the past month when you had serious thoughts about ending your life?	<input type="text" value="YES"/>		<input type="text" value="NO"/>					
Have you <b>EVER</b> in your <b>WHOLE LIFE</b> , tried to kill yourself or made a suicide attempt?	<input type="text" value="YES"/>		<input type="text" value="NO"/>					

Thank you for participating



# BMJ Open

**High burden of teenage pregnancy and low modern contraceptive methods uptake in refugee settlements of Northern Uganda in the post COVID-19 era Between 2020 and 2023**

Journal:	BMJ Open
Manuscript ID	bmjopen-2024-089361.R3
Article Type:	Original research
Date Submitted by the Author:	22-Nov-2024
Complete List of Authors:	Donald, Otika; Gulu University; Uganda Cancer Institute, Northern Uganda Regional Cancer Center Odongo, George; Uganda Cancer Institute, Northern Uganda Regional Cancer Center Muzaki, Ruth Mary; Gulu University Lamwaka, Beatrice Oweka; Gulu University Bongomin, Felix; Gulu University Pebolo, Francis; Gulu University, Reproductive Health
<b>Primary Subject Heading</b>:	Reproductive medicine
Secondary Subject Heading:	Obstetrics and gynaecology, Reproductive medicine, Sexual health
Keywords:	Adolescents < Adolescent, Pregnancy, Cross-Sectional Studies

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**1 Prevalence and factors associated with teenage pregnancy in refugee settlements of**  
**2 northern Uganda post-COVID-19 (2020-2023): A cross-sectional study**

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18 **Keywords:** Teenage pregnancy., Modern contraceptives., Refugee Settlements., Adolescent  
19 Pregnancy,. Uganda.

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20   **Abstract**

21   **Background:** Following the COVID-19 pandemic, there was an increase in teenage  
22   pregnancies nationally, however, limited data exists regarding the same among girls living in  
23   refugee settlements.

24   **Objectives:** We evaluated the prevalence of teenage pregnancy and associated factors in  
25   Palorinya and Bidi Bidi refugee settlements in Obongi and Yumbe districts of Northern Uganda,  
26   in the post-COVID-19 era.

27   **Design:** We conducted a cross-sectional study.

28   **Setting:** Refugee settlements in northern Uganda.

29   **Participants:** We included 385 teenage girls aged 15 to 19 years

30   **Methods:** We used convenience sampling techniques between March and May 2023.  
31   Prevalence of teenage pregnancy was assessed by self-reported pregnancies between January  
32   2020 and May 2023 among participants. We conducted Pearson’s chi-square and Fisher’s  
33   exact tests for bivariate analysis. All variables with a P-value <0.2 at bivariate analysis were  
34   included in multivariable regression. We applied a modified Poisson regression model at  
35   multivariable level to evaluate independent associations. The level of statistical significance  
36   was set at P < 0.05.

37   **Primary and Secondary Outcome Measures:** The primary outcome measure was the  
38   prevalence of teenage pregnancy, assessed through self-reported pregnancies among  
39   participants. Secondary outcome measures included factors associated with teenage

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pregnancy, such as living with a husband, lack of formal education, peer pressure, and history of sexual abuse.

**Results:** Overall, the mean age of 17 (IQR: 15-18), and sexual debut at 16 (IQR: 15-17) years. Lifetime modern contraceptive use was 13.8% (n= 53/385) and current use was 7.5% (n=29/385). Teenage pregnancy period prevalence was 34.0% (CI: 29.4% to 38.9%). Factors independently associated with teenage pregnancy were; living with a husband (aPR: 3.8, 95% CI: 2.51 to 5.84, P <0.001), lack of formal education (aPR: 2.3, 95% CI: 1.26 to 4.35, P = 0.007), peer pressure (aPR: 2.1, 95% CI: 1.54 to 2.86, P <0.001) and history of sexual abuse (aPR: 1.5, 95% CI: 1.07 to 1.99, P = 0.018).

**Conclusion:** Our study revealed that around 1 in 3 adolescent girls in Northern Uganda's refugee settlements experienced pregnancy during the COVID-19 pandemic, with only 1 in 13 currently using modern contraceptives. To address this, targeted strategies by relevant authorities are crucial, including legal actions against sexual abuse, promoting girl child education, and enhancing access to long-term contraception, to reduce teenage pregnancy and associated health risks in these settings.

## Article Summary

### Strengths and Limitations of the Study

- The study's inclusion of only two refugee settlements may limit generalizability to all refugee settlements in Uganda, affecting external validity.
- Randomly selecting settlements and using a substantial sample size within each strengthens the statistical reliability of our conclusions.

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61       • Conducting a cross-sectional analysis without pre-pandemic data prevents  
62       establishing causal relationships between variables.  
63       • Future research could adopt longitudinal approaches to track changes over time and  
64       incorporate historical data for a comprehensive assessment of causal associations.

65   **Background**

66   Teenage pregnancy is defined as a pregnancy in girls 13–19 years of age [1]. Teenage  
67   pregnancies can have negative consequences for the mother’s health such as unsafe abortion  
68   attempts leading to mortality, as well as economic and social outcomes, exacerbated by  
69   stigmatization, school dropout and isolation from family [2]. Complications from teenage  
70   pregnancy and childbirth are the leading cause of death in girls aged 15 to 19 years  
71   worldwide [3].

72   The incidence of teenage pregnancy is increasing and has become a worldwide concern. It is  
73   estimated that about 16 million girls 15–19 years old give birth each year, contributing nearly  
74   11% of all births worldwide [1]. Globally in 2022, an estimated 13 per cent of adolescent  
75   girls and young women give birth before the age of 18 [4, 5]

76   In Africa, more than 20% of women aged 15 to 19 have given birth to at least one child [1].  
77   Sub-Saharan Africa is home to more than one million teenage girls with pregnancy [5]. Sub-  
78   Saharan Africa additionally experiences some of the highest rates of gender inequality in the  
79   world, resulting in unequal access to education and high rates of violence against girls, early  
80   pregnancy, and child marriage [6]. It is estimated that 608,000 girls are thought to be at risk  
81   of child marriage, and 542,000 additional girls are at risk of early pregnancy [7].

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82 The regional teenage birth rate in SSA is more than double the global average, with 101  
83 births per 1,000 girls aged 15 to 19 – ranging from 39 births per 1,000 girls aged 15 to 19 in  
84 Rwanda to 184 births per 1,000 girls aged 15 to 19 in Nigeria [4]. Child marriage is  
85 widespread in West and Central Africa, where 42% of women are married as children, and in  
86 East and Southern Africa, where child marriage affects 37% of girls [8].

87 Despite Uganda's commitment to ending child, early and forced marriages and teenage  
88 pregnancy by the year 2030 through co-sponsoring the 2013 and 2014 UN General Assembly  
89 and 2013 Human Rights Council resolutions on early and forced marriages [9], one in four  
90 (24%) teenage girls in Uganda report having given birth for the first time by the age of 18  
91 [10]. According to UNICEF (2021) estimates, a total of 354,736 teenage pregnancies were  
92 registered in 2020, and 196,499 in the first six months of 2021 amidst the COVID-19  
93 pandemic [11].

94 The COVID-19 pandemic wreaked unprecedented havoc on children, families, and  
95 communities around the globe, disrupting vital services like girl-child education, and putting  
96 millions of lives at risk. The United Nations estimated that nearly 11 million primary and  
97 secondary school learners worldwide – 5.2 million of whom are girls – did not return to  
98 education following school closures amidst COVID-19 due to teenage pregnancy and related  
99 outcomes [12].

100 For the most vulnerable children, especially girls living in refugee settlements, accessing  
101 education and staying in school is hard enough. The pandemic caused additional,  
102 unanticipated disruption, compounding their vulnerability to teenage pregnancies by many  
103 folds [7]. Moreover, teenage girls living in refugee settlements face challenges accessing

sexual and reproductive health services, including sex education and modern contraceptive methods [13]. These girls are at a significantly higher risk of early pregnancy, a situation that worsened due to the COVID-19 pandemic. According to a recent study by the Forum for African Women Educationalists (Uganda Chapter), the rate of teenage pregnancy among girls in refugee settlements rose from 3.3% to 4.1% during the pandemic. In one Palabek settlement, the proportion of refugee girls who reported being pregnant during the COVID-19 period reached 4.8%, compared to the national average of 1.8% [14]. Additionally, statistics on modern contraceptive methods uptake among this population are unknown.

Teen pregnancies in refugee and humanitarian settings are influenced by several factors including poverty, lack of education, cultural norms, etc., further driven by limited access to health care, lack of social support and increased risk of sexual violence [15–17]. Addressing these issues requires targeted interventions that consider the unique challenges faced by teenage girls in these settings.

We therefore aimed to estimate the prevalence and associated factors of teenage pregnancies in the post-COVID-19 era in Palorinya and Bidi Bidi refugee settlements of the west Nile region, Northern Uganda.

121 **Methods**

## 122 Study Design and Rationale



123 We conducted a community-based, cross-sectional study between March and May, 2023. We  
124 followed the Strengthening The Reporting of Observational Studies in Epidemiology  
125 (STROBE) guidelines to design this manuscript in order to ensure attention to detail [18].

## 126 **Study Setting and Rationale**

127 We conducted this study in Palorinya and Bidi Bidi refugee settlements of the west Nile  
128 region, Northern Uganda. According to data from the Office of the Prime Minister (OPM)  
129 and United Nations Higher Commissioner for Refugees (UNHCR), Uganda is now home to  
130 1,622,738 refugees living in 13 refugee settlements across the country, and almost half (6) of  
131 these are in the west Nile region [19]. Women and girls constitute over 80% of this  
132 population, and the settlements are arranged in blocks and zones. Palorinya refugee  
133 settlement has 4 zones, and 9 level 3 health centers, meanwhile Bidi Bidi has 6 zones and 16  
134 level 3 health centers. None of the refugee settlements has a higher-level health center,  
135 however, there are several referral sites e.g., Yumbe Health Center IV, Midigo Health Center  
136 IV and Yumbe Regional Referral Hospital. All these facilities provide family planning  
137 services to adolescents. This setting was chosen because it hosts the biggest number of  
138 refugee settlements, proposed to provide a big pool of potential respondents for sampling.

## 139 **Study Population, Inclusion and Exclusion Criteria.**

140 Our study targeted teenage girls living in the refugee settlements of Northern Uganda. We  
141 included only respondents between 15 to 19 years old, who provided written informed  
142 consent or assent with a consent from parent / guardian, and were living in the refugee  
143 settlements before the beginning of COVID-19. Those who did not provide informed consent  
144 or assent were not included.

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**Sample size determination.**

146 We used the Kish Lisle (1965) formula for the calculation of sample size for an unknown  
147 population. At 95% confidence interval, we used an error of 5%, alpha risk expressed in z  
148 score of 1.96 and a conservative assumption of a 50% population proportion was made to  
149 ensure robustness. We obtained a sample size of 385. These choices were guided by standard  
150 practices, aiming to balance precision and practicability.

151

**Sampling method.**

152 We used convenience sampling to select study participants from Bidi Bidi and Palorinya  
153 refugee settlements. Convenience sampling in our study involved selecting participants who  
154 were readily available and willing to participate in the study. We approached individuals in  
155 many community spaces, targeting various times and days to ensure diversity. The  
156 participation acceptance rate was 100%, with no declines. This method allowed us to gather  
157 data from a broad participant base.

158

**Research Instruments**

159 We developed a semi-structured questionnaire including both open and closed-ended  
160 questions. The data collection tool was developed in English and translated into three  
161 languages: *Acholi, Kuku, and Arabic*. We pretested the tool among respondents of similar  
162 characteristics outside the study area, after which we refined and fine-tuned the tool for  
163 reliability and validity. The tool was then exported into Kobotoolbox installed on mobile  
164 phone devices which was used for data collection. We asked about demographics, household  
165 characteristics, pregnancy history between January 2020 and May 2023 and intentions,

marriage status, modern contraceptive use between January 2020 and May 2023, sex education, and sexual and physical abuse among others. Abuse was measured by asking 'Have you ever experienced physical abuse?' and 'Have you ever experienced sexual abuse?' with timeframes specified as 'in the past 12 months' and 'in your lifetime,' respectively. Contraception use was assessed by asking 'Have you ever used any form of contraception?'. Those who had ever used were further asked to specify the method of contraception used. Peer pressure was measured by asking 'Have you ever experienced any form of peer pressure to get pregnant?' Alcohol consumption was assessed by asking 'Do you take alcohol?'. These responses were recorded as binary outcomes (yes/no). The tool was developed de novo, adhering to established guidelines and drawing from relevant literature. This tool had not been previously used in this setting, and it was tailored specifically for this study.

### **Data Collection Procedures**

A private and comfortable room was acquired and used during the process of data collection to ensure a private and confidential environment for respondents. We recruited research assistants, who were given a one-day training for acquaintance with the tool and were taken through research ethics and good clinical practice. The research assistants carried out the collection of data. Although gender matching between participants and data collectors was not implemented, all research assistants underwent comprehensive training on ethical principles. This training highlighted the importance of maintaining privacy and confidentiality, especially when handling sensitive information related to abuse. They explained the purpose of the study to each of the respondents identified, and obtained informed consent, followed by administration of the questionnaire using an electronic form

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188 stored in the Kobo toolbox mobile application, which is a free open-source tool for mobile  
189 data collection.

190 **Data management.**

191 The phone devices that were used to collect the data were fully charged at every moment the  
192 research team set off to collect data, and the data captured in the phone was regularly saved to  
193 avoid loss of data. We safely kept the devices under key and lock before and after data  
194 collection, and limited access. We exported the data into STATA version 15, where analysis  
195 was done from.

196 **Data analysis.**

197 The prevalence of teenage pregnancy was assessed by self-reported pregnancies from January  
198 2020 to May 2023. We conducted Pearson’s chi-square and Fisher’s exact tests for bivariate  
199 analysis. The level of statistical significance was set at  $P < 0.05$ . Variables with a P-value  $<$   
200 0.2 from these tests were included in the multivariable analysis. We applied a modified  
201 Poisson regression model at the multivariable level to evaluate independent associations. The  
202 level of statistical significance was set at  $P < 0.05$ . Modified Poisson regression was chosen  
203 over logistic regression because the outcome was common (i.e., the prevalence rate was  
204 high), because in such cases, the odds ratio from logistic regression can significantly  
205 overestimate the relative risk. We considered variables with  $P < 0.2$  from bivariate analysis to  
206 be included in the multivariable regression since their power of association is  $> \text{ or } = 80\%$ .

207 The research questions tested in statistical analysis were, ‘what is the prevalence of teenage  
208 pregnancies in the study population?’ and ‘what are the associated factors of teenage  
209 pregnancies in the study population?’

210 The data was then computed in percentages and frequencies and finally presented in figures  
211 (pie chart, bar graph) and tables.

### 212 **Patient and Public Involvement**

213 The public was involved in this study. Dissemination of findings was done to key  
214 stakeholders.

215

### 216 **Results**

#### 217 **Participant Characteristics**

218 Table 1 summarizes the general characteristics of 385 teenage girls living in refugee  
219 settlements of the West Nile region, in northern Uganda. The mean age was 17 (IQR: 15 to  
220 18), years, and 99.5% were Christians, 316 (82.1%) had attained primary education as the  
221 highest level, 85.6% were not working, median monthly income was 0 (IQR: 0 to 1,000),  
222 Uganda shillings, 56.1% did not live with both parents, 54.8% of household heads were  
223 female, and 22.1% of household leads were husband /spouse.

224 Overall, 178 (46.2%) were sexually active, and the mean age of sex debut was 15.8 (SD:  
225 1.44), years, sexual abuse was reported by 5.2% of respondents, of whom 75% were sexually  
226 abused by strangers, meanwhile physical abuse was reported by 21.6% of respondents, 37.1%

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227 of teenage girls experienced peer pressure and alcohol consumption was reported by 8.8% of  
228 respondents.

229 Figure 2 summarizes modern contraceptive methods used by teenage girls living in refugee  
230 settlements of the west Nile region, in northern Uganda. Some of the teenage girls; 13.8%  
231 had ever used modern contraceptives in their lifetime, meanwhile only 7.5% were currently  
232 using modern contraceptives, of whom only 13.2% reported to have ever used long term  
233 contraceptive methods, and 30.2% reported to have ever used multiple methods (including  
234 long term and short-term methods). Overall, 17.9% received contraceptive use counselling  
235 from home, and 36.1% received home sex education, meanwhile 55.1% had received sex  
236 education from school, 40.5% had received contraceptives use counselling from school, and  
237 64.7% had ever been health educated on the dangers of teenage pregnancy.

238 Some respondents, 5.7% had the intention of getting pregnant in the next 12 months, whereas  
239 52.0% had friends who are pregnant,24.9% were married, of whom 38.5% were forced /  
240 arranged. Up to 9.8% of the respondents had ever had an abortion, and 22.0% had had a  
241 caesarean section.

242  
243 **Fig 1: Prevalence of teenage pregnancy among 385 girls aged 15 to 19 living in**  
244 **Palorinya and Bidi Bidi refugee settlements of west Nile region, Northern Uganda.**

**Fig 2: The different contraceptive methods used by teenage girls living in Palorinya and Bidi Bidi refugee settlements of west Nile region, Northern Uganda (N=385; n=53)**

**Table 1: Individual characteristics of 385 teenage girls living in Palorinya and Bidi Bidi refugee settlements of west Nile region, northern Uganda**

Variable	Frequency	Percentage
Age, median (Interquartile range), years	17	15-18
<b>Occupation</b>		
Working	56	14.6
Not working	329	85.6
Average monthly income, median (Interquartile range), Ugx	0	0 – 1,000
<b>Education</b>		
No formal education	5	1.3
Primary	316	82.1
Secondary and beyond	64	16.6
<b>Media Exposure</b>		
Listens to Radio	60	15.6
Owens a mobile phone	71	18.4
Reads newspaper	11	2.9
Watch Television	3	0.8
Uses more than one Medium	65	16.9
None of the above	175	45.6
<b>Relationship to household head</b>		

Parent	251	65.2
Relative	49	12.7
Husband/Spouse	85	22.1
<b>Intention to get pregnant in 12 months</b>		
Yes	22	5.7
No	363	94.3
<b>Have friends who are pregnant</b>		
Yes	200	52.0
No	185	48.0
<b>Ever gotten pregnant</b>		
Yes	131	34.0
No	254	66.0
<b>Number of pregnancies, median (min, max), times</b>	1	1, 3
<b>Pregnancy Outcome</b>		
Live births	110	90.2
Abortions	7	5.7
Both	5	4.1
<b>Peer pressure</b>		
Yes	143	37.1
No	242	62.9
<b>Married</b>		
Yes	96	24.9
No	289	75.1
<b>Mode of Marriage</b>		
Arranged / Forced	37	38.5
Willingly	59	61.5
<b>History of Contraceptive Use</b>		
Yes	53	13.8
No	332	86.2
<b>Current contraceptive use</b>		
Yes	29	7.5
No	356	93.5
<b>Living with both Parents</b>		
Yes	169	43.9
No	216	56.1
<b>Home sex education</b>		
Yes	139	36.1
No	246	63.9
<b>Home contraceptive use counselling</b>		
Yes	69	17.9
No	316	82.1
<b>Received school sex education</b>		



Yes	212	55.1
No	173	44.9
<b>School contraceptive use counselling</b>		
Yes	156	40.5
No	229	59.5
<b>Health education on dangers of teenage pregnancy</b>		
Yes	249	64.7
No	136	35.3
<b>Sexual abuse</b>		
Yes	20	5.2
No	365	94.8
<b>Perpetrator (n=20)</b>		
Relative	5	25.0
Stranger	15	75.0
<b>Physical abuse</b>		
Yes	83	21.6
No	302	78.4
<b>Alcohol Consumption</b>		
Yes	34	8.8
No	351	91.2

## **Period prevalence of teenage pregnancy among 385 teenage girls living in Palorinya and Bidi Bidi refugee settlements of west Nile region, northern Uganda**

Figure 1 shows the prevalence of teenage pregnancy among 385 teenage girls living in refugee settlements of west Nile region, northern Uganda. We found out that up to 34.0% of respondents reported to have ever gotten pregnant between 2020 to 2023 (CI: 29.4% to 38.9%), the median number of pregnancies was 1, with a minimum of 1 and maximum of 3.

## **Predictors of teenage pregnancy among 385 teenage girls living in Palorinya and Bidi Bidi refugee settlements of west Nile region, northern Uganda**

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Table 2 summarizes the factors associated with teenage pregnancy among 385 teenage girls living in refugee settlements of west Nile region, northern Uganda. At bivariate level, factors such as; lack of formal education (PR: 3.1, 95% CI: 2.64-3.64,  $p<0.001$ ), male house hold head (PR: 2.3, 95% CI: 1.72 – 3.13,  $p<0.001$ ), living with a husband / spouse (PR: 5.4, 95% CI: 4.11-7.17,  $P<0.001$ ), intention to get pregnant (PR: 1.1, 95% CI: 1.03 – 1.15,  $p= 0.003$ ), peer pressure (PR: 3.7, 95% CI: 2.73-5.05,  $P<0.001$ ), being married (PR: 6.6, 95% CI: 4.95 – 8.82,  $P<0.001$ ), history of contraceptive use (PR: 3.2, 95% CI: 2.55 – 3.94,  $P<0.001$ ), lack of home sex education (PR: 1.6, 95%CI: 1.16 – 2.24,  $P = 0.005$ ), health education on dangers of teenage pregnancy (PR: 1.8, 95% CI: 1.25 – 2.49,  $P = 0.001$ ), sexual abuse (PR: 2.7, 95% CI: 2.14 – 3.46,  $P<0.001$ ), physical abuse (PR: 2.3, 95% CI: 1.80 – 2.99,  $P<0.001$ ) and alcohol consumption (PR: 2.3, 95% CI: 1.77 – 3.03,  $P<0.001$ ), were positively associated to teenage pregnancy.

We then performed modified Poisson regression on all variables that had a P value  $< 0.2$ , while controlling for occupation, media exposure and living with both parents. Teenage girls with no formal education were 2.3 times more likely to be pregnant (aPR: 2.3, 95% CI: 1.26-4.35,  $P = 0.007$ ) as compared with those who had formal education; those who were living with a husband / spouse were 3.8 times more likely to be pregnant (aPR: 3.8, 95% CI: 2.51-5.84,  $P<0.001$ ) as compared with those who lived with their parents; teenage girls who experienced peer pressure were 2.1 times more likely to be pregnant (aPR: 2.1, 95% CI: 1.54-2.86,  $P<0.001$ ) as compared to those who didn't; those who had a history of contraceptive use were 1.8 times more likely to be pregnant (aPR: 1.8, 95% CI: 1.31-2.33,  $P<0.001$ ) as compared to those who did not have; and teenage girls who experienced sexual abuse were

289 1.5 times more likely to be pregnant (aPR: 1.5, 95% CI: 1.07-1.99, P = 0.018) as compared to  
 290 those who didn't.

291

292 **Table 2: Factors independently associated with teenage pregnancy among 385 teenage**  
 293 **girls living in Palorinya and Bidi Bidi refugee settlements of west Nile region, Northern**  
 294 **Uganda**

Variable	All (N=385) Freq (%)	Teenage Pregnancy		Crude PR (95% CI)	P value	Adjusted PR (95% CI)	P value
		Yes (n=131) Freq (%)	No (n=254) Freq (%)				
Occupation							
Working	56 (14.6)	29 (22.1)	27 (10.6)	1.7(1.24 – 2.56)	0.001	1.1(0.86-1.54)	0.346
Not working	329 (85.6)	102 (77.86)	227 (89.4)	Reference		Reference	
Education							
No education	5 (1.3)	5 (3.8)	0 (0.0)	3.1(2.64-3.64)	<0.001	2.3(1.26-4.35)	0.007
Primary	316 (82.1)	102 (77.9)	214 (84.3)	Reference		Reference	
Secondary and beyond	64 (16.6)	24 (18.3)	40 (15.8)	1.2(9.81-1.66)	0.407	1.1(0.84-1.51)	0.439
Media Exposure							
Listens to Radio	60 (15.6)	5 (3.8)	55 (21.6)	1 (1.00 – 1.00)	1.000	N/A	0.052
Owns a mobile phone	71 (18.4)	50 (38.2)	21 (8.3)	0.9 (0.80 – 0.98)	0.015	0.9 (0.80 – 1.00)	
Reads newspaper	11 (2.9)	1 (0.8)	10 (3.9)	1 (1.00 – 1.00)	1.000		
Watch Television	3 (0.8)	1 (0.8)	2 (0.8)	1 (1.00 – 1.00)	1.000		
Uses more than one Medium	65 (16.9)	39 (29.8)	26 (10.2)	0.9 (0.84 – 1.01)	0.085		
None of the above	175 (45.6)	35 (26.7)	140 (55.1)	Reference			
Relationship to household head							
Parent	251 (65.2)	43 (32.8)	208 (81.9)	Reference		Reference	
Relative	49 (12.73)	9 (6.9)	40 (15.8)	1.1(0.56-2.06)	0.834	0.9(0.47-1.64)	0.687
Husband/Spouse	85 (22.1)	79 (60.3)	6 (2.4)	5.4(4.11-7.17)	<0.001	3.8(2.51-	<0.001

5.84)							
Intention to get pregnant in 12 months							
Yes	22 (5.7)	19 (14.5)	3 (1.2)	1.1 (1.03 – 1.15)	0.003	1.0 (0.97 – 1.1)	0.246
No	363 (94.3)	112 (85.5)	251 (98.8)	Reference		Reference	
Have friends who are pregnant							
Yes	200 (52.0)	116 (88.6)	84 (33.1)	1.1 (0.89 – 1.36)	0.421	N/A	
No	185 (48.0)	15 (11.4)	170 (66.9)	Reference			
Peer pressure							
Yes	143 (37.1)	90 (68.7)	53 (20.9)	3.7 (2.73-5.05)	<0.001	2.1(1.54-2.86)	<0.001
No	242 (62.9)	41(31.3)	201 (79.1)	Reference		Reference	
Married							
Yes	96 (24.9)	90 (68.7)	6 (2.4)	6.6 (4.95 – 8.82)	<0.001	1.1 (0.88 – 1.46)	0.337
No	289 (75.1)	41 (31.3)	248 (97.6)	Reference		Reference	
Mode of Marriage							
Arranged /	37 (38.5)	33 (36.7)	4 (66.7)	Reference		N/A	
Forced	59 (61.5)	57 (63.3)	2 (33.3)	1.0 (0.95 – 1.16)	0.347		
Willingly							
History of Contraceptive Use							
Yes	53 (13.8)	44 (33.6)	9 (3.5)	3.2(2.55 – 3.94)	<0.001	1.8(1.31-2.33)	<0.001
No	332 (86.2)	87 (66.4)	245 (96.5)	Reference		Reference	
Living with both Parents							
Yes	169 (43.9)	65 (49.6)	104 (40.9)	1.3(0.95 – 1.66)	0.104	1.1(0.88-1.40)	0.392
No	216 (56.1)	66 (50.4)	150 (59.1)	Reference		Reference	
Home sex education							
Yes	139 (36.1)	34 (26.0)	105 (41.3)	Reference		Reference	
No	246 (63.9)	97 (74.0)	149 (58.7)	1.6(1.16 – 2.24)	0.005	1.2(0.94-1.63)	0.127
Home contraceptive use counselling							
Yes	69 (17.9)	26 (19.8)	43 (16.9)	1.13(0.81 – 1.60)	0.471	N/A	
No	316 (82.1)	105 (80.2)	211 (83.1)	Reference			
Received school sex education							
Yes	212 (55.1)	67 (52.3)	145 (57.1)	1.0 (0.96 – 1.17)	0.265	N/A	
No	173 (44.9)	61 (47.7)	109 (42.9)	Reference			
School contraceptive use counselling							
Yes	156 (40.5)	56 (43.8)	100 (39.4)	1.0 (0.93 – 1.13)	0.573	N/A	
No	229 (59.5)	75 (56.2)	154 (60.6)	Reference			
Health education on dangers of teenage pregnancy							
Yes	249 (64.7)	100 (76.3)	149 (58.7)	1.8(1.25 – 2.49)	0.001	1.2(0.92-1.66)	0.167
No	136 (35.3)	31 (23.7)	105 (41.3)	Reference		Reference	

**Sexual abuse**

Yes	20 (5.2)	17 (13.0)	3 (1.2)	2.7(2.14 – 3.46)	<0.001	1.5(1.07-1.99)	0.018
No	365 (94.8)	114 (87.0)	251 (98.8)	Reference		Reference	

**Physical abuse**

Yes	83 (21.6)	51 (38.9)	32 (12.6)	2.3(1.80 – 2.99)	<0.001	1.1(0.82-1.36)	0.658
No	302 (78.4)	80 (61.1)	222 (87.4)	Reference		Reference	

**Alcohol Consumption**

Yes	34 (8.8)	24 (18.3)	10 (3.9)	2.3(1.77 – 3.03)	<0.001	0.9(0.64-1.20)	0.414
No	351 (91.2)	107 (81.7)	244 (96.1)	Reference		Reference	

**Discussion**

This study reveals a high prevalence of teenage pregnancies (34.0%) among teenage girls living in refugee settlements in northern Uganda. Several factors were independently associated with teenage pregnancies in this context, including living with a spouse or husband, lack of formal education, peer pressure, and inconsistent use of modern contraceptives. Additionally, 9.8% of the respondents had experienced an abortion, highlighting the potential risks of maternal morbidity and mortality in this vulnerable population. Furthermore, the study identified concerning levels of sexual abuse, with 25% of the perpetrators being relatives, emphasizing the challenges faced by these girls in seeking support and justice.

Notably, there is a gap in the literature on sexual and reproductive health issues in humanitarian settings in general, and teenage pregnancy statistics in similar settings are not

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widely studied. Our study reveals a comparatively higher prevalence of teenage pregnancy in the refugee settings of northern Uganda, way higher than that in other studies. The high prevalence of teenage pregnancy in our study could be because our study only considered teenage girls between 15 to 19 years old, meanwhile the other studies considered 13 to 19. We found a close relationship between sexual abuse and teenage pregnancy, which was similarly observed in Malawi [20]. Our study found that up to 25% of the perpetrators of sexual abuse among teenage girls are relatives. This makes it particularly hard to seek support from community and cultural leaders, necessitating the involvement of higher authorities. Several factors were independently associated with teenage pregnancies in our study. Importantly, living with a spouse/husband presented four-fold likelihood of teenage pregnancy compared to those who lived with their parents. Other studies agree with our findings [21]. Moreover, we also found out that most of the child marriages in the refugee context were forced (38.5%), similarly observed in different studies [21]. Forced and early/child marriage in Bidi Bidi refugee settlement and among Ugandan refugees is a complex issue driven by various factors such as poverty and economic hardship, gender norms and cultural practices, stigma and social pressure [22]. Providing education and vocational training for girls, engaging community leaders and members in dialogue and strengthening and enforcing laws against child marriage can provide a legal deterrent, meanwhile offering comprehensive sexual and reproductive health services and support for survivors of child and / or forced marriages can mitigate some of the adverse effects [22]. Our study also found that 9.8% of the respondents had ever had an abortion. The limitation is that our study did not explore whether this was induced or spontaneous. Furthermore, we do not know whether this abortion was in the watch of a qualified health service provider. This

333 poses a greater risk of severe morbidity and mortality among teenage mothers in these  
334 settings.

335 Additionally, teenage girls without a formal education stood at a 2.3 times higher risk of  
336 teenage pregnancy compared to those with at least a primary education. Similarly, another  
337 study conducted in Malawi noted an inequality in teenage pregnancy which worsened to the  
338 disadvantage of the less educated [23]. Another important predictor of teenage pregnancy in  
339 our study was peer pressure. This is related to another study carried out in Kibuku district,  
340 Uganda, that pointed out that bad peer groups were an outstanding cause of teenage  
341 pregnancy among the respondents [24]. Addressing the challenge of peer pressure requires a  
342 multi-sectoral collaboration, involving the Ministry of Health, and education among other  
343 ministries.

344 Paradoxically, our study found out that teenage girls who had a history of using modern  
345 contraceptives stood at 1.8 risk of teenage pregnancies as compared to those who did not.  
346 These findings were unlike those observed in Malawi [17], which otherwise found that  
347 history of contraceptive use was a protective factor. Unfortunately, our study did not  
348 distinguish between the use of long-term and short-term contraceptives, in relation to  
349 pregnancy. We observed that 13.8% of teenage girls living in refugee settlements reported  
350 having ever used a modern contraceptive method in their lifetime. Despite this, given the  
351 relatively low average age of sexual debut (15.8 years), only 7.5% were currently using  
352 modern contraceptives, with just 13.2% having ever used long-term contraceptive methods.  
353 Noting the inconsistencies in the use of modern contraceptives among the study participants  
354 makes it possible that these inconsistencies contribute to the high prevalence of teenage  
355 pregnancy in this setting. Additionally, the proportion of respondents who had ever used



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356 long-term methods is relatively low, leaving a wider window for teenage pregnancies in this  
357 setting.

358 **Conclusions and Recommendations**

359 Our study found out that about 1 in 3 adolescent girls in refugee settlement of Northern  
360 Uganda experienced pregnancy during the COVID-19 pandemic. Only 1 in 13 of the  
361 adolescents was currently using modern methods of contraception.

362 Relevant refugee authorities and government stakeholders must develop targeted strategies to  
363 address teenage pregnancy in refugee settings, which contributes to the broader issue of  
364 maternal morbidity and mortality. This includes exploring legal actions against perpetrators  
365 of sexual abuse and implementing measures to combat forced child marriages, such as  
366 forming support groups, promoting girl child education, and protecting the rights of girls in  
367 refugee settlements.

368 The Ministry of Health, in collaboration with the Office of the Prime Minister, should  
369 implement measures to combat sexual violence against teenage girls in refugee contexts. This  
370 could include enhancing education access for girls, which not only reduces teenage  
371 pregnancy but also helps in the fight against HIV. Encouraging the uptake of long-term  
372 contraceptive methods and fostering inclusive education solutions will help lower the  
373 incidence of teenage pregnancy and address associated challenges.

374 In as much as this study provides important insights into the SRH challenges faced by  
375 adolescent girls in the Bidi Bidi refugee settlement, the findings must be interpreted within  
376 the context of the study's limitations. Future research should aim to include a larger, more



377 diverse sample to further validate these findings and explore the broader applicability of the  
378 results.

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## 382 References

- 383 1. WHO. (2014). "teenage pregnancy fact sheet," 2014. View at: Google Scholar
- 384 2. Neema S, Musisi N and Kibombo R. (2014). teenage sexual and reproductive health  
385 in Uganda: a synthesis of research evidence. Occasional report No. 14. 2014.  
386 <http://www.guttmacher.org/pubs/2004/12/20/or14.pdf?q=uganda>.
- 387 3. WHO. (2020). teenage pregnancy. [https://www.who.int/news-room/fact-](https://www.who.int/news-room/fact-sheets/detail/teenage-pregnancy)  
388 [sheets/detail/teenage-pregnancy](https://www.who.int/news-room/fact-sheets/detail/teenage-pregnancy).
- 389 4. UNICEF. (2024). *Top 10 Causes of Disability* (pp. 6–11). Source: [Early childbearing](#)  
390 [and teenage pregnancy rates by country - UNICEF DATA](#)
- 391 5. UNICEF (2019). Early childbearing. <https://data.unicef.org/topic/childbearing>
- 392 6. UNAIDS. (2022). The 'Education Plus' Initiative (2021-2025) - Empowerment of  
393 Adolescent Girls and Young Women in sub-Saharan Africa.  
394 [Https://Www.Unaids.Org/En/Topics/Education-Plus](https://www.unaids.org/en/topics/education-plus).
- 395 7. Humanities International. (2021). Girls at higher risk of child marriage and teenage  
396 pregnancy due to pandemic, Humanists International tells UN. Source: [Girls at higher](#)  
397 [risk of child marriage and teenage pregnancy due to pandemic, Humanists](#)  
398 [International tells UN](#)

8. UN. (2019). GIRLS NOT BRIDES. 2019. <https://www.girlsnotbrides.org/child-marriage/uganda/>.

9. UBOS (Uganda Bureau of Statistics). (2016). Uganda demographic and health survey 2016. Kampala, UBOS and Calverton: ICF International Inc; 2016. <https://dhsprogram.com/pubs/pdf/FR333/FR333.pdf>.

10. UNFPA Uganda | Addressing teenage pregnancy during the COVID-19 pandemic. (n.d.). <https://uganda.unfpa.org/en/news/addressing-teenage-pregnancy-during-covid-19-pandemic>

11. UNESCO (2020). COVID-19 Education Response: How many students are at risk of not returning to school? Source: <https://unesdoc.unesco.org/ark:/48223/pf0000373992>.

12. Inter-agency working group. (2019). Adolescent sexual and reproductive health needs in emergencies. *Inter-Agency Working Group, 2019*.

13. *Post-COVID school reentry for pregnant girls and young mothers in Ugandan refugee communities\_ A reality or myth\_ \_ Brookings*. (n.d.).

14. *Post-COVID school reentry for pregnant girls and young mothers in Ugandan refugee communities\_ A reality or myth\_ \_ Brookings* n.d.

15. *Post-COVID school reentry for pregnant girls and young mothers in Ugandan refugee communities\_ A reality or myth\_ \_ Brookings* n.d.

16. Bol KN, Negera E, Gedefa AG. Pregnancy among adolescent girls in humanitarian settings: a case in refugee camp of Gambella regional state, community-based cross-sectional study, Southwest Ethiopia, 2021. *BMJ Open* 2022;12:e064732. <https://doi.org/10.1136/bmjopen-2022-064732>.

17. *Post-COVID school reentry for pregnant girls and young mothers in Ugandan refugee communities\_ A reality or myth\_ \_ Brookings* n.d.

18. Bol KN, Negera E, Gedefa AG. Pregnancy among adolescent girls in humanitarian

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- settings: a case in refugee camp of Gambella regional state, community-based cross-sectional study, Southwest Ethiopia, 2021. *BMJ Open* 2022;12:e064732. <https://doi.org/10.1136/bmjopen-2022-064732>.
19. Adhena G, Fikre A. Teenage pregnancy matters in refugee setup: early pregnancy among adolescent girls in Kule refugee camp, Gambella, Ethiopia. *BMC Pregnancy Childbirth* 2023;23:861. <https://doi.org/10.1186/s12884-023-06178-0>.
20. Soeiro RE, de Siqueira Guida JP, da-Costa-Santos J, Costa ML. Sexual and reproductive health (SRH) needs for forcibly displaced adolescent girls and young women (10–24 years old) in humanitarian settings: a mixed-methods systematic review. *Reprod Health* 2023;20:174. <https://doi.org/10.1186/s12978-023-01715-8>.
21. STROBE – strengthening the reporting of observational studies in epidemiology. Available from: <https://www.strobe-statement.org/>
22. Loutet, M. G., Logie, C. H., Okumu, M., Berry, I., Lukone, S. O., Kisubi, N., McAlpine, A., Mwima, S., & Kyambadde, P. (2022). Sexual and reproductive health factors associated with child, early and forced marriage and partnerships among refugee youth in a humanitarian setting in Uganda: Mixed methods findings. *African Journal of Reproductive Health / La Revue Africaine de La Santé Reproductive*, 26(12), 66–77. <https://www.jstor.org/stable/27231849>
23. Office of the Prime Minister (OPM) and United Nations Higher Commissioner for Refugees (UNHCR). (2023). *Uganda- Population Dashboard: Overview of Refugees and Asylum-seekers in Uganda. April 2023*, 0–1Parliament Of Uganda.
24. Kaphagawani NC, Kalipeni E. Sociocultural factors contributing to teenage pregnancy in Zomba district, Malawi. *Glob Public Health*. 2017 Jun;12(6):694-710. doi: 10.1080/17441692.2016.1229354. Epub 2016 Sep 30. PMID: 27687242.
25. Gwido V and Fekadu M.A. (2015). Factors contributing to, and effects of, teenage pregnancy in Juba. Juba College of Nursing and Midwifery. Source: [www.southsudanmedicaljournal.com/archive/](http://www.southsudanmedicaljournal.com/archive/)

26. Chirwa GC, Mazalale J, Likupe G, Nkhoma D, Chiwaula L and Chintsanya J (2019)  
An evolution of Socio-economic related inequality in teenage pregnancy and  
childbearing in Malawi. PLoS ONE 14(11): e0225374.  
<https://doi.org/10.1371/journal.pone.0225374>.

27. Manzi F, Ogwang J, Akankwatsa A, Wakoli O.C, Obba F, Yahaya G, et al. (2018).  
Factors Associated with Teenage Pregnancy and its Effects in Kibuku Town Council,  
Kibuku District, Eastern Uganda: A Cross Sectional Study. Source: DOI:  
10.4172/2167-1079.1000298/

**Declarations**

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**Author Statement**

Donald Otika is the guarantor

472 Conceptualization, Formal analysis, Funding acquisition, Investigation, Methodology, Project  
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483 Funding acquisition, Supervision, Writing – original draft, Writing – review & editing.

#### 484 **Consent for Publication**

485 Not applicable

#### 486 **Conflicts of interest**

487 We declare no conflict of interest in this research work.

#### 488 **Data Availability Statement**

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489 All relevant data are within the manuscript and its supporting information files. Data are  
490 available upon reasonable request from the first author.

491 **Ethical Considerations**

492 We obtained an ethical approval and clearance letter from Gulu University Research and  
493 Ethics Committee (GUREC) (approval number: GUREC-2022-291), which was presented to  
494 the district health offices (DHO) of the selected districts, to seek administrative clearance.  
495 We presented the introductory letter from the DHO to the refugee welfare council 2 (RWC2)  
496 of selected refugee settlements to seek entry into the community and commence data  
497 collection. A private and comfortable room was acquired and used during the process of data  
498 collection to ensure privacy and confidentiality. Written informed consent was obtained from  
499 respondents who were 18 or 19 years. For respondents below 18, a written informed assent  
500 was obtained, and their parent/guardian also provided written informed consent to allow their  
501 daughter to participate in the study, and participation was free and voluntary. Participants  
502 were assured of their freedom to withdraw from the study at any time with no penalty.  
503 Confidentiality of the information collected was observed by using numbers and not names.

504  
505 **Funding**

506 This research was funded with support from Center for International Reproductive Health  
507 Training at University of Michigan (CIRHT-UM).

508 Supplementary file 1: Data collection tool

509 Supplementary file 2: STROBE checklist

510 Supplementary file 3: Supplemental Material for Editors only

511 Supplementary file 4: Response to Reviewer Comments

512 **Word count: 3503**

513 **Figure legends**

514 Fig 1: Prevalence of teenage pregnancy among 385 girls aged 15 to 19 living in Palorinya and  
515 Bidi Bidi refugee settlements of west Nile region, Northern Uganda.

516 Fig 2: The different contraceptive methods used by teenage girls living in Palorinya and Bidi  
517 Bidi refugee settlements of west Nile region, Northern Uganda (N=385; n=53)

Prevalence of Teenage Pregnancy among 385 Refugee Teenage Girls in Four Refugee Settlements of Northern Uganda

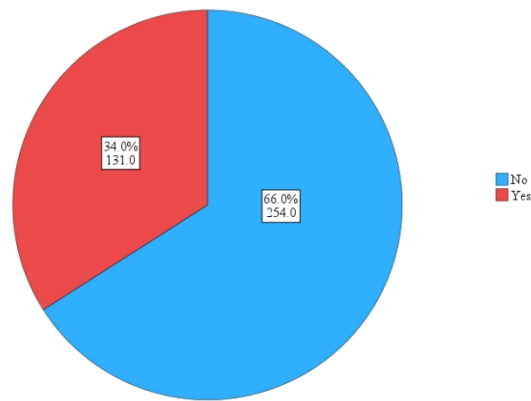


Fig 1: Prevalence of teenage pregnancy among 385 teenage girls living in Palorinya and Bidi Bidi refugee settlements of west Nile region, Northern Uganda

99x99mm (300 x 300 DPI)



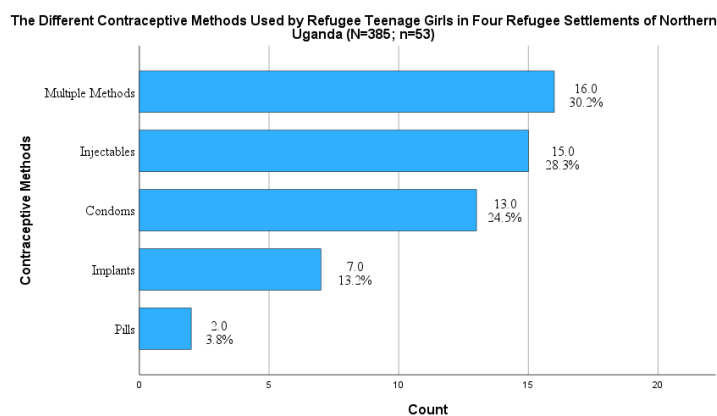


Fig 2: The different contraceptive methods used by teenage girls living in Palorinya and Bidi Bidi refugee settlements of west Nile region, Northern Uganda (N=385; n=53)

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**Appendix VIII: Questionnaire - English**

**Version: 2.0, October 18, 2022**

Instructions: Tick in the box provided on the left only answers of the respondent’s choice that apply and not more than one option can be chosen. Additional answers may be added in the spaces provided.

**Section A: Socio Demographic Data**

- 1. Age \_\_\_\_\_[Years]
- 2. Which religion are you?
  - a) Christian
  - b) Muslim
- 3. What is your country of Origin?  
.....
- 4. What is your tribe?  
.....
- 5. What is your education level?
  - a) No education
  - b) Primary
  - c) Secondary and beyond
- 6. What is your occupation?
  - a) Not working
  - b) Working
- 7. What is your average monthly income? \_\_\_\_\_[UGX/Month]

8. Do you have any media exposure? (tick all that apply)

- a) Reads newspaper.
- b) Listens to radio.
- c) Watch television.
- d) Owns a mobile phone.
- e) None of the above

9. What is the sex of household lead?

- a) Male
- b) Female

10. What is your relation to household lead?

- a) Husband / Spouse
- b) Parent
- c) Relative

11. Have you ever had sex?

- a) Yes
- b) No

12. If yes, what was your age at first sex debut \_\_\_\_\_ [Age in years]

### Section B: Pregnancy

13. Do you have the Intention-to-get pregnant in the next 12 months.

- a) Yes
- b) No

- 1  
2 14. Do you have friends within the same age bracket who are pregnant?  
3  
4  
5 a) Yes  
6  
7 b) No  
8  
9  
10 15. Have you ever got peer pressure to get pregnant?  
11  
12 a) Yes  
13  
14 b) No  
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17 16. Have you ever gotten pregnant?  
18  
19 a) Yes  
20  
21 b) No  
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25  
26 17. If yes, How many times? \_\_\_\_\_ [Number of pregnancies]  
27  
28  
29 18. What was the outcome of pregnancy (tick all that apply)  
30  
31 a) Live births [ ]  
32  
33 b) Abortions [ ]  
34  
35 c) Still birth [ ]  
36  
37 d) Ectopic [ ]  
38  
39  
40  
41  
42 19. If births, what was the mode of delivery? (tick all that apply)  
43  
44 a) SVD  
45  
46 b) C/S  
47  
48  
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50  
51 20. If live births, did your baby get any neonatal complications?  
52  
53 a) Yes  
54  
55 b) No  
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59 21. If Yes, \_\_\_\_\_ [specify]  
60

### Section C: Marriage

22. Do you have friends within the same age bracket who are married?

c) Yes

d) No

23. Have you ever got peer pressure to get married?

a) Yes

b) No

24. What is your marital status?

a) Married

b) Unmarried

25. If married, what was your mode of marriage?

a) Forced / Arranged.

b) Willingly

### Section D: Contraception

26. Have you ever used modern contraceptive methods

a) Yes

b) No

27. If Yes, which one (select all that applies)

a) Pills

i. Emergency pills

ii. Combined oral contraceptive pills

b) Condoms

- c) Implants
- d) Injectables
- e) IUDs
- f) Others \_\_\_\_\_ [specify]

28. Are you currently using modern contraceptive methods (within the last 3 months)

- a) Yes
- b) No

29. If yes, which one (select all that applies)

- a) Pills
  - i. Emergency pills
  - ii. Combined oral contraceptive pills
- b) Condoms
- c) Implants
- d) Injectables
- e) IUDs
- f) Others \_\_\_\_\_ [specify]

**Section D: Other factors**

30. Do you have both parents?

- a) Yes
- b) No

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31. Have you ever received sex education from home (parents)?

a) Yes

b) No

32. Have you ever received contraceptives use training from home (parents)?

a) Yes

b) No

33. Have you ever received sex education from school (teachers)?

a) Yes

b) No

34. Have you ever received contraceptives use training from school (teachers)?

a) Yes

b) No

35. Have you ever been health educated about the dangers of teenage pregnancies?

a) Yes

b) No

36. Have you ever been sexually abused?

a) Yes

b) No

37. If Yes, who was the perpetrator?

a) Parents

b) Relatives

c) Strangers

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38. Have you ever been physically abused?

- a) Yes
- b) No

39. Do you take alcohol?

- a) Yes
- b) No

For peer review only



## Depression Screening

### PHQ-9 modified for Adolescents (age 12-17)

Over the last 2 weeks, how often have you been bothered by any of the following:

	Not at all	Several days	More than half the days	Nearly every day				
1. Little interest or pleasure in doing things?	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>				
2. Feeling down, depressed, irritable or hopeless?	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>				
3. Trouble falling asleep, staying asleep, or sleeping too much?	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>				
4. Feeling tired or having little energy?	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>				
5. Poor appetite, weight loss or overeating?	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>				
6. Feeling bad about yourself—or feeling that you are a failure, or that you have let yourself or your family down?	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>				
7. Trouble concentrating on things like school work, reading or watching TV?	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>				
8. Moving or speaking so slowly that other people could have noticed? Or the opposite—being so fidgety or restless that you were moving around a lot more than usual?	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>				
9. Thoughts that you would be better off dead or of hurting yourself in some way?	<input type="text" value="0"/>	<input type="text" value="1"/>	<input type="text" value="2"/>	<input type="text" value="3"/>				
<p>If response to question 9 is in shaded squares, answer question 10 below.</p> <p>If response to question 9 is 0 → STOP.</p>								
10. Have you had thoughts of actually hurting yourself?	<input type="text" value="YES"/>		<input type="text" value="NO"/>					
<p><b>Staff:</b> Add score for 9 questions. Enter all information in PHQ-9 doc flowsheet.</p> <p>If question 10 response if YES, a P4 ASSESSMENT IS NEEDED.</p>								
<b>Additional Questions</b>								
In the past year have you felt sad or depressed most days, even if you felt okay sometimes	<input type="text" value="YES"/>		<input type="text" value="NO"/>					
If you are experiencing any of the problems listed on this form, how <b>difficult</b> have these problems made it for you to do your work, take care of things at home or get along with other people?	<input type="text" value="Not difficult at all"/>	<input type="text" value="Somewhat difficult"/>	<input type="text" value="Very difficult"/>	<input type="text" value="Extremely difficult"/>				
Has there been a time in the past month when you had serious thoughts about ending your life?	<input type="text" value="YES"/>		<input type="text" value="NO"/>					
Have you <b>EVER</b> in your <b>WHOLE LIFE</b> , tried to kill yourself or made a suicide attempt?	<input type="text" value="YES"/>		<input type="text" value="NO"/>					

Thank you for participating