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ORIGINAL RESEARCH

Factors Associated with Teenage Pregnancies During the Covid-19 Period in Pakwach District, Northern Uganda: A Case-Control Study

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Background: Teenage pregnancy rates have globally decreased over the years, but remain high, especially in low- and middle-income countries (LMICs). Among girls aged 15–19, teenage pregnancy remains the leading cause of death and a significant barrier to education and productivity. Its prevalence was high in pakwach district as reported by the DHO and police report during the pandemic. However, limited data exist regarding factors contributing to its rise during the COVID-19 pandemic in Uganda. This study explores the factors associated with teenage pregnancy in Pakwach district during this period.

Methods: We conducted a matched case-control study, enrolling 362 teenage girls aged 10–19 years, divided into two groups: 181 pregnant teenagers and 181 non-pregnant teenagers. We collected exposure data from both groups using a questionnaire to assess factors associated with teenage pregnancy. The study period covered March 2020 to January 2021, coinciding with lockdown measures.

Results: During the COVID-19 period, teenage pregnancies were only associated with having exclusively female peers (AOR 3.0, 95% CI: 0.1–104.4). Conversely, having a Radio/TV at home (AOR 0.2, 95% CI: 0.1–0.6), age at first sexual encounter (AOR 0.1, 95% CI: 0.03–0.9), considering teenage pregnancy as sexual abuse (AOR 0.1, 95% CI: 0.02–0.4), feeling comfortable asking questions during consultations (AOR 0.5, 95% CI: 0.2–1.3), and ensuring sufficient privacy during consultations were protective against teenage pregnancy.

Conclusion: The factors contributing to increased teenage pregnancies during the COVID-19 pandemic were consistent with long-standing contextual factors associated with teenage pregnancy. The lockdown environment may have slightly exacerbated these factors, but no direct association was observed. Only having female peers was linked to teenage pregnancy during the lockdown. But more importantly for our study population, having access to a radio/TV at home and other healthcare system-related factors were protective during the lockdown. Therefore, interventions should be focused on making pregnancy prevention information available to teenagers during any lockdown scenario.

Keywords: a case-control study, healthcare providers, COVID-19, teenage pregnancy, outcomes

Background

Teenage pregnancy is a global public health problem, with a preponderance in LMICs where it accounts for 95% of all cases, and Sub-Saharan Africa included. The pooled prevalence of teenage pregnancy in Sub-Saharan African countries stands at 18.8%,[1] with significant variation across regions. The East African region has the highest prevalence of 21.5%, followed by 20.4% in Southern Africa, 17.7% in West Africa, 15.8% and 9.2% in Central Africa, and Northern Africa respectively.[1] The available data shows significant variation between the countries of Africa. For instance, in West Africa, Liberia had the highest prevalence at 38.9% National Demographic Health Survey (NDHS) in 2013, followed by Gabon at 38.0% NDHS in 2012 and Mali at 36.3% NDHS in 2018. In East Africa, Uganda has the highest prevalence of 26.1% UDHS 2016, followed by Tanzania (25.1%) NDHS 2015–2016, then Kenya (18%) NDHS 2014, Burundi (7.9%) NDHS 2016–2017, and Rwanda the least (7.2%) NDHS 2015. In southern Africa, Angola had the highest prevalence of

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39.4% NDHS 2015–2016, followed by Namibia (21%) NDHS 2013, Lesotho (19.8%) NDHS 2014 and South Africa at 16.9% NDHS 2016, according to a systematic review of the prevalence of first teenage pregnancies across African countries.[2]

The factors responsible for teenage pregnancies in the African continent have previously been investigated and factors like being a victim of sexual abuse, risky sexual behaviours such as early sexual initiation, and non-use of contraceptives among others were found as key predictors of teenage pregnancies.[2,3] Developing countries like Ethiopia, Nigeria, Kenya, Tanzania, Malawi, and others. The risk factors found in previous studies associated with teenage pregnancies were the low socioeconomic status of teens' households, being out of school environment, and living with a single parent. Also, being a victim of sexual abuse and disrupted family structure, among others, is the key predictor of teenage pregnancies as documented by.[4] Additionally, Habitu and others in Ethiopia also found risky sexual behaviours such as early sexual initiation and non-use of contraceptives strongly associated with teenage pregnancy.[5]

Teenage pregnancies carry significant public health importance due to their complications, which are the leading cause of mortality among girls aged 15–19 globally.[6,7] Physiological and socioeconomic factors contribute to various complications associated with teenage pregnancy.[8] These complications include preterm birth, low birth weight, anemia, malnutrition, high blood pressure, and emotional and social challenges commonly observed in pregnant teenagers.[6] These complications are influenced by factors such as lack of parental care, inadequate nutrition, under-developed reproductive systems, and economic difficulties, particularly intensified by the coronavirus disease 2019 (COVID-19) pandemic.

The impact of teenage pregnancy is substantial, affecting young mothers worldwide and presenting a range of challenges such as lower educational attainment, reproductive health issues, higher fertility rates, decreased economic earnings, domestic violence, and limited opportunities.[9] Furthermore, it has long-term effects on infants and mothers, increases the risk of mental disabilities[7] and neurological problems.

With the emergence of the novel coronavirus, the impact of the COVID-19 pandemic on the adolescent population in terms of teenage pregnancy and associated risk factors remains uncertain. In Uganda, before the outbreak of the pandemic, the trend was decreasing at a uniform rate, despite its high prevalence of 25% among teenagers in the year 2016.[10] This prevalence for the East African region is the highest by far. During the COVID-19 pandemic, Uganda implemented strict lockdown measures to curb the virus spread, including school closures, curfews, suspension of public transport, and bans on gatherings.[11] In Pakwach district, the prevalence reported through the local health authority (DHO) and police reports were higher compared to the period before. We hypothesized that the prolonged lockdown in response to the pandemic escalated the risk of teenage pregnancies in Uganda. Therefore, we aimed to provide COVID-19 context-specific factors associated with teenage pregnancies during COVID-19 in Pakwach district Uganda.

Materials and Methods

Study Setting

The study area was Pakwach District, located in the West Nile Region, northern Uganda. According to the Uganda Bureau of Statistics figures, the district had a total population of 158,037 in 2014 and was projected to increase to 181,400 by 2018, and 51.7% of this are females. Pakwach has six sub-counties (Pakwach Town Council, Panyango, Alwi, Pakwach Sub County, Wadelai and Panyimur), with 30 yards and 414 villages. From these six sub-counties, three were selected randomly to be included in this study (PTC, Panyanago and PSC). We visited all the health facilities in the selected sub-counties and accessed all records of girls aged 10–19 years attending first Antenatal Care (ANC) services for cases and girls of the same age group attending other services during the period but were not pregnant. A sampling frame was developed from this list and a proportionate allocative technique was used to select participants. Simple random sampling was used to select cases and controls for inclusion.

Study Design

The study design was a case-control study. Records of pregnant teenagers aged 10–19 years were extracted. This became the sampling frame, where cases were selected randomly. The research assistants visited their homes and interviewed them.

The control group consisted of age-matched teenagers who were selected also from the same health facilities that originated the cases but attending other services and matched based on the level of education, school attendance status at the time of conception, neighborhood (for girls not in school during data collection), age, and location. Nominated by the cases. The purpose of matching was to control confounding. Importantly, none of the subjects declined to participate in the study.

Target Population

The target population were teenage girls aged 10–19 years. They were either pregnant or not pregnant teenagers who had attended ANC or accessed health services in the three selected sub-counties, from March 20th, 2020, to January 2021.

Sample Size and Sampling Procedures

The sample size for this study was determined using the Epi tools calculator for sample size estimation in Case-Control studies. We aimed to recruit 362 participants based on specified parameters. The expected proportion of teenage pregnancy in the control group, as reported in the (UDHS 2016), was utilized as 0.224. Assuming an Odds ratio of 2, we targeted a power of 0.85 and a confidence interval of 0.95.

To ensure adequate representation, Using our specification of values, we plugged it into the Sample size calculator and obtained a sample of 362 participants even distributed into (181) cases and (181) controls, as indicated in Table 1. The primary sampling frame for the study consisted of Antenatal Care registers for cases and Outpatient registers for controls. We extracted records for teenage girls aged 10–19 attending antenatal care services (cases) and other services (controls). Subsequently, a systematic random sampling method was employed to select cases and controls for inclusion.

Data Collection

A structured questionnaire designed in electronic format (Kobo Toolbox) was used to interview participants. The development of this tool was informed by the World Health organization (WHO) Illustrative questionnaire developed by John Cleland (Cleland, 2001) for interview surveys with young people. This standard tool was adjusted to fit the local context. It had questions on socio-demographic characteristics, economic factors, teenage factors, health system factors, environmental factors, and cultural factors.

Data Management

The data was downloaded in Excel and subsequently checked. It was then exported to Stata 15 for cleaning, coding, and analysis.

Table 1 Shows the Breakdown of the Sample Size Calculation for This Study

Specified Inputs	Specified Values
Expected proportion in the controls	0.224
Assumed Odds Ratio	2
Confidence interval	0.95
Desired power	0.85
Study Type	Case-Control Study
Sample size per group	181
Total sample size (both groups)	362

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Data Analysis

Initially, at the univariable level, frequencies and percentages were calculated. We presented means and standard deviations for normally distributed variables and median and interquartile ranges for skewed variables in tables and charts. At the bivariable analysis level, each potential factor or predictor variable was analyzed individually to assess its association with the outcome variable (pregnant/not pregnant). To do this we conducted chi-square statistics to quantify the strength and direction of the relationship. The results were presented in tables as odds ratios and Pearson chi-square p-values for both cases and controls.

To determine the strength of the association between the exposure variables and our main outcomes (pregnant/not pregnant), logistic regression was utilized. At this multivariable level, we employed conventional logistic regression since matching was only carried out to control for confounding but not as the primary focus of the analysis.

The results were reported as adjusted odds ratios along with corresponding 95% confidence intervals (CIs).

Ethical Clearance

Ethical consideration was sought from the Mbale Regional Referral Research Ethic Committee (MRRHREC), approval number MRRH-2021-75:A and Busitema University Higher Degree. Informed consent was sought from the study subjects. The minors assented and parents/guardians signed the informed consent form for participation. The research was also conducted per the guidelines outlined in the Declaration of Helsinki. Other authoritative clearances to conduct the study were also sought from the District Health Officer, Chief Administrative Officer, District Education Officer, Resident District Commissioner, Facility In-charge and the LC1 chairpersons in all Villages. All the stipulated COVID-19 standard operating procedures (SOPs) set by the government were adhered to protect the study subjects from any harm from contracting the COVID-19 virus during data collection.

Results

Demographic Profile of Participants

A total of 362 adolescent girls, with a mean age of 17.7 years (Std. Err 0.063, 95% CI = 17.6, 17.8), participated in the study. Approximately 49.2% of the participants were recruited from Pakwach sub-county (Figure 1), and most of them (99.7%) fell into the older teenage category of 15–19 years (Table 2). Overall, the literacy level was high, with 95.8% of the girls being able to read and write. Additionally, the majority (91.7%) were unmarried (Figure 2) and a significant proportion (82.6%) was attending primary school (Figure 3).

Table 2 presents the findings regarding age groups, literacy levels, health facility visits, and types of services sought by teenagers during the COVID-19 lockdown. Over the lockdown period, 68.2% of participants visited health facilities,

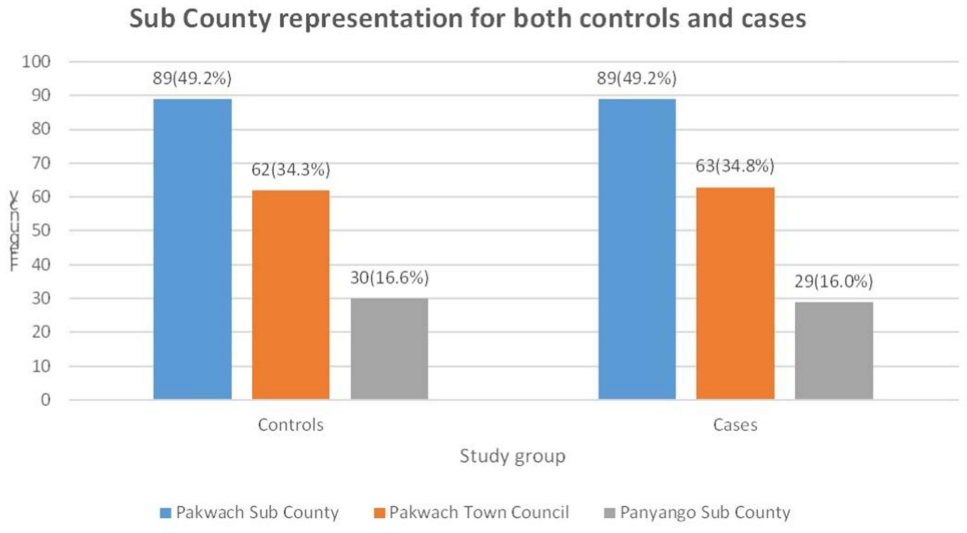

Figure 1 Showing a graphical presentation of Sub counties.

Table 2 Showing Age Categorizations, Literacy Level, Health Facilities Visits, and Type of Services Requested by Teenagers

Variable	Frequency n=362	Percentage (%)
Age		
Young Teenage (10–14 yrs)	1	0.3
Older Teenage (15–19 yrs)	361	99.7
Literacy level	346	95.8
Health facility visit during Lockdown	247	68.20
Number of Visit		
<2 times	28	11.30
2–4 times	188	76.10
≥5 times	31	12.60
Types of services Requested at the facility		
Contraceptives	113	45.7
Pregnancy services	121	49%
Facility Type		
Government	244	98.80
Private	3	1.20
Health information	230	93.10
The attending clinician talked about the following services		
Condom use	160	64.8
Contraceptives	161	65.2
Pregnancy	241	97.6
Attending clinician receptive	235	95.10
Received the services/care one went looking for	232	93.90
Felt comfortable enough to ask questions	136	55.10
Consultation Questions answered adequately	169	68.40
There was enough privacy	170	68.80

with the majority (99%) accessing government health facilities. A notable proportion (75%) made 2 to 4 visits. Regarding service demand, there was a pronounced request for pregnancy-related services (97.6%) among pregnant teenagers.

Amidst the COVID-19 lockdown, nearly all teenage girls (99%) attending health facilities received health information, primarily focusing on pregnancy prevention, particularly contraception and condom use. Clinicians provided receptive care, with over two-thirds reporting privacy during consultations (68.8%) and satisfaction with answers received (68.4%). Additionally, more than half felt comfortable asking questions (55.1%). Importantly, the vast majority (93.9%) confirmed receiving the sought-after services.

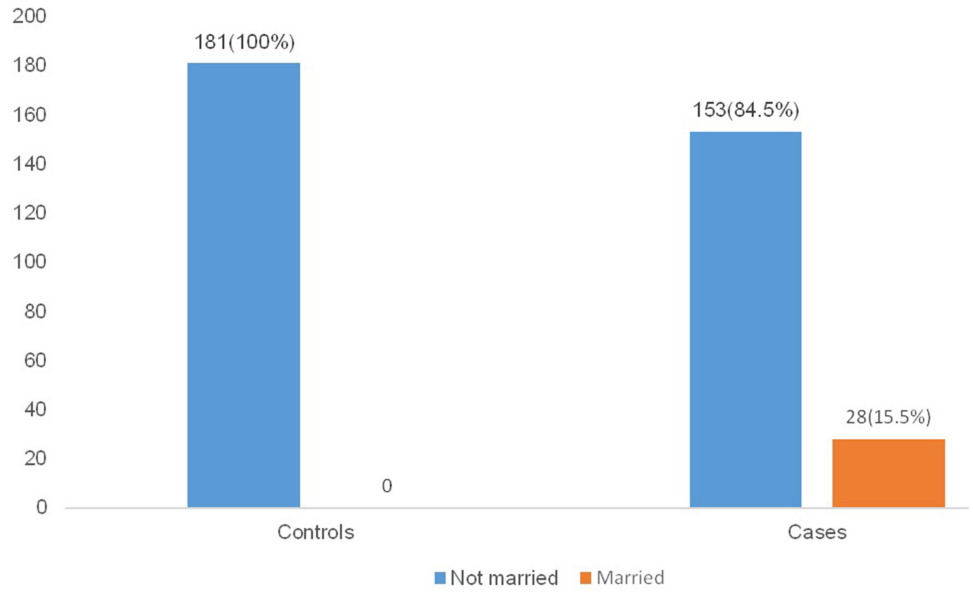

Figure 2 Shows the martial status of our participants.

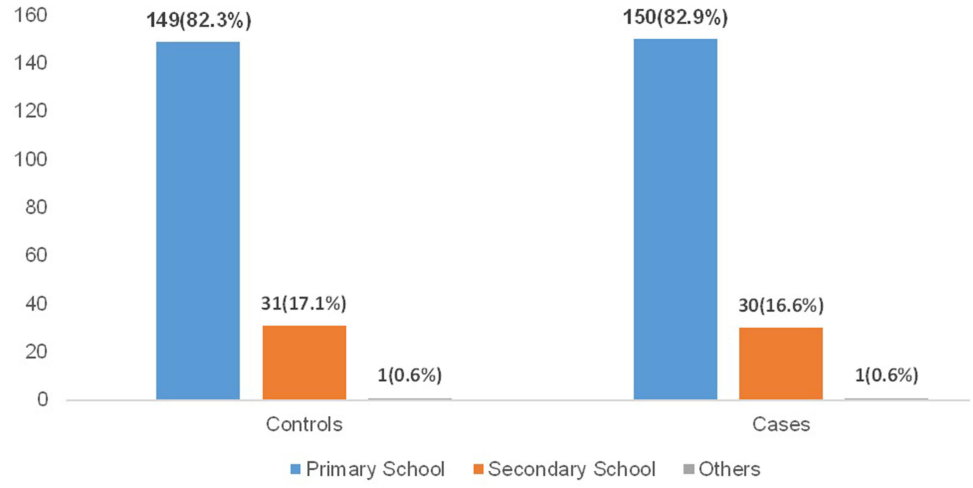

Figure 3 Shows the level of education of all participants.

In Table 3, we see that most pregnancies (99%) were in older teenagers aged 15–19 years, and about 92% of them were still living at home with their parents and not married. There was a high literacy level (92%) among our participants, and this was statistically significant at P< 0.001.

Table 4, present the results for health facility visits and services requested by teenagers during the COVID-19 lockdown. Notably, health facility visits were more prevalent among the pregnant group (79%), significantly predicting the likelihood of pregnancy. Those who visited health facilities had 2.9 times higher odds of pregnancy, a statistically significant result ($p < 0.00001$). Conversely, an increase in the frequency of these visits was significantly associated with reduced odds of pregnancy ($p < 0.0077$).

Attending at health talks focusing on contraceptive use (64.8%) and condom use (65.2%) was correlated with a decreased likelihood of pregnancy ($p < 0.0001$). Intriguingly, positive reception from attending clinicians at the facility was also significantly associated with a lower likelihood of pregnancy ($p < 0.002$). Moreover, a substantial proportion (90%) of teenagers reported receiving the services they sought at the health facility, a statistically significant outcome ($p < 0.001$).

Table 3 Bivariate Results for Location and Social-Demographic Characteristics of the Teenagers

Variables	Total	Pregnancy		OR (95% CI)	P-value
		Control	Cases		
Sub County					0.988
Pakwach Sub County	178	89(49.2)	89(49.2)	1.0(0.7, 1.5)	1
Pakwach Town Council	125	62(34.3)	63(34.8)	1.0(0.7,1.6)	0.9121
Panyango Sub County	59	30(16.6)	29(16.0)	0.9(0.5, 1.7)	0.887
Age category					0.317
Young Teenage	1	1(0.6)	0(0.0)	–	–
Older Teenage	361	180(99.4)	181(100.0)	–	
Marital status					0
Not married	332	181(100)	153(84.5)	–	–
Married	28	0(0)	28(15.5)	–	–
Reading/Writing	346	180(99.4)	166(92.2)	0.1(0.01, 0.5)	0.001
Level of education					0.99
Primary School	299	149(82.3)	150(82.9)	1.0(0.6, 1.8)	0.8899
Secondary School	61	31(17.1)	30(16.6)	0.9(0.6, 1.7)	0.8885
Others	2	1(0.6)	1(0.6)	1.0(0.1, 16.2)	1

Table 4 Bivariate Results for Health Facility Visits and Type of Services Requested by Teenagers

Variables	Total	Pregnancy		OR (95% CI)	P-value
		Cases	Controls		
Health facility visit during Lockdown	247	104(57.5)	143(79.0)	2.9(1.7, 4.5)	0.0001
Number of Visits					0
<2 times	28	15(14.4)	13(9.1)	0.6(0.3, 1.3)	0.1928
2–4 times	188	88(84.6)	100(69.9)	0.4(0.2, 0.8)	0.0077
≥5 times	31	1(1.0)	30(21.0)	27.3(3.3, 225.6)	
Types of services Requested at the facility					
Contraceptives	113	101(97.1)	12(8.4)	–	–
Gynecological	8	8(7.7)	0(0)	–	–
MCH	44	1(1.0)	43(30.1)	–	–
Pregnancy services	104	3(2.9)	101(70.6)	–	–
Pregnancy Test	19	0(0)	19(13.3)	–	–

(*Continued*)

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Table 4 (Continued).

Variables	Total	Pregnancy		OR (95% CI)	P-value
		Cases	Controls		
Facility Type					0.757
Government	244	103(99.0)	141(98.6)	0.7(0.1, 7.7)	0.7573
Private	3	1(1.0)	2(1.4)	1.5(0.1, 16.4)	0.7573
The doctor talked about the following services					
Condom use	160	98(94.2)	62(43.4)	0.04(0.02, 0.11)	0.0001
Contraceptives	161	98(94.2)	63(44.1)	0.1(0.01, 0.12)	0.0001
Pregnancy	241	102(98.1)	139(97.2)	0.7(0.1, 4.9)	0.6595
Health information	230	99(96.1)	131(92.3)	0.5(0.1, 1.6)	0.2141
Attending clinician receptive	235	104(100.0)	131(91.6)	–	0.002
Received the services/care one went looking for	232	104(100.0)	128(90.1)	–	0.001
Felt comfortable enough to ask questions	136	71(68.3)	65(45.8)	0.4(0.2, 0.7)	0.0005
Questions asked during the consultation were answered adequately	169	76(73.1)	93(65.0)	0.7(0.4, 1.2)	0.179
There was enough privacy	170	87(83.7)	83(58.0)	0.3(0.1, 0.5)	0

Additionally, the health system factors such as feeling comfortable asking questions during consultations, receiving adequate answers, and maintaining privacy during consultations were also significantly associated with a lower likelihood of pregnancy.

Table 5 presents peer types, friendship dynamics, and pregnancy prevention methods among teenagers. The majority (96.4%) had friends, with females being preferred (86.2%). Associations were found between certain friendships and

Table 5 Bivariate Results for the Type of Peers, Type of Friends, and Pregnancy Prevention Methods Used by Teenagers

Variables	Total	Pregnancy		OR (95% CI)	P-value
		Cases	Controls		
Have friends	349	174(96.1)	175(96.7)	0.9(0.3, 2.6)	0.778
Type of peers					0
Adults	8	7(4.0)	1(0.6)	7.3(0.9, 61.0)	0.0315
Boys	9	3(1.7)	6(3.4)	0.5(0.1, 2.0)	0.3159
Boys/Girls	31	1(0.6)	30(17.1)	0.03(0.03, 0.2)	0.0001
Females	301	163(93.7)	138(78.9)	4.0(2.0, 8.2)	0.0001
How much does one trust friends					0.003
Always	72	34(19.5)	38(21.7)	0.9(0.5, 1.4)	0.6163
Never	18	16(9.2)	2(1.1)	8.8(1.9, 39.8)	0.0007
Not Always	259	124(71.3)	135(77.1)	0.7(0.4, 1.2)	0.2101

(*Continued*)

Table 5 (Continued).

Variables	Total	Pregnancy		OR (95% CI)	P-value
		Cases	Controls		
Friends do not believe in sex at an early age	344	169(97.1)	175(100)	–	0.024
Have older siblings at home were	281	130(71.8)	151(83.4)	0.5(0.3, 0.8)	0.0082
Ever talked to them about sex	21	10(7.7)	11(7.3)	1.1(0.4, 2.6)	0.897
Know they were also having sex	41	24(18.5)	17(11.3)	1.7(0.9, 3.5)	0.0887
In a Relationships	266	161(89.0)	105(58.0)	5.8(3.2, 10.5)	0.001
Age at first sexual intercourse					0.0024
10–14 yrs	26	23(14.3)	3(2.9)	5.6(1.6, 19.7)	0.0024
15–19 yrs	239	138(85.7)	101(97.1)	0.2(0.1, 0.6)	0.0024
Regret engaging in sex at that age	221	167(93.3)	54(29.8)	32.7(13.6, 78.9)	0.001
Pregnancy preventions	215	118(65.2)	97(53.6)	1.6(1.1, 2.5)	0.0248
Methods used					0.126
Condom	135	75(63.6)	60(61.9)	1.1(0.6, 1.9)	0.7975
Injections	6	5(4.2)	1(1.0)	4.2(0.5, 37.6)	0.1565
Pills	15	7(5.9)	8(8.2)	0.7(0.2, 2.0)	0.5083
Safe period	53	25(21.2)	28(28.9)	0.7(0.4, 1.2)	0.1946
Withdrawal	3	3(2.5)	0(0.0)	–	–
Others	3	3(2.5)	0(0.0)	–	–
Sexual Abuse	17	17(9.4)	0(0.0)	–	0
Sex Trade	19	19(10.5)	0(0.0)	–	0

pregnancy: friendships with mature individuals and exclusive female friendships were significantly associated with higher odds of pregnancy ($p < 0.0001$). Conversely, having older siblings at home was associated with 0.5 times lower odds of pregnancy, while being in a relationship increased the odds of getting pregnant by 5.8 times. First sexual intercourse between ages 15–19 and regret were significantly associated with pregnancy ($p < 0.0024$). 59.4% reported using pregnancy prevention methods, predominantly condoms, though this was associated with higher odds of pregnancy (COR 1.6, 95% CI= [1.1, 2.5]). Sexual abuse (9.4%) and sex trade (10.5%) strongly predicted pregnancy ($p < 0.000$).

Table 6 outlines socioeconomic factors and teenagers' perceptions of pregnancy. Ownership of radio and television by parents of teenagers during the lockdown was protective against teenage pregnancy ($p < 0.0001$). Furthermore, returning home from places of watching TV/listening to the radio in the afternoon was associated with a higher likelihood of pregnancy (Odd ratio (OR) 4.7, 95% CI= [0.9, 23.6]).

Additionally, receiving phones as gifts from friends was associated with a 2.3 times higher likelihood of pregnancy. Teenagers who perceived teenage pregnancy as risky had a lower likelihood of getting pregnant ($p < 0.0001$). However, residing at home with parents was associated with 1.5 times higher odds of getting pregnant.

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Table 6 Socioeconomic Characterization and Teenagers' Perception of Pregnancy

Variables	Total	Pregnancy		OR (95% CI)	P-value
		Cases	Controls		
Have a Radio/TV at Home	281	123(68.0)	158(87.3)	0.3(0.2, 0.5)	0.001
Where one listen/watch TV/Radio from during the lockdown					0.279
Neighbors house	53	41(70.7)	12(52.2)	2.2(0.8, 6.1)	0.1164
Others	7	4(6.9)	3(13.0)	0.5(0.1, 2.4)	0.3776
Relative place	21	13(22.4)	8(34.8)	0.5(0.2, 1.6)	0.255
Time of returning home					0.024
Afternoon hours	20	18(31.0)	2(8.7)	4.7(0.9, 23.6)	0.0367
Evening hours	23	16(27.6)	7(30.4)	0.9(0.3, 2.5)	0.7989
Morning hours	21	14(24.1)	7(30.4)	0.4(0.1, 1.2)	0.0876
Night	17	10(17.2)	7(30.4)	1.0(0.3, 3.6)	0.9872
Own a cell phone	156	85(47.2)	71(39.2)	1.4(0.9, 2.1)	0.1257
Who bought the phone					0.089
Family member/Relative	46	21(25.3)	25(35.7)	0.6(0.3, 1.2)	0.1631
Gift from a friend	36	25(30.1)	11(15.7)	2.3(1.0, 5.2)	0.037
Myself	71	37(44.6)	34(48.6)	0.9(0,4, 1.6)	0.6229
Have boys at home	313	152(84.0)	161(89.0)	0.7(0.4, 1.2)	0.1673
Sleeping together with boys in the same room	15	14(9.4)	1(0.7)	15.5(1.9, 124.6)	0.006
Early Marriage	1	1(0.6)	0(0.0)	–	0.317
Sex is not permitted before marriage in your culture (N0)	362	181(100.0)	181(100.0)	–	–
I do not believe that it is okay for girls to be married off at a young age	362	181(100.0)	181(100.0)	–	–
Think closing school contributed to one's being pregnant	350	176(97.8)	174(96.1)	1.8	0.3639
Think teenage pregnancy is risky	336	156(86.2)	180(99.4)	–	0
Place of residence at the time of pregnancy					0.351
Home with my parents	345	174(96.1)	171(94.5)	1.5(0.5, 3.9)	0.4567
With Relatives	15	7(3.9)	8(4.4)	0.9(0.3, 2.5)	0.7923
Others	2	0(0.0)	2(1.1)	–	–
Think teenage pregnancy during lock down was a result of peer influence	329	154(85.1)	175(96.7)	–	0
TP description					0.001
Child Marriage	84	50(27.6)	34(18.9)	1.6(1.0, 2.7)	0.0499
Rape	1	1(0.6)	0(0.0)	–	
Sex Trade	9	4(2.2)	5(2.8)	0.8(0.2, 3.0)	0.7297
Sexual Abuse	117	21(11.6)	96(53.3)	0.1(0.1, 0.2)	0.0001
Teenage play	150	105(58.0)	45(25.0)	4.1(2.6, 6.7)	0.0001

Table 7 General Characterization of Pregnancies Among Teenagers

Variables	Frequency N=181	Percentage (%)
Pregnancy		
Cases	181	50.0
Planned/Unplanned		
Planned	10	5.6
Unplanned	170	94.4
Married to the father of the child	33	18.2
School return after delivery		
Dropped out	129	71.3
In school	52	28.7

Outcomes of Teenage Pregnancies During the COVID-19 Lockdown in Pakwach District

Table 7 presents the outcomes and contexts of pregnancies among teenage girls. The majority (94.4%) of the pregnancies were unintended, and 95% of the girls were living outside a marital union.

Of the 181 girls who became pregnant, 88.3% resulted in live births, 11.1% experienced neonatal deaths, and 0.6% had an abortion (Figure 4). Delivery at the health facilities was high, with 95% of the girls giving birth in such settings (Figure 5). Additionally, there was a significant school dropout rate of 71.3% among the participants.

Table 8 Presents the result of pregnancy birth outcomes versus Place of delivery. Nearly one-fourth (22.2%) of neonatal deaths occurred at home, compared to only 10.5% at health facilities. Health facility deliveries were associated

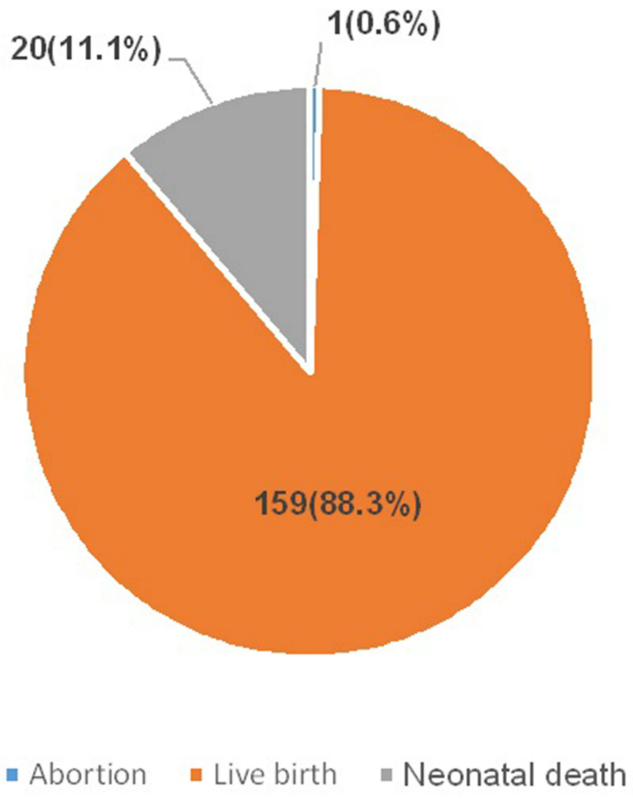

Figure 4 A pie chart showing pregnancy outcomes among teenagers.

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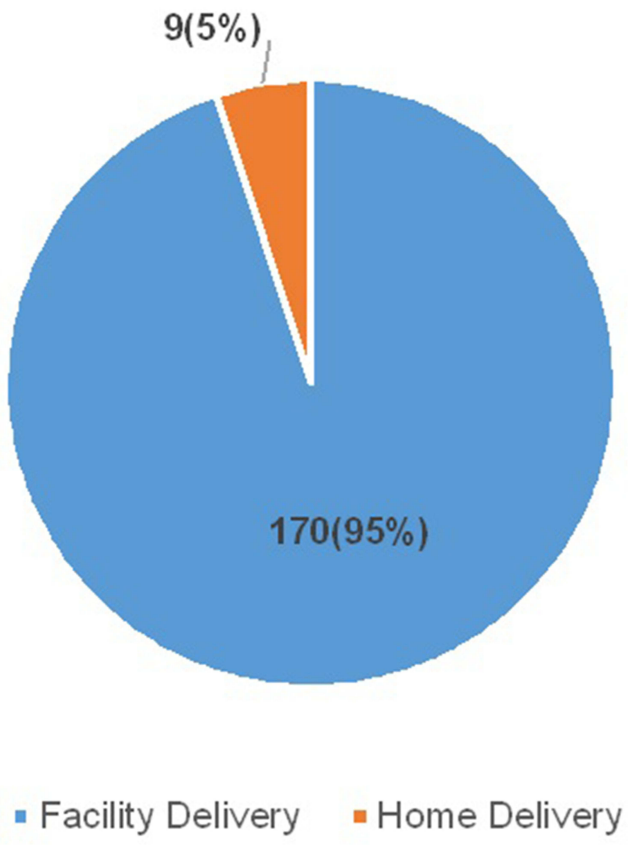

Figure 5 A pie chart showing the place of delivery chosen by teenagers.

with a higher percentage (96.2%) of live births, whereas home deliveries were characterized by higher rates of neonatal death and abortion. The place of delivery strongly predicted neonatal death and abortion ($p < 0.0001$).

Risk Factors for Teenage Pregnancy During the COVID-19 Lockdown

After adjusting for all other factors, the findings indicate that having only female friends significantly increased the likelihood of pregnancy among teenagers during the COVID-19 lockdown in Pakwach district [Adjusted Odd Ratio (AOR) 3.0, 95% CI = (0.1, 104.4)]. Conversely, several factors were associated with a reduced likelihood of pregnancy. These included viewing teenage pregnancy as sexual abuse [AOR 0.1, 95% CI = (0.02, 0.4)], having a radio or TV at home [AOR 0.2, 95% CI = (0.1, 0.6)], having the first sexual encounter between ages 15–19 [AOR 0.1, 95% CI = (0.03, 0.9)], feeling comfortable asking questions during consultations [AOR 0.5, 95% CI = (0.2, 1.3)], having enough privacy during consultations [AOR 0.3, 95% CI = (0.1, 0.9)], and using pregnancy prevention methods [AOR 0.04, 95% CI = (0.01, 0.2)]. See Table 9

Table 8 Pregnancy Birth Outcomes vs Delivery Place

Pregnancy Outcome	**Place of Delivery**			
	Facility Delivery	Home Delivery	Total	P-value
Abortion	0(0.0)	1(100.0)	1	0.0001
Live birth	153(96.2)	6(3.8)	159	
Neonatal death	18(90)	2(10.0)	20	
Total	171(95.0)	9(5.0)	180	

Table 9 Multivariate Results of Our Adjusted Variables

Variable	COR (95% CI)	AOR (95% CI)
Felt comfortable enough to ask questions	0.4(0.2, 0.7)	0.5(0.2, 1.3)
There was enough privacy	0.3(0.1, 0.5)	0.3(0.1, 0.9)
Type of peers		
Boys	1	1
Adults	14.0(1.1, 172.6)	0.5(0.01, 47.2)
Boys /Girls	0.1(0.01, 0.7)	0.04(0.01, 2.6)
Girls	2.3(0.6, 9.6)	3.0(0.1, 104.4)
Have older siblings at home were	0.5(0.3, 0.8)	0.9(0.3, 2.6)
Age at a first sexual encounter		
10–14 yrs	1	1
15–19 yrs	0.2(0.1, 0.6)	0.1(0.03, 0.9)
Pregnancy preventions	1.6(1.1, 2.5)	0.04(0.01, 0.2)
Have a Radio/TV at Home	0.3(0.1, 0.5)	0.2(0.1, 0.6)
Adolescent thinking about teenage pregnancy		
Child Marriage	1	1
Rape	–	–
Sex Trade	0.5(0.1, 2.2)	0.2(0.02, 1.6)
Sexual Abuse	0.1(0.1, 0.3)	0.1(0.02, 0.4)
Teenage play	1.6(0.9, 2.8)	1.3(0.5, 3.1)

Discussions

The findings from this study provide the first examination of risk factors for teenage pregnancy during the COVID-19 pandemic in Uganda. Understanding these results requires situating them within the broader context of a public health emergency, where lockdowns were imposed as a preventive measure. This case-control analysis builds on our previous interrupted time series analysis, published in BMC Reproductive Health,[12] which highlighted the rise in teenage pregnancies during the COVID-19 lockdown. While the earlier study identified the trend, this analysis goes further by shedding light on the specific risk factors driving this increase, offering a more comprehensive understanding of the impact of the pandemic on teenage pregnancy.[12] In this study, we found that most of the girls were older teenagers (15–19 years). Even though pregnancy is often linked to an adult female, it was surprising to find many teenagers pregnant at very young ages. This could be explained by the increased age of primary school completion in our setting, which is typically between 17 and 19 years, according to the district education office.

We also found that the age of the teenager was not a statistically significant risk factor for pregnancy, which is contrary to existing knowledge. However, the majority (99%) participant who reported initiating sexual intercourse between the ages of 15 and 19, had a reduced likelihood of becoming pregnant compared to the sole participant in the 10–14 age group. While the data suggests potential differences between age groups, the limited representation of younger participants precludes robust comparisons. This observation could also still be linked to the increased age of primary and secondary school completion in our setting, which is typically between 17 and 19 years, according to the district education office. This finding agrees with a study conducted in Ethiopia,[3] which also found age at first sexual intercourse to be associated with teenage pregnancy. It, however, contradicts what Ochen and others found in Lira, Northern Uganda,[13] where age at first sex was found not to be significantly associated with teenage pregnancy.

Surprisingly, our data also revealed a shift in teenage pregnancy trends from being high among secondary school attendees to high among primary school attendees. However, this was contrary to what,[14] found among school-going learners in South Africa, where teenage pregnancies were higher among secondary school attendees than their primary counterparts. However, the high level of sexual experimentation and maturity associated with secondary school teenagers supported their findings at the time. In this study, we think that the increased age at primary school graduation which is somewhere between 16 and 17 years and the amount of time taken to complete primary-level education in our study population could have contributed to this shift.

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Surprisingly, of all the factors investigated in this study, only having females as friends was associated with teenage pregnancies during the COVID-19 lockdown. A teenage girl associating primarily with other females as her only peers showed an increased risk of getting pregnant during lockdown. Most of the pregnant girls in this study had friends who were exclusively female, which contradicts our understanding of female friendships. However, we believe this might be attributed to the urge to mimic what their peers are doing with boys. This was a novel finding from our study, however it disagree with what Misunas and others found in Kenya in their longitudinal cohort study in Nairobi, where they found no evidence that other types of friendships affect girls' probability of becoming pregnant.[15] Nonetheless, this observation strongly hints at the potential effects of sending girls to single-sex schools as opposed to mixed-gender schools.

Conversely however, having a radio/TV at home, age at the first sexual encounter, describing teenage pregnancy as sexual abuse, feeling comfortable to ask questions during a consultation at the facility, having enough privacy during a consultation, and using pregnancy preventions were associated with less likelihood of getting pregnant.

However, owning a radio/ TV at home during the COVID-19 lockdown was found to be associated with a reduced risk of getting pregnant. We reckon this could have been because girls who had a radio/TV at home never had to look outside their home environment for entertainment and movies during the lockdown and hence they did not get pregnant. This finding however agrees with another study done in South Africa among sexually active black teenagers in Cape Town,[16] that found having a radio/TV at home to be associated with reduced risk of pregnancy in teenagers.

Even though there were restricted visits to the health facilities during the lockdown, we also found that teenagers who visited health facilities during the lockdown in search of services like STI testing /treatments, abortions, and others had reduced risk of getting pregnant.

We also found feeling comfortable to ask questions, having enough privacy, and getting a good reception from the attending clinicians while at the facility were some of the health system factors associated with less likelihood of getting pregnant.

While many pregnancy-related issues in teenagers are well-documented, including adverse obstetric outcomes, ongoing research continues to investigate various aspects of teenage pregnancy. This study, in particular, centers on birth outcomes, school dropout rates, and the location of delivery as potential factors that could predict unfavourable pregnancy outcomes in teenagers. We found that the pregnancy outcomes in these teenagers were characterized by high live births at 88.3%, with 11.1% neonatal death and 0.6% abortion in this study. Health facility delivery as a predictor of good birth outcomes for most teenage mothers was also high at 95%, compared to home deliveries. However, when we cross-tabulated to predict where 11.1% of neonatal deaths occurred, we found that nearly one-fourth (22.2%) of these neonatal deaths happened at home compared to only 10.5% at the health facility, which was not surprising. A multitude of factors has been advanced to explain death associated with home delivery, but we think this could have been connected to delay in seeking care early due to distance and other context-specific factors. This is true for many women, as documented by,[17] who found delays in deciding the place of delivery associated with home delivery and poor birth outcomes.

School dropout was also high among teenagers who became pregnant. We think this could have been because of the need to take care of the babies or the fear of stigma at school associated with being pregnant. This finding agrees with another cross-sectional study done before COVID-19 in Kibuku Town Council, Kibuku District, Eastern Uganda[18] where teenage pregnancy was strongly associated with high school dropout.

Limitations of the Study

Given the COVID-19 public health emergency specific context of our findings, the results of this study must be interpreted and generalized with caution. The scope of this study did not include adverse obstetric outcomes of teenage pregnancies and other consequences like defilement, sexually transmitted diseases like HIV/AIDs, syphilis, gonorrhoea, and other outcomes. Another key limitation of this study is the potential for bias in the results due to unknown variations in how the lockdown affected different groups, such as socioeconomic status, access to healthcare, or regional disparities. Additionally, the findings may not be generalizable to all populations since the analysis does not account for group-specific responses to the lockdown, which could influence teenage pregnancy trends in distinct ways.

Lastly, our study sample predominantly consisted of participants aged 15–19, with only one participant aged 10–14. This imbalance limits the validity of direct comparisons between these age groups and was a limitation of the study. Therefore, we recommend that another study be conducted with a balance age group inorder to detect this association.

Despite all this, our study has demonstrated that having only females as peers is associated with a high likelihood of getting pregnant and having a friendly healthcare setting for girls is protective against pregnancy.

Conclusion and Recommendation

In conclusion, our study was the first to determine factors associated with teenage pregnancies during a public health emergency in Uganda. This finding is vital to designing appropriate interventions by NGOs and the government in this area. It can also act as a baseline of evidence to help speed up the implementation of the newly released guidelines for preventing teenage pregnancy and management in schools in 2020. And finally, we recommend a more comprehensive study involving both quantitative and qualitative data approaches be conducted to generate data to understand better the contextual factors of teenage pregnancies and experiences of the girls who got pregnant during the COVID-19 pandemics.

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