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Determinants of Adolescent Pregnancy in Luuka District, Eastern Uganda: A Mixed Methods Study

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Abstract

Adolescent pregnancy is a serious public health and social problem. Over 95% of adolescent pregnancy cases occur in developing countries. Understanding and addressing the determinants of adolescent pregnancy is crucial to ending the vice. This study aimed to explore factors associated with adolescent pregnancy in Luuka District, in Uganda. An embedded mixed methods study design was used. Primary data was collected from 336 adolescent girls, aged 10–19 years, selected through simple random sampling, using a case-control survey, with a structured questionnaire. In addition, qualitative data was collected through 20 in-depth interviews and 16 focus group discussions. Quantitative and qualitative analyses were done using SPSS for descriptive, bivariate (i.e., Chi-square tests), multivariable analyses (i.e., logistics regression) used for determining independent associations and content analysis respectively. Findings revealed multiple factors influencing adolescent pregnancy including behavioral factors: such as having multiple sexual partners, frequent sex, lack of self-control over sex and irregular contraceptive use; familial factors: peer pressure, being an orphan living with mother, sexual abuse, and socioeconomic factors such as poverty. In conclusion: behavioral, demographic, familial and socioeconomic factors are major determinants of adolescent pregnancy in Luuka District. We recommend interventions focusing on providing information on sexual and reproductive health, including improving access to contraceptives for adolescent girls. Improving socio-economic status of families, legal punishment of sexual offenders, as well as keeping girls in school to mitigate effects of adolescent pregnancy in the low-income settings.

Keywords*: Adolescent pregnancy, Behavioral factors, Familial factors, Luuka District, Uganda.*

Introduction

The world now has more young people than ever before. Out of the 7.2 billion people worldwide, 1.2 billion are adolescents aged between 10 and 19 years [1]. The World Health Organization (WHO) defines adolescence as a period ranging from 10 to 19 years. It is the transition from childhood to adulthood, characterized by physical, psychological, emotional, and social changes [2-4]. Such changes influence social-economic and health needs among adolescents which if not appropriately addressed, become risk factors in life, increasing adolescent girls' vulnerability to early pregnancies [1] Globally, adolescent pregnancy is considered a public health and social problem [5]. Sub Saharan Africa has the highest prevalence of teenage pregnancy in the world [6], and, every year, about 21 million girls aged 15–19 years in developing regions become pregnant [7].

Scholars have endeavored to establish factors that contribute to high rates of adolescent pregnancies. Some argue that the factors contributing to adolescent pregnancy are

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multifactorial, ranging from individual-behavior, traditional, and socio-cultural to religious in nature. Others state that low socio-economic status [8], limited education [9], early sexual activity [10] and a weak legal system that fails to protect girls can perpetuate teenage pregnancy are responsible for this unending social and health challenge. Uganda has taken strides to combat this vice through implementing laws such as the Penal Code Act which criminalizes sexual intercourse with girls below 18 years. Unfortunately, statistics about adolescent pregnancies continue to grow. Uganda has one of the highest rates of adolescent pregnancies in sub-Saharan Africa, estimated at about 25% [11]. Some of the districts are more affected than others. It is worth mentioning that not all adolescent girls in cultural or social –economic challenged environments end up with adolescent pregnancies. It is plausible that there could be a number of factors yet unknown that help such girls to remain free from adolescent pregnancy. There are limited studies conducted to explore and better explain factors that enable some adolescent girls to survive the risks that expose other girls to adolescent pregnancies. Possibly how the parents and guardians in the homes where the girls come from, could be a contributing factor. It is also plausible that the way mothers and fathers relate with the girls in the homes could in some way or another be responsible for the results of whether the adolescent ends up as a case of adolescent pregnancy or not. In this current era where ICTs such as mobile phones are increasingly accessible, access to and use of such technologies could translate into an adolescent pregnancy or not. Other factors in society could result in cases of adolescent pregnancies or not. Thus, the two aims of this article were: to establish the determinant of adolescent pregnancy in Luuka District among adolescent girls aged 10–19 years and establish those factors that have a positive influence on enabling adolescent girls avoid pregnancy. This article should provide increased understanding of the context specific factors and go a long way to improve policy, programs and practice geared to address the challenge of adolescent pregnancy. Thus, this study is important to provide evidence that can influence policy and practice so as to successfully curb the vice of adolescent pregnancy in Luuka District in particular, and Uganda and the rest of the world at large.

Methods

Study Design

An embedded mixed methods design was adopted in which qualitative and quantitative data was collected, analyzed, and triangulated. The design of a case-control can be complex due to the selection of the appropriate cases and controls [12]. Therefore, to mitigate the challenge of identifying and selecting the cases and controls, an inclusion and exclusion criteria was developed. Quantitative and qualitative data was collected simultaneously between 01 August 2020 and 4th September 2020. Quantitative data was collected through a structured questionnaire, administered by research assistants. Study area was two Sub Counties of Ikumbya and Kiyunga town Council in Luuka District, Eastern Uganda. This district and the two Sub Counties were selected because they are in one of the poorest regions of the country and with the highest adolescent pregnancy rates [13].

Description of the Study Setting

Luuka is one of the 146 districts of Uganda, found in the eastern part of the country. Majority of the population in Luuka depend on subsistence farming. Luuka District is divided into seven sub counties including 89 parishes and 751 villages. The total population of the district is 408,043 people with approximately 12.5% of these being adolescent girls aged 10–19 years [14]. Out of these, the total population for the adolescent girls is 33,511 and boys are 33,776. Luuka district is known for sugarcane

growing amidst high levels of poverty. The study was, however, conducted in two sub counties which included one urban and the other rural. There were 26 Health Centre IIs, 10 Health center IIIs, one Health Centre IV but without a major government Hospital in the study area. Luuka also has four private for profit heath units and eight health facilities private for not for profit.

Sampling Strategy and Selection of Cases and Controls

Two sub counties, one rural and one urban were randomly selected. After listing all the sub counties in the district, a simple random selection from the papers bearing the sub-county names and placed in a box were picked without replacement and the ones picked from either category was taken as the choice. It was within these two sub-counties that the 336 adolescent girls with their parents or guardians as household heads were recruited to participant in the survey. Further, both cases and controls were selected from the community- the general population as well as from the health institutions using a similar random approach. In case – control studies, data are usually summarized in Odds Ratio i.e., OR rather than the differences between the 2 proportion. The prevalence, P in the population is the prevalence of adolescent pregnancies in Luuka district which was quoted as 42% (0.42). If r is the ratio of control to cases which is 2 in this case and Ln is the natural logarithm, then the total sample of adolescents, N: N = {(1+r)2 (Zα + Z 1-β)2}/{r(ln OR)2(P[1-P]} that you are looking at is: 336. However, to cater for confounders during analysis, assume that the expected OR is small that it lies between 2 and 2.5. Based on this the above formula takes on OR as 2.0. Zα is the Z- critical value at a given alpha and in this case this value is 1.96 at α =0.05 (two tails). Z 1-β is the value, given that the power of your study is 80% (commonly used. In this case Z 1-β =0.84. By substitution, N = 305.

However, an additional 10- 20% study participants are needed on top of this minimal sample size calculated to cater for adjustments and other factors like withdrawals, missing data or loss to follow up which can affect the findings during analysis [15]. So, to account for this, an additional 10% on the calculated sample size which is 30.5 was included on calculated minimum sample size to give us 335.5, approximately 336. Having earlier determined that the ratio of cases to controls at 1:2, there were 112 cases and 224 controls.

The controls in this case were paired controls and represented those members at risk of becoming cases who are adolescents never pregnant.

The cases were adolescent girls of age 10–19 years who were pregnant at the time of the study while controls. All of them were recruited by six research assistants. With the help of the Village Health Teams (VHTs) lists of adolescent girls in the two sub counties, girls who either had ever been or who were still pregnant, had aborted or delivered in the past 6 months was generated. These formed the sampling frame and individual names were written on pieces of papers. The papers were put in 2 separate boxes one for rural and the other for urban areas. The papers were mixed to ensure each participant had an equal chance of being selected. The names were picked by simple random sampling with no replacement until the required numbers of 112 we obtained. Each day, the research assistants proceeded to the homes of VHTs who guided them to the households where the study participants lived. Cases were first identified by probing their pregnancy status again to cross check and for every case two controls were recruited. Controls were those girls who had never been pregnant. These were also identified with the help of health visitors from the community, in the households where there was no case. All household heads for the cases and controls were subjected to an interviewer administered questionnaire after which they consented for the

un-emancipated minors before the minors' assent. Sampling methods for the cases was by simple random sampling based on the sampling frame generated as per recruitment procedures described. Participants for the qualitative study were purposively selected.

Data Collection

Qualitative data was collected through 20 Key Informant interviews conducted with different categories of people including: health care providers, community and opinion leaders, district administrators such as the district health officers, village health teams, district health team, civil society representatives, cultural leaders, religious leaders, health facility in charges, private medical practitioners, and adolescent boys. 14 in-depth interviews were conducted among some more knowledgeable adolescent girls identified during the 16 FGDs that were conducted with adolescent males and girls. The study also conducted a total of 8 FGDs with male held jointly with female adults from the two study sub counties (2 with female and 2 with male parents).

Data management and analysis in this study was done in three phases. The quantitatively generated and the qualitatively generated data was managed and analyzed separately as discussed in the following sections after.

Quantitative Case-Control

Initially, all filled questionnaires were managed by "cleaning" the questionnaires in the field before the participant left in order to ensure completeness. Data cleaning involved editing of the returned questionnaires to ensure that they are complete. Thereafter, data was entered for analysis using a computer software package to generate analytical statistics for the survey data was done using SPSS 23 to generate descriptive, bivariate (i.e., Chi-square tests) and multivariable analyses (i.e. logistics regression) used to determine independent associations.

While qualitative data was analyzed using content analysis. The qualitative data included several data types: transcripts from audio recorded IDIs and KIIs, FGDs, observations and handwritten notes (brief field notes, summary notes, debriefing reports) from field. All qualitatively generated data was qualitatively analyzed. Qualitative data required interpretation, and texts were coded as a primary analytical approach, for data reduction, that is, to summarize, extract meaning, and condense the data. The transcripts were coded first through descriptive coding for key themes and topics, using a preliminary codebook. Additional codes were identified through an iterative process of reading the textual data to identify emergent themes, and the codebook was modified accordingly. In addition to descriptive codes, pattern codes, which achieve a greater level of abstraction, was used to start linking themes and topics together. We then sought to identify relationships between these various codes and how they are linked to adolescent pregnancy, within a given level of the socio-ecological framework, in order to build a revised conceptual model that incorporates the themes that were empirically identified during analysis.

Ethical Consideration

In undertaking this project, the general ethical guidelines including obtaining informed consent and assent, the right to privacy and confidentiality of the participants as well as the information obtained. All possible identifiers linking the participant to the interview records were removed and pseudonyms used. Ethical clearance was obtained from Clarke international University Research Ethics Committee and Uganda National Council for Science and Technology. Due to the Covid-19 pandemic all precautions were taken to protect the participants and the researcher as per WHO guidelines.

Results

Socio-economic and Demographic Characteristics

A total of 672 (i.e., 336 adolescents and 336 household heads or their representatives) respondents participated in the survey using the household questionnaire (Table 1a).

Findings further reveal health and living household characteristics (weighted percentages). The overall reported use of insecticide treated mosquito nets the night before the interview was 77.5%. More household members had suffered from an illness or injury in the 30 days preceding the interview; 97% household structures had modern roofing materials (Iron sheets, Asbestos, tiles), and 84.3% reported access to a closed water source (tap, borehole, protected spring) (Table 1b).

Table 1a. Descriptive Characteristics

Variable	**Characteristics**	**n (%)**
Sex of household head n=332	Female	242 (72.9)
	Male	90 (27.1)
Religion: n=333	Protestant	142(42.6)
	Catholic	81(24.3)
	Muslim	85 (25.6)
	others	25 (7.5)
Place of residence (n=327)	Rural	182 (55.7)
	Urban	145 (44.3)
Age group (n=332)	Young adolescents (10-14)	105 (31.6)
	Older adolescents (15-19)	227 (68.4)
School attendance (n=329)	Yes	307 (93.3)
	No	22 (6.7)
Household head education (n=328)	No education	22 (6.7)
	Pre-primary	15 (4.6)
	Adult	8 (2.4)
	Primary education	175 (53.4)
	Secondary education	88 (26.8)
	Post-secondary education.	19 (5.8)
	Don’t Know	1 (0.3)
Parents alive n=333	Yes	277 (83.2)
	No	56 (16.8)
Type of parent’s occupation	Professional	22 (6.7)
	Manager/executive	3 (0.9)
	Office work	1 (0.3)
	Service work	8 (2.4)
	Artisan/craftsman	1 (0.3)
	Business	33 (10.0)
	Farming	242 (73.6)
	Bodaboda	8 (2.4)
	other	11 (3.3)
Age at first sex n=149	Younger than 15	56 (37.6)
	Older than 15	93 (62.4)

Marital status of adolescent girls n=143	Yes	51 (35.7)
	No	92 (64.3)

Table 1b. Health and Living Household Characteristics

Characteristic	Cases%	Control%	Unweighted count
Slept in a mosquito net: n=334			
Yes	97 (86.6)	162 (73)	259 (77.5)
No	15 (13.4)	60 (27.0)	75 (22.5)
Household member suffered from any illness or injury in past 30 days (n=333)			
Yes	59 (53.2)	158 (71.2)	217 (65.2)
No	52 (46.9)	64 (28.8)	116 (34.8)
Household's source of drinking water: n=332			
Open (river, unprotected) well	4 (3.6)	6 (2.7)	10 (3.1)
Closed (tap, borehole)	108 (72.3)	214 (90.5)	322 (84.3)
Roofing materials: n=327			
Modern (iron sheets)	108 (96.4)	210 (97.7)	318 (97.3)
Traditional (grass, wood planks)	4 (3.6)	5 (2.3)	9 (2.8)

Table 2a shows orphan status and living arrangement characteristics. Eighty three percent were non-orphans. Paternal orphanhood was the commonest at 12% while maternal orphanhood was 3.6%) and double orphanhood stood at 0.6%. one in two (57%) adolescents were co-residents with both parents.

Table 2a. Schooling and Employment Status

Characteristic	cases	control	Unweighted totals
Education			
Ever attended school n=329	96 (88.1)	211 (95.9)	307 (93.3)
Currently in school n= 306	20 (20.8)	201 (95.7)	221 (72.2)
Ever failed in a class n= 307	33 (34.7)	83 (39.0)	116 (37.7)
Ever worked in the past 12 months: n=327			
Yes	70 (63.1)	88 (40.7)	158 (48.3)
No	41 (36.9)	128 (59.3)	169 (51.7)

Table 2b. Orphan Hood Status and Living Arrangement Characteristics

Characteristic	cases	control	Unweighted total
Parental status: n=333			
Both alive	88 (79.3)	191 (86.0)	279 (83.8)
Only mother alive	17 (15.3)	23 (10.4)	40 (12.0)
Only father alive	5 (4.5)	7 (3.2)	12 (3.6)
Both not alive	1 (0.9)	1 (0.5)	2 (0.6)
Adolescent current co-residence: n=335			
Both parents	51 (45.5)	140 (62.8)	191 (57.0)
Single parent	20 (17.9)	46 (20.6)	66 (19.7)
Guardian	13 (11.6)	26 (11.7)	39 (11.6)
Self	1 (0.9)	1 (0.5)	2 (0.6)
Husband	26 (23.2)	9 (4.0)	35 (10.5)
other	1(0.9)	1(0.5)	2 (0.6)

Common Adolescent Health Risk Behaviors

The study findings show that there was insignificant use of substance and illicit drug or alcohol use among the adolescents in the study area, both in the rural and urban sub county as well as among the cases and control. Findings further revealed that there were other risky behaviors that the adolescents indulged in. These are presented below (Table 3).

Table 3. Common Risk Behaviors

sex	Odds Ratio	Std. Err.	z	P>z	[95% Conf. Interval]	
urban	3.243923	1.332115	2.87	0.004	1.450524	7.254643
not in sch	357.9445	368.2325	5.72	0.000	47.65944	2688.329
h/h h marrried>19	7899444	2916006	0.64	0.523	3831628	1.628582
Polygamy	1.422417	5379436	0.93	0.351	6778148	2.984988
Orphanhood (ref: both parents alive)						
Mother alive	3.255361	1.656568	2.32	0.020	1.200729	8.825784
Father alive	3.192096	2.882156	1.29	0.199	.5439049	18.73393
_cons	.1284967	.0505951	-5.21	0.000	.0593929	.2780029

Early Sex Debut

Findings also revealed that early sex debut, i.e. engaging in sex before 15 years was factors associated with adolescent pregnancy (n=122). Other risk factors associated with early sex debut (sex before 15 years) with odds ratio of 1.5 and 2.9 respectively were: polygamy and whether the mother of the adolescent was alive (Table 4).

Table 4. Factors Associated with early Sex Debut

Variables	Odds Ratio	Std. Err.	z	P>z	[95% Conf. Interval]	
urban	.8656613	.37753	-0.33	0.741	.3682343 2	035035
not in sch	.8111967	.3308018	-0.51	0.608	.3647629	1.804022
Head marrried>19	.8255703	.3226019	-0.49	0.624	.3838278	1.775709
Polygamy	1.509584	.6523852	0.95	0.341	.6471431	3.521393
Orphanhood (ref: both parents alive)						
Mother alive	2.940075	1.527309	2.08	0.038	1.062127	8.138421
Father alive	.8953207	.7957489	-0.12	0.901	.1568347 5.	111108

Results in Table 5 show risk factors associated with adolescent pregnancy which include: currently not being in school, age bracket 18-19, mother alive, residing in urban area, having multiple sexual partners, and sexually abused with odds ratios of 81.9, 1.7, 1.1,6.1, 3.7 and 16 respectively.

Further, more factors revealed with their Odds Ratios (Table 6).

Table 5. Risk Factors Associated with Adolescent Pregnancy

Variables						
Adol pregnancy	Odds Ratio	Std. Err.	z	P>z	[95% Conf. Interval]	
Currently not in school	81.96423	115.3853	3.13	0.002	5.192104	1293.914
Age category (ref: <15 years)						
15-17	.7437456	1.152903	-0.19	0.849	.0356411	15.52022

18-19	1.731027	2.85072	0.33	0.739	0686299	43.66106
Mother alive	1.05921 1.	393519	0.04	0.965	. 0803753	13.95858
Father alive	.126587	.3462624	-0.76	0.450	.0005943	26.96133
Never been married	8489566	1.252565	-0.11	0.912	.0470986	15.30253
Urban	6.184803	11.09927	1.02	0.310	.1835507	208.399
H/h head married>19	.581497	.6739479	-0.47	0.640	.0599812	5.63741
Polygamous family	.3415674	.4662125	-0.79	0.431	.0235317	4.957916
Multiple sex partners	3.708988	4.269216	1.14	0.255	.3885826	35.40198
Not sexually abused	16.20833	23.80872	1.90	0.058	.910736	288.459

Table 6. Of Risk Factors associated Adolescent Pregnancy

Variable	**OR**	**CI**	**Z**	**P-value**
Having Radio	0.622	0.3524-1.0986	1.636	0.1019
Having mobile phone	1.238	0.7729-1.9833	0.888	0.3744
Age household head got married	1.257	0.7758-2.0374	0.929	0.3527
Involvement in sports	1.418	0.8937-2.2505	1.094	0.2740
Type of building material Permanent/temporary	1.418	0.8937-2.2505	1.4182	0.1381
Knowledge of Reproductive health rights	1.371	0.6914-2.717	0.9035	0.3665
Level of formal education for parent	1.388	0.8344-2.3117	1.264	0.2064
Occupation of parent	0.693	0.4177-1.1509	1.417	0.1566
Decision making experience of the adolescent	3.119	1.8903 - 5.1446	4.453	0.0001
Ethnicity	0.797	0.3203-1.9835	0.488	0.6258
Religion	1.1562	0.6836-1.9548	0.542	0.5881
Source of the sex/RH information	2.8313	1.7715- 4.5252	4.350	0.0001
Family Praying together	1.169	0.6964-1.9651	0.5935	0.5534
How good the Relationship between husband and wife	0.6654	0.3135 -1.4123	1.061	0.2888
Parental time spent with adolescent	0.6489	0.4053-1.0391	1.800	0.0718
Household awareness of RH laws	0.7441	0.3746 - 1.4782	0.844	0.3987
Awareness of helpline phone contact for RH emergencies	0.5187	0.2028-1.3200	1.377	0.1684
Owning a computer	0.9048	0.3065 -2.6713	0.181	0.8563
Repeating class	0.8459	0.5076 - 1.4097	0.642	0.5207

Transactional sex was also shown to be a factor for adolescent pregnancy. This study showed that sexually active adolescents who had ever been involved in transactional sex were more at risk. About 8% of adolescents in school reported ever having been involved in exchange of gifts for sex. This factor was also more common among the control group, especially among the older girls above 15 years of age. Further, money was mentioned as the commonest (80.3%) type of gift received by sexually active adolescents in exchange for sex. Clothes, food, and other gifts like make-up were the other gifts exchanges for sex.

This finding was also mentioned during the Key Informant Interviews alluding to poor economic status of homes as a determinant. In fact, finding revealed that some parents used

their daughters as a bait to get money from unsuspecting and unethical men who lured girls with gifts. Such parent would send the girls out at night with the pretext that they are selling items, hoping that boys or men will befriend them. If the trick worked, they send the girls into early marriage. By so doing such parents are reducing the financial stress as the girl seizes to be their obligation. Other poor parents out rightly told their young girls to go find men, as quoted below:

"*Yes, there is a woman who forced her daughter to go and get married there are those that tell their daughters to go and get married saying now you have grown I only want sugar …Like at 12/13 years even if you're of our age [much younger-say 10 years], a parent can tell you that go and get a man" (Female FGD, 10 - 14 years).*

Further, because the parents know that they are not able to provide all their children needs, they look away when the girls come home with gifts from men:

Sometimes she doesn't even ask about it she just looks at you because she is not providing for you sometimes, she even sends you their there are girls who even take some to their mothers" (Female FGD, 10-14years).

In this study district, the main source of income has for a long time been sugarcane growing. Even the households that cannot afford the production costs at least opt to let the land they have to sugarcane growing. The time for hire stretches for 2 to 10 years. As a result, the families cannot even grow their own food. Adolescent girls in families that have let out the land and are food insecure are more vulnerable to boy and men friend relationships that result into sexual relationships and pregnancies:

Here in Luuka, the cause of the problem is that the source of income is sugar cane but now that price is down, many families are experiencing famine. The land they have is already occupied by sugarcane growers who rented it from them, and they have nowhere to grow the food to eat. Now to get what to eat is a big struggle, that is why the parents are even sending their children to sell pancakes in order to get some money to buy food. And for the mothers, instead of being home to look after the children and even go digging, they also end up selling pancakes and may be juice on streets to get money for food because they don't have land to dig. Both parents and the children will not be home because they are looking for money and the problem in Luuka is resulting from sugarcane growing because the people don't have money and they rented away their land to investor growing the sugarcanes and in general, people in Luuka don't have incomes to support their homes (KC, Male, KI).

The sugarcane plantations have numerous activities that are manually done and therefore employ more men than women. Some of these men travel from distant areas to come in search of work. They leave their families back and so 'prey' on the unsuspecting young girls, exposing them to early sex and early pregnancies. In fact, the girls allude to the fact that these men 'hunt' after the girls as quoted:

"We will keep home and keep reporting them. We will ignore them but again sometimes you ignore him, and you use another rout but again bump into him in a corridor you use another rout but still you find him where you are going and another time when they send you again you find him where you are going" (Female FGD, 10-14years).

The study also revealed that religion sometimes compounds the burden of poverty among households. The Islamic religion for example allows for parents and guardians to give their daughters in marriage once they start their monthly periods. In cases where these parents cannot keep their girls in school, it will be a heavier decision to choose to continue keeping the girl in the home. As such, Muslim girls living in poor households inevitably become more vulnerable to early marriage and therefore early pregnancies. Further, without basics in life, some girls lose their patience, as commented below:

Yes, even when you have reached a stage of getting your periods and you need pads, or wearing short cloths, yes, and trousers. Girls love such things so much. So, they also get tempted when they need them Yes, she [a girl] can ask for money to go and buy pads, or to buy shoes, or sometimes asks for little money from your parents to buy pan cakes. He [the parent] takes ages to give [her] the money or tells her that he doesn't have the money and yet the girls desires those items" (Female FGD, 10-14years).

This study also revealed that parents spend less time with their children. Children stay at home all by themselves and over time men that have bad intention get to know and take advantage of the situation:

The parents no longer stay home so the children can do everything they want because they have plenty of time all day when the parents are away. The child may have a phone but when even the parent doesn't know, and they will keep communicating with the man (KC, Male, KI).

Findings also revealed that parents are increasingly abandoning their parental roles including counseling their children. One of the mothers who accepted to participate in this study had this to say:

"*The challenges that these girls are facing, that are compelling them to get pregnant; have the main root cause originating from the parents who leave their daughters to move anyhow without controlling their movements. She [the girl] leaves home and goes and does whatever she wants, and the parent says nothing, she returns home very late at night and the parent says nothing at all. Not even counseling her or tell her the danger of having men or boyfriends and how it can affect her future but keeps on saying after all she is a girl, let her go and do whatever she wants*" (Mother, KI, Kiyunga).

Another factor at familial level that is responsible for the increased rates of adolescent pregnancy has been blamed on parents abandoning their cultural values. This issue has been compounded by conflicts between new religious beliefs and the traditional faiths as was argued by one traditional –cultural leader.

Further to abandoned cultural values are cases of abandoned spiritual ties or religion. Children who participated in this study confirmed that their parents no longer have ties with faith or religious activities like going to church during the days of prayer:

Some of us go but our parents don't. There are parents who don't go for prayers there are homes that don't even have bibles. Some parents even don't have religion anymore. Most of them dropped their religions. Some of them [parents] leave home and lie that they are going to church but then end up doing other things (Female 11years).

However, some protective factors were revealed such as when the parents are able to enroll and maintain their children in school, this keeps the girls away from early pregnancy as confirmed by one KI:

And then the other thing is that children are being kept at school and not home, and the parents could easily move away from home looking for money … not worried about who to take care of them "(KC, Male, KI).

Data Integration

Quantitative and qualitative data were compared and triangulated. The quantitative data showed that currently not being in school, mother being alive for orphaned girls, having multiple sex partners, sexually abused, not being able to make decisions were significantly associated with adolescent pregnancy and this corroborated qualitative findings. Although poverty, religion and having mobile phone were not independently associated with adolescent pregnancy as per Odds ratio; FGD, KII and IDI revealed that these variables were associated. Having a father alive as an orphan was protective whereas having a mother alive was positively associated with adolescent pregnancy. Based on observations done there

were inadequate adolescent friendly spaces/environment for the adolescents to access reproductive health services. I was also observed that there were hardly any information materials about sexual and reproductive health in the health units. There was also hardly observable implementation of the Adolescent Health Policy Guidelines and Service Standards. There was no functional District Committee on Adolescent Health (DICAH). This could be affecting the smooth running of the delivery of adolescent reproductive health including prevention of pregnancies in the district. Furthermore, whereas most responds are not aware of the helpline to report any sexual abuse corruption was cited as a hindrance to justice for the victims. The local leaders and the law enforcers connive and frustrate the victims after taking bribes.

Discussion

Regarding pregnancy among adolescents aged 10-19 years old in Luuka District Eastern Uganda [16] has a high burden of adolescent pregnancies [13, 17]. While some efforts have been made by the health system to curb the vice there is still a high rate of adolescent pregnancies [18]. This study explored the behavioral, familial, and social factors associated with pregnancy among adolescent girls aged 10–19 years in Luuka District, Uganda. This study agrees with earlier studies on determinants of adolescent pregnancies like child marriages, lack of family support, peer pressure, low socio-economic status [3, 4, 6, 19, 20], and low use of contraceptives [16]. This study is strengthened by its design being embedded and having many diverse stakeholders who participated.

Multivariable analyses: age of respondents 18-19 (OR 1.7 p-value0.739), not being in school (OR 82 p-value 0.002), multiple sexual partners (OR 3.7 p-value 0.3, orphan staying with mother (OR 1 p-value 0.96 and sexual abused (OR16 p-value 0.0001) were found to be significantly associated with adolescent pregnancy. Based on qualitative strand the perceived determinants of adolescent pregnancies included, lack of knowledge on how to avoid pregnancy, sexual abuse low acceptance/use of contraceptives, peer pressure neglect by parents, lack of community responsibility, media influence, cultural beliefs that promote early marriage/childbearing and lack of role models, pressure to contribute to family welfare through early marriage or sexual transactions Other contributing factors include, poverty, drug use among boys, poor implementation of related government policies, corruption and poor adolescent friendly services This study was based on the Social Control theory and the Socio-Ecological theory. Understanding the determinants of adolescent pregnancy and what the community suggest reducing adolescent pregnancies across a range of levels, may help to consider possible interventions. In the paragraphs that follow, a discussion of the key findings is presented with respect to the sub-topics: demographic, social factors, behavioral, and familial.

Determinants

Demographic Factors

The results showed that age of the respondents significantly associated with adolescent pregnancy older adolescents (15–19) were found to be more likely at risk of adolescent pregnancy as compared to younger adolescents (10–14). Being in school was found to be protective against adolescent pregnancy. Residence could not be assessed since there was intentional equal recruitment for both rural and urban for cases and controls. These findings are consistent with the previous studies in Uganda [19-22], Tanzania [23] and Ethiopia [21, 24]. This situation could put them in a higher risk of becoming pregnant. However, being in school may provide periods of supervision of adolescent girls by teachers as well as parents, which could reduce opportunities for sexual activity [21].

Social Factors and Adolescent Pregnancy

The results of multivariable analysis on social factors and adolescent pregnancy reveals that peer pressure, and sexual abuse, were significantly associated with adolescent pregnancy. These results are in agreement with some studies that have postulated that sexual abuse place girls at higher risk of experiencing adolescent pregnancy. Peers can influence the views of their age groups, hence, bad influence leading to risky behaviors such as: alcohol and drug abuse, dropping out of school, unprotected sexual activity which may lead to pregnancy [19]. This study agrees with this analogy, as those who were not sexually abused were less likely to become pregnant.

Familial Factors and Adolescent Pregnancy

Multivariable analysis of familial factors revealed that being an orphan and living with mother was associated with adolescent pregnancy. It was noted that living with father if the mother was dead was protective. This also came out during the qualitative analysis as it was mentioned that mothers send the young girls in the evening to go to trading centers to sell pancakes and looking for money through transaction sex. Other factors which were not found significantly associated with adolescent pregnancy at quantitative data but were cited qualitatively included low socio-economic status, domestic violence, physical neglect, early marriages, cultural practices, and parental divorce. Low socio-economic status, and cultural traditions, especially payment of dowry as a source of income is most likely the issue exacerbating early marriages in Uganda. Economic deprivation is likely to influence adolescent behaviors and heighten their exposure to early pregnancy as observed in Uganda [19, 21, 22] and other countries such as Tanzania [23] In this study It was also revealed that there is growing concern that physical neglect of teenage girls could foster relationships with older men which is seen as more beneficial when daily needs such as food, shelter, clothing and money are not met by parents/caregivers as reported by earlier studies [19, 21, 23].

Behavioral Factors and Adolescent Pregnancy

The multivariable analysis on behavioral factors and adolescent pregnancy shows that multiple sexual partners, significantly associated with adolescent pregnancy. Not having multiple sexual partners is protective against adolescent pregnancy. These results agree with a national study conducted in Uganda by the Uganda Bureau of Statistics (UBOS) [16, 21]. The qualitative strand of the study however also revealed frequency of sex, and irregular contraceptive use, having frequent sex, inadequate access to contraceptive technologies contributed to adolescent pregnancy in Luuka district. This was in agreement with earlier studies [6, 19, 20, 25]. This study however fell short of addressing reasons for irregular contraceptive use quantitatively. Qualitatively however some of the contributory factors included inadequate access, stigma, and limited information on availability of contraceptive methods which is in line with previous studies [19, 22].

Implications for Policy and Programmes

The findings reported can be used to formulate or amend policies and programmes intended to curb the vice of adolescent pregnancy. The determinants hinge on social, behavioral, and familial factors. The Government of Uganda has put up a few policies that should, in theory, be useful to reduce adolescent pregnancies including setting the minimum age of sexual consent at 18 years; the defilement law against having sex with a girl under 18 years, penal code Act 2007 [26, 27]; he National Adolescent Health Policy [28, 29] Universal and Secondary Primary Education that offers free elementary and secondary education to children [30]. These

policies are not current and not operational as evidenced by the findings of this study. They do not seem to have much effect due to lack of enforcement and lack of knowledge about the policies by the public as revealed by this study. The government of Uganda needs to review and make the policies operational and sensitize the public about them. Provisions that allow contraceptive use among teenage girl's communities, sex education so that teenage girls avoid early sexual encounters and multiple sexual partners must be put in place. Girls need critical thinking skills as well as an enabling environment such as family and societal commitment and life skills development.

Strengths and Limitations of the Study

The embedded mixed methods study design was used due its strengths in providing a more holistic, contextually sensitive view about the phenomenon of interest and its potential for allowing to explore relatively "new" and "emergent" topics [12]. For the quantitative strand a case-control study was conducted for. the fact that it is suitable when comparing two study groups (in this study cases and controls) and when exploring multiple exposures with one single outcome (adolescent pregnancy). Besides, controls were drawn from the same population as cases thus minimizing potential biases from both groups.

Furthermore, simple random sampling technique allows even distribution of confounders among study participants. Adjusting for all other factors and assessing for effect modification helped to further reduce potential biases. Therefore, strengthening the association between predictor variables and the outcome. Lastly, the large sample size of 336 participants could have increased the power of the study as well. The qualitative strand involved conducting FGDs, KIIs and KIIs of purposively selected participants. Data obtained was triangulated.

Study limitations included case-control design is prone to recall bias as participants must recall some events that occurred sometimes in their lives and selection bias due to the fact that some girls selected as controls may have in fact been cases because of lack of disclosure caused by stigma surrounding teenage pregnancy. This limitation was minimized by recruiting girls currently pregnant or those who have ever been in the past six months. The results for school attendance and control over sex showed high point estimates with wide confidence intervals which could have reduced the level of precisions of their measures. Furthermore, pregnancy test was not conducted to confirm the pregnancy status of teenage girls, those who were one or 2 weeks pregnant could have not realized they were pregnant and therefore included as controls (non-pregnant). This scenario was minimized by paring the controls per case.

Conclusions and Recommendations

The study considered social behavioral and familial variables which were used to determine associations with adolescent pregnancy. Demographic factors that became significantly associated with adolescent pregnancy were older age of respondents (15–19 years and, school attendance. Behavioral factors associated with teenage pregnancy in Luuka District included: having multiple partners and frequent sex. Familial factors significantly associated with adolescent pregnancy were poverty, orphan hood with mother alive and sexual abuse.

Perceived factors derived from qualitative analysis included comprised of peer pressure, lack of control over sex, poorly implemented government policies, corruption, lack of awareness on adolescent sexual and reproductive health, poorly organized spaces for the adolescents. These findings will help improve adolescent sexual and health services in low-income settings. There is need to promote sex education aimed at abstinence from sex; contraceptive use enhancement among adolescent girls in communities

dialogue with parents with the view of discouraging early marriages of teenage girls; community sensitization so as to avoid groups that influence peers to engage in risky behaviors and early sex; strengthening the implementation of existing laws in order to deter sexual abusers; and promoting sexual and reproductive rights of adolescent girls so that they have full control in making decisions concerning their sexual life. We recommend similar study to be replicated in other districts and initiate a randomized community trial for some of the interventions proposed to test what works and what does not work, strengthen social norms through engagement of parents, religious and cultural leaders in adolescent Health promotion, Identify and recommend appropriate interventions to address the key drivers of adolescent Pregnancy and early marriages, promote use of innovations and technology for adolescent's health and reduction of adolescent pregnancy and early marriage, strengthen Advocacy and political leadership support at all levels for adolescent health and reduction of adolescent pregnancy, and substance abuse, strengthen multi-sectoral coordination for adolescent health at national and sub-national levels.

Governments should also expand free sanitary pads programme to eliminate barriers to girl child education. Lastly, girls who drop out of school due to pregnancy issues should be supported to go back to school in line with the government policy.

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Conflict of Interest

The researchers have no conflict of interest to declare.

Notes on Contributors

Samuel Kabwigu is an obstetrician and gynecologist with enormous expertise in male involvement in reproductive health. Samuel is passionate about male involvement and has explored barriers of male participation in family planning. As an Investigator on several NIH-funded grants, has established strong ties with communities with effective networks useful in recruit and tracking study participants and managing collaborations.

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Authors' contributions

All Participated in the conception and design, analysis, drafting and revising first manuscript. Participated in the interpretation, corrections and revising of the manuscript. Participated in the corrections and reviewing of the manuscript. All authors participated sufficiently in the work and take responsibility for the appropriate portions of the content. All authors reviewed and approved the final manuscript.

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