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Pregnancy and Associated Factors Among Adolescents and Young Adults Living with HIV in the Northwest Region of Cameroon

Mirabel Vifeme[1*], Nsom Gwendoline[1], Banlack Ernest[1], Eveline Mboh[1], Emmanuel Nshom[1], Tebeu Pierre Marie[2,3]

Abstract

Background: The evolution in antiretroviral treatment programs enabled HIV infected children to reach adulthood, passing through a series of sexual relationship challenges, notably early/unintended pregnancies. The risks facing young mothers are amplified for those living with HIV, who face additional vulnerabilities. This study aimed to assess the prevalence and factors associated with pregnancy among adolescents and young adults living with HIV.

Methods: This was a cross-sectional study using a sequential sampling of adolescents and young adults living with HIV. Structured questionnaires were used to collect data between February and April 2022 from 238 clients in 16 HIV care and treatment sites in the Northwest Region. Data collected was cleaned and analyzed using Stata version 14.0.

Results: The mean age of the 238 study participants was 18.7 years with a 26.5% prevalence of pregnancy. About 59.2% were adolescents aged 15-19 years, 90.8% single, 72.3% unemployed, while only 40.8% of those who had been exposed to sex used a pregnancy prevention method. Being an urban dweller, not schooling and having first sex between the ages 15-19 years were statistically associated with higher odds of pregnancy.

Conclusion: The rate of pregnancy among adolescents and young adults living with HIV is high and mostly associated with sociodemographic factors. Setting strategies to retain youths in school, intensifying the creation of awareness on reproductive health issues, and especially counseling on pregnancy prevention methods could be options to mitigate this real-time challenge in young girls as a whole particularly those living with HIV.

Keywords: Pregnancy; Adolescents; Young adults; HIV

Introduction

The rapid roll-out of anti-retroviral treatment programs has made it possible for perinatally infected infants to live through adolescence into adulthood, thereby engaging in dating and sexual relationships [1]. The World Health Organization (WHO) defines the age group 10–19 years as adolescence and the United Nations (UN) generally refer to persons within the age group 15-24 years as youths [2]. Adolescence is a time of transition from childhood to adulthood marked by pubertal development, sexual identity formation and social/cognitive maturation. The physical, emotional, mental, and social changes place their life at high risk, as such adolescents are saddled with health risk exposures related to their sexuality and reproduction [3].

Affiliation:

[1]Cameroon Baptist Convention Health Services AIDS Care and Prevention Program, Cameroon

[2]University of Yaounde I, Faculty of Medicine and Biomedical Sciences, Cameroon

[3]University Centre Hospital of Yaounde, Cameroon

[4]Inter-State Center for Higher Education in Central African Public Health (CIESPAC) Brazzaville, Republic of Congo, Central Africa

***Corresponding Author**

Mirabel Mbueh Vifeme, Cameroon Baptist Convention Health Services AIDS Care and Prevention Program, Cameroon. Tel: +237765099392.

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Consequently, most young persons are exposed to unwanted pregnancy, casual sexual practices; rape; childbearing at an early age, high-risk abortion, HIV/AIDS and other sexually transmitted diseases, partly because they do not receive adequate information and services on sexual and reproductive health [2]. This transitional stage requires special attention and sustained support and negotiating these milestones can be both rewarding and challenging for all youths, but exacerbated for those living with Human Immunodeficiency Virus (HIV) [4]. The United Nations Children Fund (UNICEF), defines teenage pregnancy as "a girl, usually within the ages 13-19, who has not reached legal adulthood becoming pregnant. WHO has established that, approximately 21 million girls aged 15-19 years become pregnant in developing countries every year) , accounting for 11% of births worldwide [5-7]. Young mothers often describe their pregnancy as unplanned and 50% of these are unintended, indicating a lack of access to contraceptive and lack of control over sexual decision-making [3,8,9]. Adolescent pregnancy remains a significant public health problem in Africa and a major contributor to an increased risk of adverse events due to pregnancy and childbirth outcomes compared to older women [10, 11]. It is equally a significant determining factor of maternal and child morbidity and mortality leading to the vicious cycles of poverty [5,12]. Cameroon has one of the highest adolescent fertility rates in West and Central Africa [13], as reported at 98.88% in 2020 by the World Bank [14]. WHO report showed that pregnancy and childbirth complications are the leading causes of death among girls aged 15-19 years globally [10,15], with low and middle-income countries accounting for 99% of global maternal deaths of women aged 15-49 years [5]. Pregnancy among young girls has a major impact with respect to its medical, social and economic implications, both for the newborns and their young mothers [2,5]. Unlike in older women, pregnancy and delivery in adolescents is associated with increased rates of hypertensive disorders of pregnancy, anemia, systemic infections, unsafe abortion, preterm delivery, stillbirth, puerperal endometritis, eclampsia, caesarean delivery and obstetric fistula [5,8,10,13]. Babies of younger mothers in low- and middle-income countries face higher risks of severe neonatal conditions like neonatal asphyxia, preterm delivery and low neonate birth weight, with long-term potential effects [5,8,10]. Young girls are less likely than older women to access sexual and reproductive health care and skilled assistance during pregnancy and childbirth. They are further exposed to other life- threatening conditions and have a higher likelihood of dying [5,6]. The emotional, psychological and social needs of pregnant young girls can be greater than those of older women. Some girls fear humiliation that they pre-emptively drop out of school once they discover they are pregnant, leading to poor education, unemployment and intergenerational cycles of poverty. Others resort to unsafe abortions [11,12,16]. Previous studies have shown that each year, about 3 million girls aged 15-19 years undergo unsafe abortions, administered by unskilled providers, mostly resulting in mortality [5,17].

Adolescent pregnancy itself can be a source of increasing inequality within communities and therefore has important negative consequences, not only for the young woman and her child, but for the future health and well-being of communities [8]. The social taboos around teenage pregnancy often leave young mothers highly stigmatized [18]. Culturally, the pregnancy is often considered to be the girl's fault, whether planned, unplanned or as a result of abuse [19]. In sub-Saharan Africa, where most Adolescents Living with HIV (ALWHIV) live, about 25% of young people begin childbearing at the age of 15. The risks facing young mothers are amplified for those living with HIV, who face additional vulnerabilities. This high-risk group may have little control over their own sexual and reproductive health and are at risk for additional health and social consequences. As such, this age group needs information and access to contraceptive methods and secondary prevention strategies to prevent re-infecting themselves and transmitting the HIV to their children and sexual partners [20]. Rates of mother to child transmission of HIV are increased in HIV positive young persons compared to adults due to lower uptake of Prevention of Mother to Child Transmission (PMTCT). Adolescents and young adults are therefore a critical target group in PMTCT. Finally, HIV positive pregnant adolescents have an increased need for social support during pregnancy due to the stigma as a result of both the pregnancy and HIV as well as the requirements for ART compliance for themselves and their babies [8]. They experience delayed initiation of Antiretroviral Therapy (ART), less consistent engagement in antenatal and HIV care, intermittent viral suppression and poorer access to infant HIV testing. Consequently, young mothers living with HIV in sub-Saharan Africa are more likely than older mothers to transmit HIV to their children, despite global reductions in vertical HIV transmission [21]. Efforts have been made to reduce adolescent pregnancy globally, as evident in the Sustainable Development Goal 3.7 that seeks to ensure universal access to sexual and reproductive health-care services, including family planning, information, education and the integration of reproductive health into national strategies and programs by 2030. It's slow progress has brought about a renewed call for evidence-based provision of adolescent-focused sexual and reproductive health services and pregnancy prevention, with HIV positive adolescents identified as a specific vulnerable population due to poverty, homelessness and orphan status [8,15]. Several related studies have been conducted in the general adolescent population, but there is limited literature on similar studies among adolescents and young adults living with HIV in Cameroon, leading to a paucity of knowledge on the prevalence and associated factors of pregnancy among ALWHIV in the Northwest region and Cameroon as a whole. Knowing the prevalence and factors associated with pregnancy among adolescents and young adults living with

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HIV is important to prevent its medical, social and economic impact. Therefore, the aim of this study was to determine the prevalence and factors associated with pregnancy among adolescents and young adults living with HIV in the Northwest Region of Cameroon.

Methods

Study design

A cross-sectional study was conducted between February and April 2022 and included a quantitative survey of female adolescents (15-19 years) and young adults (20-24 years) living with HIV in the Northwest Region of Cameroon. Participants were recruited from 16 selected HIV care and treatment sites in the region, taking into consideration patient load (15 adolescents and young adults on ART), functional level, diversity of ownership, and residential setting (rural or urban).

Sampling

A purposeful sampling technique was used to select the 16 study sites, including high, medium and low volume Antiretroviral Therapy (ART) treatment centers with at least 15 adolescents and young adults on ART. Study participants from each site were selected using a sequential sampling technique. From the calculated sample size and the estimated study population, every fourth client was selected.

Data collection

Structured questionnaires containing questions on demographics, age at first pregnancy, schooling status etc were administered to adolescents and young adults who agreed to participate in the study. The research assistant explained the objectives of the study to clients when they came to collect their ART medication, and asked for their consent to participate. Those who consented were then asked to complete a questionnaire in a private room with assistance from the nurse in charge of adolescent HIV care and treatment. The questionnaires were administered in English and Pidgin-English as per the convenience of the participant. In addition to sociodemographic characteristics of study participants, they were asked whether or not they had ever been pregnant, the age at first pregnancy, schooling status prior to pregnancy and whether or not the pregnancy was intended.

Data management and analysis

The data was checked, coded, entered into Microsoft Excel, cleaned and exported to Stata version 14.0 where statistical analysis was performed. The dependent variable was "ever been pregnant" and independent variables included socio-demographic, age at first sex, sexual and reproductive health knowledge, uptake of sexual and reproductive health services, and method of pregnancy prevention ever used. Descriptive statistics (frequencies and proportions) were used to describe the characteristics of participants in the pregnant and non-pregnant groups. The Chi square test was used to compare the difference in characteristics of participants. Odds ratios at 95% confidence interval were calculated using logistic regression analysis to determine the association between the dependent and independent variables and their precision. Univariate analysis was initially conducted and significant variables were entered into a multiple logistic regression model to investigate the associated characteristics on the outcomes.

Results

A total of 238 adolescents and young adults living with HIV in the Northwest region of Cameroon were included in the study with a mean age of 18.7 years. Of the participants enrolled, a total of 141 (59.2%) were in the age group 15-19 years, close to half (44.5%) were residing in urban settings, majority (90.8%) were singles and 72.3% were unemployed. Over half (53.8%) were schooling, about two thirds (66.8%) had attended post primary educational level and the participants were predominantly Christians (94.9%). More than half (61.3%) of the participants had their first sexual experience before the age of 15 years, majority (63.4%) of participants had good sexual and reproductive health knowledge, up to 32.8% of them had never used any sexual and reproductive health service and close to half (40.8%) of those who had been involved in sex never used any pregnancy prevention method. Table 1 presents details of the characteristics of the study participants.

The crude pregnancy rate was estimated at 26.5%. Table 1 shows the univariate and bivariate analysis which was performed between the dependent variable "ever been pregnant" and the independent variables to determine factors which were associated with pregnancy. The results show that there was a statistically significant relationship between pregnancy and age group, marital status, occupational status, current educational status, age at first sexual experience and pregnancy prevention method used (*P*-values = <0.01). There was no statistical significance in the relationship observed between pregnancy and residential setting, level of education, sexual and reproductive health knowledge and use of sexual and reproductive health services (Table 1).

Significant variables from the bivariate analysis were put into a multiple logistic regression analysis to predict their association with pregnancy among adolescents and young adults living with HIV. Level of education and place of residence had a slightly significant association and were also added into the multivariable analysis. From the logistic regression analysis, place of residence, current educational status and age at first sexual experience were significantly associated with pregnancy among adolescents and young adults living with HIV. The odds of pregnancy among adolescents and young adults who were not schooling were

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Table 1: Characteristics of adolescents and young adults living with HIV by pregnancy status.

Variable/Level	All Participants		Ever been Pregnant		Never been Pregnant		P-Value
	N=238	%	n=63	%	n=175	%	
Age group (Years)							**<0.01**
15 – 19	141	59.20%	18	12.80%	123	87.20%	
20 – 24	97	40.80%	45	46.40%	52	53.60%	
Marital status							**<0.01**
Single	216	90.80%	47	21.80%	169	78.2	
Married	22	9.20%	16	72.70%	6	27.3	
Place of residence							0.07
Rural	106	44.50%	22	20.80%	84	79.3	
Semi urban	40	16.80%	9	22.50%	31	77.5	
Urban	92	38.70%	32	34.80%	60	65.2	
Occupational status							**<0.01**
Formally employed	10	4.20%	3	30.00%	7	70	
Self Employed	56	23.50%	28	50.00%	28	50	
Unemployed	172	72.30%	32	18.60%	140	81.4	
Current educational status							**<0.01**
Schooling	128	53.80%	11	8.60%	117	91.4	
Not schooling	110	46.20%	52	47.30%	58	52.7	
Level of education							0.07
None	19	8.00%	9	47.40%	10	52.6	
Primary	60	25.20%	17	28.30%	43	71.7	
Post primary	159	66.80%	37	23.30%	122	76.7	
Religion							0.06
Christians	226	95.00%	57	25.20%	169	74.8	
Muslims	12	5.00%	6	50.00%	6	50	
Age range (years) at first sex							**<0.01**
14-Dec	146	61.30%	6	4.10%	140	95.9	
15 -19	77	32.40%	49	63.60%	28	36.4	
20 - 24	15	6.30%	8	53.30%	7	46.7	
SRH knowledge							0.52
Poor	32	13.40%	6	18.80%	26	81.2	
Average	55	23.10%	14	25.50%	41	74.5	
Good	151	63.40%	43	28.50%	108	71.5	
Use of SRH service							0.07
None	78	32.80%	15	19.20%	63	80.8	
Average	76	31.90%	27	35.50%	49	64.5	
Good	84	35.30%	21	25.00%	63	75	
Pregnancy prevention method							**<0.01**
Condoms	76	31.90%	41	53.90%	35	46.1	
Other contraceptives	65	27.30%	2	3.10%	63	96.9	
None	97	40.80%	20	20.60%	77	79.4	

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Table 2: Factors associated with pregnancy among adolescents and young adults living with HIV in the Northwest Region of Cameroon.

Variable/Level	Pregnancy Status		COR (95%CI)	AOR (95%CI)	P-Value
	Yes	No			
Age group (Years)					
15 – 19	18	123	1	1	
20 – 24	45	52	5.91(3.12-11.16)	1.83(0.71-4.73)	0.21
Marital status					
Single	47	169	1	1	
Married	16	6	9.59(3.55-25.87)	3.11(0.75-12.89)	0.12
Place of residence					
Rural	22	84	1	1	
Semi urban	9	31	1.11(0.46-2.67)	1.37(0.38-4.97)	0.63
Urban	32	60	2.04(1.08-3.85)	2.87(0.99-8.30)	**0.05**
Occupational status					
Formally employed	3	7	1	1	
Self Employed	28	28	2.33(0.55-9.95)	0.52(0.59-4.61)	0.56
Unemployed	32	140	0.53(0.13-2.18)	0.69(0.96-4.99)	0.71
Current educational status					
Schooling	11	117	1		
Not schooling	52	58	9.54(4.63-19.64)	3.35(01.14-9.81)	**0.03**
Level of education					
None	9	10	1	1	
Primary	17	43	0.44(0.15-1.27)	0.28(0.05-1.53)	0.14
Post primary	37	122	0.34(0.13-0.89)	0.69(0.16-3.05)	0.63
Religion					
Christians	57	169	1	1	
Muslims	6	6	2.96(0.92-9.56)	3.32(0.49-22.21)	0.22
Age range (years) at first sex					
14-Dec	6	6	1	1	
15 -19	49	28	40.83(15.95-104.51)	23.01(6.33-83.67)	**<0.01**
20 - 24	8	7	26.67(7.25-98.09)	15.53(2.43-99.27)	**<0.01**
Not sexually involved	0	134	NA	NA	
Pregnancy prevention method					
Condoms	41	35	1	1	
Other contraceptives	2	63	0.02(0.01-0.12)	1.67(0.42-6.63)	0.47
None	20	77	0.22(0.11-0.43)	1.27(0.31-5.24)	0.74

3.35 (AOR=3.35, 95%CI:01.14-9.81) times higher than those of their counterparts who were currently schooling and this was statistically significant (P-value = 0.03). Compared to adolescents and young adults living with HIV residing in rural areas, there was strong statistical evidence that those residing in semi-urban areas had an increased risk (AOR=1.37, 95% CI: 0.38-4.97) of pregnancy and this risk was even greater among those residing in urban areas (AOR:2.87, 95%CI:0.99-8.30). The odds of pregnancy were 23.01 (AOR=23.01, 95% CI:6.33-83.67) and 15.53 (AOR=15.53, 95%CI:2.43-99.27) higher in participants who had their first sex involvement within the 15-19- and 20-24-year age groups respectively, compared to those who had this experience within the 12-14 years age group (Table 2).

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Discussion

This study aimed to determine the prevalence and associated factors of pregnancy among adolescents and young adults living with HIV in the Northwest region of Cameroon. The rate of pregnancy in the study was estimated at 26.5% and it was significantly associated with place of residence, current educational status and age at first sexual experience. The prevalence of pregnancy in this study was higher than the 11% and 18% obtained in African countries [12,15].This difference could be due to the fact that the previous studies were conducted in the general adolescent population while the present study was conducted amongst adolescents and young adults living with HIV. A higher rate (33%) was registered in a study conducted among adolescents and young adults living with HIV in Zimbabwe (9). Our findings which are in line with the study conducted in Zimbabwe could be indicative of the fact that HIV infected young girls are exposed to unsafe sexual practices leading to a higher rate of unplanned pregnancies. Generally, the fear of contracting HIV is usually the greatest reason for which young people avoid unhealthy sexual practices. So, those who were already infected perinatally no longer fear HIV and as such go about careless sexuality that end up not only in unintended pregnancy but exposes them to other sexually transmissible infections and placing their sexual partners at higher risk of contracting HIV. The prevalence of pregnancy in our study was similar to that of Sevidzem in the Kumbo West District of the NW Region of Cameroon. Key findings are discussed in the paragraphs that follow.

Sociodemographic factors

At bivariate analysis, almost all sociodemographic factors were significantly related to pregnancy. We found that the rate of pregnancy was higher among young adults (20-24 years) than the adolescents (15-19 years) (P <0.01). Older girls may have multiple sexual partners due to peer pressure to meet their increasing monetary needs, which could lead them to transactional sex, increasing their chances of becoming pregnant. The peculiarity in our findings could probably be because we used 15years instead of lower cutoff age for adolescents and we included young adults 20-24years which previous studies did not. However, participant's age group was not significantly associated at multivariate analysis. Our results showed that pregnancy was more (72.7%) among the married girls than those who were single (P <0.01). However, the proportion of married girls was small (9.2%) and their influence on the rate of pregnancy in the study population could be negligible. These findings however concur with previous findings in the African region; East Africa [11] Uganda [22], Sub Saharan Africa [3], Eastern Ethiopia [7]. Place of residence was significantly associated to pregnancy in adolescents and young adults living with HIV both at bivariate and multivariate analysis. Participants who resided in urban settings were twice more likely to become pregnant than their counterparts residing in rural areas. This could be because exposure to risky sexual behaviors is higher in towns than villages due to modernization, random use of gargets, increased peer pressure as well as increased use of drugs such as alcohol and tramol. This could suggest that young people in urban settings are more exposed to sexually transmissible diseases and their sexual partners are highly exposed to HIV infection. Our findings are contrary to those of previous authors who established that youths in rural areas were more likely to be pregnant than those in urban areas [10,22,23]. The difference in our findings can be explained by the fact that the Northwest region of Cameroon is currently experiencing a sociopolitical crisis which has caused a stop of school activities in many rural areas and has compelled most young people who used to reside in the rural areas to resettle in urban settings and consequently more exposed to unhealthy sexual activities. Our results however correlate with findings from Ghana [23].

At bivariate analysis, we observed that being employed was significantly associated with pregnancy, with highest rate (50%) among participants who were self-employed, followed by those who were formally employed (30%) and least (18.6%) among the unemployed (P<0.01). When a young girl has an income source, she probably assumes some financial autonomy and this may increase her exposure to risky behaviors like buying and consuming alcohol and drugs, which may intend increase her exposure to unsafe sexual activities, hence leading to unintended pregnancy. The findings of our study concur with past research in East Africa [11] and Eastern Ethiopia [7]. Our findings were however contrary to those of Asare in Ghana who noticed that unemployed young girls were more prone to becoming pregnant [23]. The odds of pregnancy were three times higher among school dropouts than their counterparts who were currently schooling, meaning that being in school could be protective against pregnancy in young girls. Being in school increases knowledge of pregnancy prevention methods and may provide more supervision of these young girls by teachers as well as parents, which could improve healthy sexual behaviors. Equally students are preoccupied by their studies and have very limited time for leisure, which could include sexual activities. The high rate of pregnancy among those who were not schooling could be due to the fact that Northwest region was and is currently experiencing a sociopolitical crisis which led to a stop of school activities in many areas, as such many young people are roaming the streets in idleness and some have resolved to petite trades and odd jobs for a living, making them more prone to activities that increase the rate of pregnancy. The findings of our study were consistent with the one in Uganda [22] and in Eastern Ethiopia [7]. Participants who had their first sex between the ages of 15-19 years and 20-24 years had higher chances

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of becoming pregnant than their counterparts who had this experience between the ages of 12-14 years. This was consistent with what Worku and colleagues found in 2021 in East Africa. But this was not consistent with other findings [2,15]. They established that initiation of sex before age of 15 was positively associated with higher odds of pregnancy. The difference in their results and ours may be because most young people attain maturity and become sexually active at age fifteen, so their chances of becoming pregnant after that age are greatly increased. Also, most of the communities around the Northwest region of Cameroon encourage early marriage in girls, hence some of them start procreating at their youthful ages.

Knowledge and use of sexual and reproductive health services

Sexual and reproductive health knowledge did not have a statistically significant association with pregnancy at both bivariate and multivariate analysis, but its role in determining pregnancy cannot be over-emphasized. More than half (63.4%) of the study participants had a good level of SRH knowledge. But surprisingly, the rate of pregnancy was highest (28.5%) among those with good knowledge, followed by those with average knowledge (25.5%) and least in those with poor knowledge (18.8%). This could simply be indicative of the fact that youths are very daring such that even with good knowledge, they will want to experiment. Equally some of these girls still nurse a lot of bitterness owing to the fact that they were not responsible for their infection (perinatally infected), some even intentionally involve in risky sexual activities with the mindset to infect others, as such increasing their risk of unintended pregnancy and other sexually transmissible infections. These findings may also suggest their intention to have babies at an early age, incase HIV eventually kills them. Our results differ from those obtained in Uganda and Ethiopia where it was noticed that lack of sexual and reproductive knowledge health increases risk of pregnancy [7, 17]. This difference could be because their study was conducted among the general adolescent population while we used young persons living with HIV. We expected to see that good uptake of SRH services should be protective against pregnancy but surprisingly, only 35.5% of participants reported good uptake of these services and up to 25% of them still became pregnant. This could mean that the provision of SRH information at facilities may be suboptimal or absent. The fact that pregnancy was least (19.2%) among girls who did not use any SRH services could have just been a matter of chance. The type of pregnancy prevention method was strongly significant at bivariate analysis ($P<0.01$) though not at multivariate level. Interestingly, rate of pregnancy was highest (53.9%) among girls who choose condoms as pregnancy prevention method, followed by those who did not use any method (20.6%) and least (3.1%) in those who used other contraceptives. This could imply incorrect and inconsistent condom use by those who preferred them. However, our result did not concur with that of Jonas et al, 2016 who found that the odds for never been pregnant were lower for those who used condoms.

Conclusion

This study set out to assess pregnancy and associated factors among adolescents and young adults living with HIV in the Northwest region of Cameroon. We found that the rate of pregnancy among adolescents and young adults living with HIV was high at 26.5%. Having first sex at age of 15 years and above, living in urban residential settings and not being in school were associated with pregnancy in the study population. These findings highlight the need for strategies to retain youths in school, especially females. Intensifying counseling on reproductive health issues in general and more education on pregnancy prevention methods could be options to mitigate this real time challenge in young girls as a whole and those living with HIV in particular.

Recommendation

Besides health education, strategies to adopt and maintain healthy sexual behaviors among adolescents and young adults living with HIV should be incorporated in their care package and consistently shared during clinic visits to reduce the rate of unwanted pregnancy and help them achieve their treatment goals. The quality of services delivered should be tailored to young people's needs like reduction of prices of SRH services and promoting privacy or confidentiality, as these may result in an improvement in service uptake and adherence to contraceptive methods. Given that most SRH services are provided in health facilities, they could also be decentralized to other prominent spots where youths gather such as schools, malls, youth centers, streets, entertainment grounds.

Limitations

A few of the young adults were married and this automatically increases theirs chances of getting pregnant, which was not considered at the time of conception

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Ethical Considerations

Prior to interview, a written informed consent was obtained from every participant who were 18 years and older and written assent with guardian consent was obtained for those younger than 18 years. To ensure confidentiality, the questionnaires were coded and did not carry any information that could easily identify the clients.

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Authors Contributions

MV, the principal investigator and corresponding author, designed the study, executed it and wrote the first draft of the manuscript. NG, discussed the design and reviewed the manuscript. EN, analyzed the data. EM and BE reviewed the manuscript. PMT discussed the design and reviewed the manuscript. All authors read and approved the final manuscript.

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Disclaimer

The views expressed are those of the author.

Competing Interests

The authors declare no conflicts of interest

Ethics Approval

The study was approved by the Institutional Review Board of the Cameroon Baptist Convention Health Services, with study approval number IRB2021-77. An administrative approval was obtained from the Regional Delegation of Public Health, Northwest Region and other relevant authorities.

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