HIV and contraceptive use in Zimbabwe amongst sexually active adolescent girls and women: Secondary analysis of Zimbabwe Demographic Health survey data

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Abstract

Objective To describe contraceptive usage amongst HIV positive and negative sexually active adolescent girls and women using data from the Zimbabwe Demographic and Health Survey (2015-16). **Methods** We used statistical analysis to determine the association between use of various methods of contraception and HIV status using the Zimbabwe Demographic and Health Survey, 2015-16 data. **Results:** Sexually active adolescent girls and women on the pill and on injections were less likely to be HIV positive compared to those not using any method of contraception, odds ratio (95% confidence interval) 0.54 (0.45-0.64), $p=0.001$ and 0.75 (0.59-0.96), $p=0.020$ respectively. Those using either a male or female condom were more likely to be HIV positive, OR (95%CI) 3.36 (2.63-4.28), $p=0.001$. **Conclusions:** This study corroborates that the use of implants and intrauterine contraceptive devices is very low both among the HIV-positive and HIV-negative sexually active adolescent girls and women, with no statistically significant differences between the two groups. However, statistically significant differences were noted in the use of condoms (13% versus 3%, $p=0.001$), with those who are HIV positive having a higher usage of condoms compared to those who are HIV negative. This may reflect that HIV positive individuals have received appropriate counselling messages on the need to protect their sexual partners.

Background

HIV continues to be a major public health challenge in Zimbabwe with a national prevalence of 14%, one of the highest globally and 11.8% for the 15–49 age group [1]. Owing to several socioeconomic and cultural disadvantages, adolescent girls and women are differentially affected by the HIV epidemic and constitute an estimated 67 percent of people living with HIV/AIDS (PLWHA) in the country. The country has a comprehensive family planning (FP) strategy which has seen a gradual increase in the uptake of modern methods of contraception over the past two decades [2]. However, evidence of integration of HIV education and family planning and maternal health services is generally lacking in the region including Zimbabwe [3–5]. This is despite the fact that integration of family planning and HIV education has been shown to be effective in preventing both HIV and unplanned pregnancies. In the region, family planning and HIV visits are the only contacts women have with the health system and an opportunity to educate them on the prevention of both is lost [3]. Resultantly, higher incidence of unintended pregnancies in women living with the virus than in the general population have been reported [6].

The Zimbabwe National Family Planning Council (ZNFPC) [7] lists the following family planning methods in use: (a) Short-Acting Methods (emergency contraception, the pill, male and female condoms and injectables, fertility awareness based methods, and lactational amenorrhea method), (b) Long Acting Reversible Contraceptives (Implants and Intrauterine Contraceptive Device) and Permanent Methods (both male and female surgical contraception). Between 1988 and 2015, use of modern contraception among women increased from 36 percent to 66 percent [8]. Hormonal contraceptives, in particular oral contraceptives, implants and injectables dominate the method mix [2]. However, unlike condoms, hormonal contraceptives do not offer dual protection. Understanding the pattern of FP use among

women living with HIV is critical for formulating relevant public health interventions to improve uptake and use of reliable methods in this population to reduce the incidence of unintended pregnancies. Our study uses Zimbabwe Demographic and Health Survey (ZDHS) 2015 data to describe the various contraceptive methods used by HIV positive and negative women in Zimbabwe.

Methods

Study area and data sources

The ZDHS methodology has been described elsewhere. Briefly, subjects were enrolled in the ZDHS via a two-stage sampling procedure to select households. A total of 400 ZDHS sample locations were selected. The study population was limited to 7397 sexually active adolescent girls and women 15 to 49 years who had ever had sex, were asked about contraceptive usage and had a definitive HIV result.

Anonymous HIV testing was performed with the informed consent of all sampled individuals. HIV serostatus was determined by testing with the enzyme-linked immunosorbent assay (ELISA) Vironostika Uniform 2 Ag/AB. All samples that tested positive and a random sample of 10% of samples that tested negative were retested with a second ELISA, the Enzygnost® HIV Integral II assay (Siemens). Positive samples on both tests were classified as HIV positive. If the first and second tests were discordant, the two ELISAs were repeated; if the results remained discordant, a confirmatory test, the HIV 2.2 western blot (DiaSorin), was administered.

Statistical analysis

STATA Version 16.1, Texas USA, was used to conduct statistical analysis. We used simple proportion to describe the characteristics of the women included in the analysis. We presented a table showing various types of contraceptive used by HIV positive and negative women. Thereafter, for each contraceptive method, women not using any contraceptive method at all was used as the comparison group to show association between contraceptive use and HIV status. Odds ratios and their 95% confidence intervals were used to calculate the risk estimate for HIV positivity among these women for various forms of contraceptives used. Statistical significance cut-off for purposes of describing the significant contraceptive factors associated with HIV positivity was set at $p < 0.05$.

Results

From Table 1, approximately two thirds (4248) of the participants lived in rural areas, consistent with the national population distribution by area of residence, and (4696) had secondary education. The majority of the women 5170 (72%) were married. The largest (43%) religious group was the apostolic sect with 2958 respondents.

Table 1: Participant demographic characteristics

Variable	Female Frequency n (%) N=7397
Age group in years	
15-19	655 (9)
20-24	1385 (18)
25-29	1466 (20)
30-34	1426 (20)
35-39	1074 (15)
40-44	873 (12)
45-49	518 (7)
Type of residence	
Urban	3149 (37)
Rural	4248 (63)
Highest education level	
None	94 (2)
Primary	2002 (28)
Secondary	4696 (63)
Higher	605 (7)
Marital status	
Never in union	780 (8)
Married	5170 (72)
Living with partner	285 (4)
Widowed	388 (5)
Divorced	444 (6)
Separated	330 (4)
Religion	
Traditional	44 (1)
Roman catholic	464 (6)
Protestant	1108 (15)
Pentecostal	1937 (25)
Apostolic sect	2958 (43)
Other Christian	456 (5)
Muslim	21 (0)
None	401 (6)
Other	8 (0)

Figure 1 below shows the geospatial distribution of contraceptive usage by women in Zimbabwe. The maps show that the use of oral contraceptives and injectable contraception is low in high HIV prevalence areas.

From Table 2, a smaller proportion of the HIV positive people (23%) uses the pill compared to their HIV negative counterparts (37%), $p < 0.001$. Usage of IUD was very low for both groups and not significantly different. There was no significant differences in proportions of injection use by for the HIV positive and the HIV negative. A significantly larger proportion of the HIV positive (13%) uses condoms compared to the HIV negative (35), $P < 0.001$. There is low adoption of the female and male sterilisation methods and the usage is not different between the HIV positive and the HIV negative. Very small proportions use the withdrawal method and there are no significant differences between the two groups of HIV statuses. Only 11% of the HIV positive women uses implants compared to 10% of the HIV negative and these proportions are statistically the same. A negligible proportion of the women from both groups use the LAM method

Table 2: Type of contraceptive use by HIV status of the women

Contraceptive type	HIV Positive n (%)	HIV Negative n (%)	P-Value
Pill			
Not using pill	1216 (77)	3768 (63)	
Using	315 (23)	2098 (37)	0.001
IUD			
Not using IUD	1521 (99)	5834 (100)	
Using	10 (1)	32 (0)	0.554
Injections			
Not using injections	1399 (92)	5293 (91)	
Using	132 (8)	573 (9)	0.147
Male or female condom			
Not using condom	1333 (87)	5629 (97)	
Using	198 (13)	237 (3)	0.001
Male or female sterilization			
Not using sterilization	1518 (99)	5814 (99)	
Using	13 (1)	52 (1)	0.992
Withdrawal			
Not using withdrawal	1524 (99)	5833 (99)	
Using	7 (1)	33 (1)	0.975
Implants			
Not using implants	1348 (89)	5266 (90)	
Using	183 (11)	600 (10)	0.145
LAM			
Not using LAM	1528 (100)	5854 (100)	
Using	3 (0)	12 (0)	0.840

Table 3 shows the association between contraceptive use and HIV positivity. Each method is only compared to those not using any method, to eliminate background confounding. From Table 3, women on the pill and on injections were less likely to be HIV positive compared to those not using any method of contraception, odds ratio (95% confidence interval) 0.54 (0.45–0.64), $p = 0.001$ and 0.75 (0.59–0.96), $p = 0.024$ respectively. On the contrary, odds of being HIV positive were higher for those using either a male or female condom compared to those not using any method of contraceptive, OR (95%CI) 3.37 (2.64–4.32), $p = 0.001$, indicating that they were most likely trying to protect their sexual partners.

Table 3: Association between contraceptive usage and HIV status

Contraceptive type	HIV Positive	HIV Negative	OR (95% CI)	P-Value
Pill				
Not using any method	669 (22)	2216 (78)		
Using	315 (13)	2098 (87)	0.54 (0.45-0.64)	0.001
IUD				
Not using any method	669 (22)	2216 (78)		
Using	10 (24)	32 (76)	1.13 (0.49-2.61)	0.772
Injections				
Not using any method	669 (22)	2216 (78)		
Using	132 (17)	573 (83)	0.75 (0.59-0.96)	0.024
Male or female condom				
Not using any method	669 (22)	2216 (78)		
Using	198 (49)	237 (51)	3.37 (2.64-4.32)	0.001
Male or female sterilization				
Not using any method	669 (22)	2216 (78)		
Using	13 (20)	52 (80)	0.89 (0.44-1.79)	0.734
Withdrawal				
Not using any method	669 (22)	2216 (78)		
Using	7 (20)	33 (80)	0.90 (0.35-2.30)	0.818
Implants				
Not using any method	669 (22)	2216 (78)		
Using	183 (22)	600 (78)	1.01 (0.81-1.26)	0.913
LAM				
Not using any method	669 (22)	2216 (78)		
Using	3 (18)	12 (82)	0.77 (0.20-2.96)	0.702

Discussion

The trajectory of the HIV epidemic has changed significantly over the past 2 decades globally with increased life expectancy among PLWHA [9]. Widespread access to safe and effective antiretrovirals [10] has enabled women to live full reproductive lives, and children who were born with HIV are reaching adolescence and adulthood. As people become healthier, the desire for sexual activities naturally increases [11]. It is critical to ensure that women living with HIV and AIDS are enabled to enjoy their adulthood fully, and against this background, ensure safer sexual practices with regards to acquiring other sexually transmitted infections, cross-infection with other HIV strains and prevention of unintended pregnancies. A key element of sustainable development number 3 is ensuring equitable access of reproductive health services across all populations [12]. Dual protection encompasses the use of protective barrier methods concurrently with another effective method of contraception and this should be the target for the cohort of women living with HIV/AIDS.

In this cross-sectional study we analysed the mix of methods used by sexually active women living with HIV/AIDS and compared the use to their HIV-negative counterparts. Overall, the contraceptive prevalence in this study was 60%. Though there are differences in the definition of contraceptive prevalence used by the ZNFPC, which reports contraceptive prevalence for married or in-union women only [2], and what we used in our study, where we included all sexually active women regardless of their marital/union status, the contraceptive prevalence rates are still comparable. The ZNFPC and UNFPA reported the prevalence of contraceptive use to be about 67% [13]. Our study population, randomly selected from the ZHDS for this study, was therefore representative of the population of Zimbabwean women. However, there is still a

considerable unmet need in our study population and the general population of reproductive age Zimbabwean women, and public health stakeholders in family planning must devise strategies to continually improve contraceptive uptake and use.

The combined oral contraceptive pill has traditionally dominated the method mix in Zimbabwe [2]. Unfortunately, for the HIV positive woman, this may not be the best choice because of interaction with some antiretroviral medicines. Nevirapine and efavirenz, which were previously integral components of most antiretroviral regimens, which have hepatic metabolism, have been known to possibly reduce the efficacy of hormonal contraceptives [14]. Fortunately, there is currently a general switch to dolutegravir-containing regimens, which has no documented interactions with hormonal contraception. Progestin-only pills, which are commonly used by breastfeeding women, also interact significantly with anti-retrovirals and other medicines such as anti-tuberculous medicines. HIV/TB coinfection is significant in Zimbabwe [15], with a consequent risk of unintended pregnancies among women on ARVs, anti-TB medicines and some hormonal contraceptive method.

The discrepancy in the use of oral contraceptives was not accompanied by a rise in the use of the other methods such as the injectables, implants and intrauterine contraceptive devices. The use of long-acting reversible methods of contraception (LARC) was low in this study, and this is comparable to results from other studies. In one study, the use of LARC was reported by only 5.3% of women, and women who used LARC or an injectable were likely to be aged 18–29 years, and much lower in older age groups [16]. In that study, the high prevalence of unintended pregnancies, and the low use of LARC necessitated the need for strengthening integration of family planning and contraceptive awareness among women living with HIV. Innovative interventions are needed to realise maximum benefit from integration of HIV care and treatment services with family planning services [17], and must be an ongoing process.

Statistically significant differences were noted in the use of condoms, with a higher prevalence of use among the HIV-infected women (13% versus 3%, $p = 0.001$). Whilst it's encouraging that those who have a positive HIV status have higher usage of condoms, which may reflect knowledge of HIV status, receipt of appropriate counselling messages or protecting their partners, the use of barrier methods is still very low in both groups. More needs to be done to promote the use of barrier methods, which are not only contraceptive, but also significantly reduce the risk of acquiring other sexually transmitted infections such as *Neisseria gonorrhoeae*, *Chlamydia trachomatis* and Human Papilloma Virus, all of which are quite prevalent in the population. Health education and health promotion messages aimed at improving the uptake of barrier methods are critical as public health aims at reducing the occurrence of new HIV infections to zero, but also to protect against other STIs which substantially increase the risk of other problems such as subfertility and cervical cancer.

This study corroborates that the use of implants and intrauterine contraceptive devices is very low both among the HIV-positive and HIV-negative women, with no statistically significant differences. These are tier 1 methods, highly protective against pregnancy and their protective efficacy is not user dependent. However, several factors serve as barriers against their uptake, including lack of knowledge, limited

availability in resource-limited settings, and lack of appropriately trained and skilled manpower to administer these methods [18, 19]. Several fears, myths and misconceptions surround reduced uptake of long-acting reversible contraception (LARC), including fears of disappearing IUDs, weight changes, altered bleeding patterns and subfertility [20]. Though these studies were carried out among non-HIV positive populations, there are no reasons to believe that the same barriers do not apply to the HIV-positive cohorts. Unfortunately, these are the more reliable methods for women living with HIV. The copper IUCDs have no known interactions with antiretrovirals and other medicines commonly prescribed to this cohort of women.

Examining associations between contraceptive usage and HIV status revealed statistically significant differences in the use of oral contraceptive pills, with higher use among HIV negative women (OR 0.54, 95% CI 0.45–0.64, $p = 0.001$). There were also statistically significant differences in the use of condoms as highlighted earlier, with more HIV-positive women using condoms (OR 3.37, 95% CI 2.64–4.32, $p = 0.001$). Reasons for this difference need to be explored further to tailor-make public health interventions to promote dual contraception in the HIV-positive cohort, but also to reduce risky sexual behaviour in the HIV-negative cohort. Because this was a cross-sectional study, we cannot explain the differences, but in-depth qualitative studies would be useful for identifying the possible explanations to address them appropriately.

Conclusion

Continued efforts at integration of HIV Care and Treatment services and family planning services are critical for improving contraceptive uptake among HIV positive women, to reduce the risk of unintended pregnancies and new sexually transmitted infections. A lot of work needs to be done to address the barriers and improve the uptake of long acting methods, and continued use of barrier methods. Public health players, policy makers and women living with HIV must consistently work together to attain the common goal of improving and maintaining contraceptive uptake. Safeguards must be put in place to ensure that HIV-positive women freely access this critical service and fully enjoy their sexual and reproductive health rights without discrimination.

Study Limitations

The main limitation of this study is that the ZHDS was a cross-sectional survey and collected only one biomarker, the HIV status. Therefore, some associations cannot be stated with certainty, and further studies are needed. More in-depth qualitative studies are also required to understand the barriers and facilitators of contraceptive uptake among both HIV positive and negative women. Nevertheless, the study findings significantly contribute towards understanding the patterns of contraceptive use in Zimbabwe among HIV-positive women, an area that needs continuous appraisal and tailored interventions.

Abbreviations

AIDS	Acquired Immune Deficiency Syndrome
ART	Antiretroviral Therapy
ARV	Antiretroviral Drug
COC	Combined Oral Contraceptive
DMPA	Depo medroxyprogesterone acetate
ELISA	Enzyme-Linked Immunosorbent Assay
FP	Family Planning
HIV	Human immunodeficiency virus
IUCD	Intrauterine contraceptive device
IUD	Intrauterine Device
LAM	Lactational Amenorrhea Method
LARCs	Long-Acting Reversible Contraceptives
NET-EN	Norethisterone Enanthate
OR	Odds Ratio
PLWHA	People Living with HIV and AIDS
SAfAIDS	Southern Africa AIDS Dissemination Service
STI	Sexually transmitted Infection
ZDHS	Zimbabwe Demographic health Survey
TB	Tuberculosis
UNFPA	United Nations Population Fund
ZNFPCC	Zimbabwe National Family Council

Declarations

Ethics approval and consent to participate

Procedures and questionnaires for standard Demographic Health Surveys (DHS) have been reviewed and approved by the ICF International Institutional Review Board (IRB). Additionally, country-specific DHS

survey protocols are reviewed by the ICF IRB and typically by an IRB in the host country. The ICF International IRB ensures that the survey complies with the U.S. Department of Health and Human Services regulations for the protection of human subjects, while the host country IRB ensures that the survey complies with laws and norms of the nation. In the original primary data collection for each DHS, informed consent was sought from all participants prior to serological testing for HIV (<http://dhsprogram.com/What-We-Do/Protecting-the-Privacy-of-DHS-Survey-Respondents.cfm#sthash.Ot3N7n5m.dpuf>). We sought and were granted permission to use the core dataset for this analysis by MEASURE DHS.

Informed consent was sought in writing. For minors, consent was obtained from their parents or guardians.

Consent to publish

Not applicable.

Availability of data and materials

The data that support the findings of this study are available from the Demographic and Health Surveys (<http://www.measuredhs.com>) but restrictions apply to the availability of these data, which were used under license for the current study, and so are not publicly available.

Competing interests

Drs Godfrey Musuka and Zindoga Mukandavire are Editorial Board members of BMC Public Health. All other authors declare that they have no competing interests.

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Authors' contributions

GM, MM, IC, FM conceived the study. GM & MM carried out the statistical analysis. GM wrote the first draft of the paper. All authors contributed to the writing of the manuscript. All authors read and approved the final manuscript.

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Figures

Figure 1

Shows the geospatial distribution of contraceptive usage by women in Zimbabwe.