Assessment of contraceptive utilization and associated factors among sexually active HIV-positive Indian women: A cross-sectional study from an antiretroviral therapy center

Sneha Sagar^{a,1}, Aamir Bashir^{a,1}, Biplab Pal^b, Mukhtar Ahmad Dar^a, Krishna Pandey^c,
Krishna Murti^{a,*}

^a Department of Pharmacy Practice, National Institute of Pharmaceutical Education and Research, Hajipur, 844102, Bihar, India

^b Department of Pharmacology, Lovely Professional University, Jalandhar, 144411, Punjab, India

^c Division of Clinical Medicine, Rajendra Memorial Research Institute of Medical Sciences (Indian Council of Medical Research), Agamkuan, Patna, 800007, Bihar, India

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ABSTRACT

Background: HIV/AIDS epidemic is one of the most serious global public health problems, more particularly seen in low and middle-income countries. Females contribute around 40% of total HIV cases in India who predominantly belong to fertile age group. This study aimed to assess the contraceptive utilization patterns and factors affecting the HIV-positive Indian women.

Methods: A cross-section of 400 confirmed HIV-positive women aged between 18 and 45 years were recruited. All the relevant information including socio-demographic and anthropometric details were collected from the participants. All other needed parameters were recorded from patients file. The SPSS ver. 21 was used to perform statistical analysis.

Results: The mean age of the participants was found to be 29.53 ± 5.35 years. The majority of women were housewives (97%), Illiterate (58.8%) and 90.5% had a monthly family income under 10,000 INR. Maximum (82.8%) of HIV transmission was found through unprotected sexual routes while 68.8% of patients were on HAART. Male condoms were highly utilized whereas 44.3% of participants never used any methods. Percentage of consistent contraceptive use was highest when patients were educated to graduate level (66.7%), aware of contraception methods (49.8%) and who have a monthly income more than 20,000 INR (66.7%).

Conclusion: This study gives a real picture of the contraceptive utilization among HIV-infected women from rural regions of India. The study anticipates the immediate needs in healthcare sector to improve awareness of patients regarding modern methods of contraception and effective family planning strategies.

1. Introduction

Human Immunodeficiency virus/Acquired immune deficiency syndrome (HIV/AIDS) epidemic is the most serious global public health problem, more particularly seen in low and middle-income countries.^{1,2} The different sections of the population who remain at high risk include, Female sex workers (FSW), Men having sex with men (MSM), Trans-genders, Injecting drug users (IUD), Truckers and Migrants.³ Globally, there are more than 37 million people living with HIV where 1.8 million new cases were added in 2018.⁴ National Aids Control Organization of India (NACO) has reported 2.1 million patients with a prevalence of

0.26% for HIV where females contribute around 40% of total HIV infections predominantly from fertile age group.⁵ The overall national prevalence is seen steadily declining from last two decades as 0.38% in 2001–03, 0.34% in 2007, 0.28% in 2012 and 0.26% in 2017 in both genders. This decline has resulted due to some major advances in health care services provided to HIV-patients, most importantly the rapid expansion of access to antiretroviral therapy (ART) centers since 2002 in the country, where patients can easily go for HIV testing, counselling and treatment.⁶ In Eastern Indian state Bihar, the prevalence is estimated between 0.21 and 0.25% and the infection continues as a major public health challenge, where only 44% of active cases are seen

* Corresponding author. Department of Pharmacy Practice, National Institute of Pharmaceutical Education and Research, Hajipur, 804102, India.

E-mail address: krishnamurti74@gmail.com (K. Murti).

¹ S. Sagar and A. Bashir contributed equally to this work as first authors.

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registered at different ART centers.⁵

HIV/AIDS is still considered as one of the most life-threatening diseases especially with fertile women. Importantly, as compared to young men, the young reproductive women have a 4-7-fold increased risk of getting HIV infection.⁷ This viral infection impairs and destroys the normal functioning of the immune system and individual gradually becomes immune-deficient.⁸ After the introduction of highly active antiretroviral therapy (HAART), there has been a reduction in both morbidity and mortality among HIV positive patients and also a significant change in thought is seen to consider HIV/AIDS as a long-term but manageable condition.⁹ Genuinely, like other fertile age women, sexually active HIV positive women also wish a childbearing and parenthood in their life. They also desire to have safe and effective contraception to prevent unwanted pregnancies, prevention from sexually transmitted infections (STIs), and infection of HIV to their sexual partners. However, to utilize a contraceptive method by Indian women, several factors influence the acceptance or denial such as, personal and partner's choice, available methods and services, cultural and religious beliefs and possible adverse effects of contraception.¹⁰ Therefore, an ideal contraceptive approach needs to be safe, effective, economical, user-friendly and should provide protection from both HIV-transmission and unintended pregnancy.

Currently, several methods of contraception are used by Indian women, such as hormonal [pills, vaginal ring, injections, intrauterine contraceptive device (IUDs)] and non-hormonal methods (copper IUDs, condoms, vaginal sponges).¹¹ Among available methods, oral contraceptives, IUD and sterilization are seen highly effective but none of the methods show ability to prevent HIV transmission.¹² So, a combined approach with appropriate ART therapy and a desired contraceptive method can help in impeding the high prevalence of HIV transmission. In this backdrop, we aimed to assess the prevalence and pattern of contraception methods among HIV positive women who were sexually active and receiving highly active antiretroviral therapy at ART Center in Patna, Bihar.

2. Material and methods

2.1. Study design

This was a hospital-based cross-sectional study conducted at the antiretroviral therapy center of Rajendra Memorial Research Institute of Medical Sciences-Indian Council of Medical Research (RMRIMS-ICMR) Patna, Bihar. The study protocol was approved by the Institutional Ethics Committee of Rajendra Memorial Research Institute of Medical Sciences. The study was carried out as per the declaration of Helsinki and its amendments.¹³ From all study participants, written informed consent were obtained before administering the questionnaire. The aim and objectives of the study were explained to the participants and were also assured for their confidentiality and anonymity of data. STROBE guidelines were followed while writing manuscript for strengthening the reporting of observational studies in epidemiology.¹⁴

2.2. Sample size

A simple random sampling technique was used to enrol the study subjects. The sample size was calculated by using Open Epi software Version 3.01.¹⁵ The overall prevalence of contraceptive utilization was taken as 54.7% among HIV positive patients in India, as reported by a previous study.¹⁶ On the precision of 5% at 95% confidence level, the required sample size was found to be 382. To further determine the feasibility of this study, a pilot study was performed with 50 enrolled patients and after considering a 5% non-response rate, the final sample size was taken to 400.

2.3. Study participants

A total of 442 confirmed HIV/AIDS female patients aged between 18 and 45 years who were regularly visiting the ART center of RMRIMS were enrolled in this study. However, only 400 enrolled patients completed the study procedures giving a response rate of 90.49%. The diagnosis was established after the pathological examination of subjects following WHO recommendations (detection of *anti*-HIV antibodies in serum/plasma).¹⁷ The participants with any other concurrent condition like, known infertility, any other STDs, or living with mental illness were excluded from the study. We excluded pregnant women or widows from the study and also patients who have not given their consent and not completed data or who left from the interview.

2.4. Data collection

A pretested semi-structured questionnaire was used to collect relevant information from the participants. The questionnaire was prepared in English and then translated into the local language (Hindi). The interview was arranged individually to all enrolled patients for collecting the data. The questionnaire included socio-demographic characteristics (age, marital status, occupation, income, education) and clinical features (CD4 counts, information on ART), sexual activity status, contraceptive choice, and use. A trained interviewer was assigned to administer the questionnaire to ensure completeness and consistency of collected data.

2.5. Data analysis

All the data were processed in Microsoft Excel spreadsheets and further analysis was done by using the SPSS software (Version 21; CDC Atlanta, USA). Socio-demographic variables were analyzed by using descriptive statistics. Frequencies and percentages were compared for categorical variables using Pearson's chi-square (χ^2) test. The continuous variables were shown as mean $\pm$ Standard Deviation (SD). All tests were two-tailed and differences were considered as statistically significant if the p-value was <0.05 .¹⁸

3. Results

A total of four hundred participants were recruited in this study after meeting all the eligibility requirements. The mean ($\pm$ SD) age of the participants was 29.53 ± 5.35 years, ranging from 18 to 45 years. Most of the respondents (45%) were in the age of 25–31 years and age group of 39–45 had the least portion (4.3%). With regard to marital status among infected women, 96% were married and 4% were unmarried. Regarding the occupation and education status of participants, most of them were housewives (97%) and around 59% were illiterates. Majority of enrolled patients (90.5%) had a monthly family income under 10,000 INR (Indian rupee). Details of demographic data of the participants are shown in Table 1.

The status of diagnosis, transmission, and treatment of participants is depicted in Table 2. About 50% of the patients were diagnosed in the last 3 years, amongst them maximum (68.8%) were on HAART therapy. More than 80% of the enrolled patients had admitted to have unprotected sex whereas, transmission from mother to child and after using IUD method of contraception was found to be negligible. Out of the 400 participants interviewed, 301 (75.2%) had CD4 count more than 350 cell/mm³.

Male condoms were highly utilized for contraception amongst all the methods while 44.3% of participants did not use any contraceptive method. The prevalence of choosing a dual method or injectable contraceptive was found to be the same as 0.3%. With respect to consistency of contraceptive use, 53.3% of respondents had never used contraception methods consistently; however 31.5% were using contraception regularly in their social life. The details of contraceptive preference and

Table 1
Socio-demographic characteristics of enrolled HIV positive women.

Variable		N = 400 (%)
Age (years)	18–24	72 (18)
	25–31	180 (45)
	32–38	131 (32.8)
	39–45	17 (4.3)
Marital status	Married	384 (96.0)
	Unmarried	16 (4.0)
Occupation	Housewife	388 (97.0)
	Labor	6 (1.5)
	Private Job	4 (1.0)
	Sex worker	2 (0.5)
Education	Illiterate	235 (58.8)
	Primary	99 (24.8)
	Secondary	48 (12)
	Graduates	18 (4.5)
Monthly income (INR)	≤10,000	362 (90.5)
	10,000–20,000	35 (8.75)
	≥20,000	3 (0.075)

Abbreviations: INR = Indian rupee.

Table 2
Status of diagnosis, transmission and treatment of HIV-infection among enrolled patients.

Variable		N = 400 (%)	p-value
Years since diagnosed	0–3 years	199 (49.8)	<0.001
	4–6 years	142 (35.5)	
	7–9 years	54 (13.5)	
	10–13 years	5 (1.3)	
Years since HAART started	0–3 years	275 (68.8)	<0.001
	4–6 years	107 (26.8)	
	7–9 years	18 (4.5)	
	10–13 years	13 (3.3)	
Mode of HIV transmission	Blood transfusion	13 (3.3)	<0.001
	Heterosexual	25 (6.3)	
	Mother to child	2 (0.5)	
	Unprotected sex	331 (82.8)	
	IUD	2 (0.5)	
CD4 count	Unknown	26 (6.5)	<0.001
	<350	91 (24.8)	
	>350	301 (75.2)	

Abbreviations: HAART = highly active antiretroviral therapy, HIV = human immunodeficiency viruses, CD4 = cluster of differentiation.

persuasion are presented in Table 3 (Fig. 1).

The respondents predominantly (71.8%) did not wish to have children after diagnosed with HIV however, a low but significant proportion (28.3%) of infected women still desired to have a child. To check the infection status of sexual partners amongst the participants, 86.8% were found HIV positive. A greater proportion of participants (37.5%) were not aware of contraceptive methods, meanwhile the most of respondents (88.5%) were sexually active (Table 4).

The association between socio-demographic factors and the use of contraceptives is shown in Table 5. Among the illiterate participants, 58.3% had never used any method of contraception however, most of

Table 3
Methods and consistency of different contraceptives among enrolled HIV positive women.

Variable		N = 400 (%)	p-value
Contraceptive choice	None	177 (44.3)	<0.001
	Male condom	182 (45.5)	
	Dual method	1 (0.3)	
	OCP	3 (0.8)	
	Abstinence	36 (9.0)	
	Injectable	1 (0.3)	
Contraceptive use	Consistent	126 (31.5)	<0.001
	Non-consistent	61 (15.3)	
	Never	213 (53.3)

Fig. 1. Current patterns of contraceptive utilization among HIV-positive women attending ART Center Patna.

Abbreviations: OCP = Oral contraceptive pills.

Table 4
Awareness of contraceptive methods, fertility status and partners infection status among enrolled HIV positive women.

Variable		N = 400 (%)	p-value
Awareness	Yes	250 (62.5)	<0.001
	No	150 (37.5)	
Desire for children	Yes	113 (28.3)	<0.001
	No	287 (71.8)	
Partner status	Positive	347 (86.8)	<0.001
	Negative	52 (13)	
	Unknown	1 (0.3)	
Sexually active	Yes	354 (88.5)	<0.001
	No	46 (11.5)	

Table 5
The association between socio-demographic variables and use of contraceptives.

Variable	Use of contraceptive n (%)			p-value
	Consistent	Inconsistent	Never	
Education status				0.007
Illiterate	63 (26.8)	35 (14.9)	137 (58.3)	
Primary	31 (31.3)	18 (18.2)	50 (50.5)	
Secondary	20 (41.7)	5 (10.4)	23 (47.9)	
Graduates	12 (66.7)	3 (16.7)	3 (16.7)	
Marital status				0.199
Married	123 (32.0)	60 (15.6)	201 (52.3)	
Unmarried	3 (18.8)	1 (6.2)	12 (75.0)	
Occupation				0.154
Housewife	119 (30.7)	60 (15.5)	209 (53.9)	
Labor	2 (33.3)	1 (16.7)	3 (50.0)	
Private Job	4 (100.0)	0 (0)	0 (0)	
Sex worker	1 (50.0)	0 (0)	1 (50.0)	
Awareness				<0.01
Yes	124 (49.8)	56 (22.5)	69 (27.7)	
No	2 (1.3)	5 (3.3)	144 (95.4)	
Partner status				<0.01
Positive	95 (27.4)	58 (16.7)	194 (55.9)	
Negative	30 (57.7)	3 (5.8)	19 (36.5)	
Unknown	1 (100.0)	0 (0)	0 (0)	
Monthly income				0.666
≤10,000	112 (30.9)	57 (15.7)	193 (53.3)	
10,000–20,000	12 (34.3)	4 (11.4)	19 (54.3)	
≥20,000	2 (66.7)	0 (0)	1 (33.3)	

Consistent contraceptive use: Regular use of any methods whenever having intercourse, Inconsistent contraceptive use: Not being regular, using sometimes and missing sometimes The p-value <0.05 represents the significant differences between the different subgroups for the variable.

the patients (66.7%) with higher education showed a consistent contraceptive use. In both married and unmarried groups, a higher proportion (52.3% and 75.0% respectively) of patients was not using any method of contraception. The majority of participants were housewives and most among them had also never used contraception. 49.8% of participants were consistently using contraceptives among the patients aware of contraceptives however, a majority (95.4%) who had no awareness regarding contraception had never used any contraception method. In respondents having HIV positive partners, a significant number (55.9%) had never used contraceptives however, 57.7% of patients were on consistent use of contraceptives in the HIV negative partner group. In both $\leq 10,000$ and 10,000–20,000 income groups, more than 50% of patients had never used contraception.

4. Discussion

This study aimed to assess the patterns of contraceptive utilization among sexually active HIV-positive women coming from the general population. These women were visiting the ART center, Patna from different rural areas of Bihar to get the standard antiretroviral therapy. The current study findings highlight the importance of research in this specific infection to develop potential strategies which can overcome the present situation in this region. The overall prevalence of consistent contraceptive utilization in our study patients was found to be 31.5% which is almost the same (32.65%) as reported from the general married women population in that region.¹⁹ While evaluating the association between different socio-demographic variables and the use of contraceptives, we found a greater variability with the previous literature. Present study findings show that 62.5% of infected women were aware of the contraceptive methods, however, only 46.7% were using any of the contraceptive methods to prevent pregnancy. In comparison to these findings, one previous study from a metropolitan city Mumbai has shown higher level of awareness (above 90%) and use of contraception (over 70%) among HIV positive women.²⁰ Additionally authors have documented that majority of the women were educated (89%) and also employed (52%).

In our study participants with no education, 58.3% had never used contraceptives however, a consistent contraceptive use was observed in most of the patients (66.7%) with higher education. In contrast to a former report from India, HIV infected women from Kerala have shown a higher contraceptive utilization (58.1%) as compared to our study participants.²¹ The authors also put forward that women in Kerala have a better educational and reproductive health status with more than 18 years of median age at marriage. The present study findings primarily highlight the importance of education and awareness among this particular section of the population to prevent HIV infection and its possible transmission.

Education, awareness about contraception, occupation, family income, desire to have children and partner's HIV status were the main factors associated with pattern of contraceptive choice and utilization. Among the study participants, the preferred choice of contraception was male condom (45.5%) while OCP (oral contraceptive pills), injectable contraceptives and IUCD (Intra-Uterine Contraceptive Device) utilization was almost nil ($<1\%$). These observations extend the previous data from the same state which has reported a higher number of patients (42.5%) with no knowledge about any contraceptive devices.²² The findings were also matching with the study of Thulaseedharan JV from Kerala who also reported a non-significant use of these reversible contraceptive options in his study group. However, these observations were in opposition to the results from general reproductive-age women in the same region were 8.87% were using a condom, 51.91% were using OCP and 38.56% were using IUCD reported by Vijay Shree et al.¹⁹ Additionally, one more study from Ethiopia reported that patients were utilizing IUCD (28.4%) or male condoms (26.7%).²³

More than 90% of our recruited patients were from a low-income class and most of them had never used contraception. These results

predict the income of patients as an important factor to impact the choice and use of any contraception method. In our study, 86.8% of sexual partners of patients were also HIV positive and a higher proportion (71.8%) among them did not wish to have children. These observations were in line with previous reports from Uganda and another large study from various developing countries.^{24,25} However, the findings were conflicting to a previous study suggesting that women living in a couple were more likely to express their desire to have children. The authors suggest the reasons as an increased social pressure over the couple, to get less social importance when living without children in a society.²⁶

Complementary to a previous study from north India,²⁷ reported 76.8% of the patients as married, we observed a much higher percentage (96%) of infected women as married for whom social and sexual life was a major concern. Among the participants, we also found that 97% were housewives, mostly in the age group of 25–31 years. These estimates predict that the infection is not actually restricted to a specific high-risk population group, however people from the general population predominantly from productive age could also be the infection targets.²⁸ Globally, the heterosexual route of HIV transmission is considered as the most common mode of HIV infection.^{29,30} The fact is also supported by many Indian reports,^{31,32} however in our research we found contrarily a maximum percentage (82.8%) of women getting the infection due to unprotected sexual intercourse with their partner. These results significantly define the unmet need of awareness among people regarding methods of protection while having sexual activity.

In the current study, more than 80% of patients were using male condoms among all the contraceptive methods utilized. There are several reasons which favour this contraceptive choice counted as, free availability of condoms in all public healthcare centers, high effectiveness in preventing unwanted pregnancies and its capacity of preventing secondary transmission of infection during sex with a partner of unknown HIV status. The other important perspective might be the lack of awareness about other contraceptive methods which are currently being approved to prevent unwanted pregnancies. Additionally male condoms are preferred and recommended by the healthcare providers due to the fear of possible drug interaction between hormonal contraceptives and antiretroviral drug therapy.³³

About half of the study patients were diagnosed in the last three years and around 70% among them had started the HAART therapy. These findings are encouraging in a way that due to the availability of free services and easy access to ART centers in India, poor and needy people are utilizing these healthcare facilities. Such facilities help in preventing them and other vulnerable populations from these deadly infectious diseases.³⁴ In addition, patients receiving HAART regularly visit ART centers and remain in touch with professionals who educate and counsel them about strategies to deal with infection.³⁵

Among our participants, we found primacy of consistent contraceptive use were highest when they were, highly educated and aware of contraceptives, from higher-income group, diagnosed 7–9 years before however, chances were low when patients partner was also HIV positive. These results were also supported by the findings of multiple studies from India, Kenya, Centrale and Kara regions of Togo, Ethiopia and Malawi.^{20,21,36–39} To summarize, our findings suggest that appropriate programs and policies are needed to empower women with proper information and education about the modern contraceptive methods to prevent HIV infection and its transmission.

5. Strengths and limitations

The current study has a number of strengths and limitations which are worth to mention. Strengths included; first, we have followed a random sample selection procedure to enrol the patients so, the study can represent a real-world epidemiological situation. Second, this study was conducted in an economically underdeveloped region of India where a well established reproductive healthcare system needs to be

developed to prevent its public from such dreadful infections. Third, the results of the study can aid and strongly influence the decision-making process of healthcare professionals in developing standard recommendations to control the ever-increasing HIV infection and its transmission. Our study also consists of several limitations; first, due to small sample size and single-center data collection, it may not represent the whole nation, as there are huge cultural disparities across the country which influences the contraceptive utilization. Second, in the study, only HIV positive females were enrolled so we couldn't determine the awareness level of the male population about contraception methods who are indifferent infection targets. Third, authors were unable to address the multicollinearity among the predictors of contraceptive utilization as all of them were categorical. Finally, our study design was cross-sectional and the results do not allow causal interpretations.

Therefore a number of regular longitudinal cohort studies are urgently needed to explore the contraceptive utilization and the need for additional reproductive healthcare services. These important steps can help in providing support, education, and awareness to all the high-risk reproductive age women in preventing unwanted pregnancies and infection spread. The diverse available contraceptive choices can further reduce the number of HIV-positive births and infection transmission to sexual partners.

6. Conclusion

This study gives a better comprehension of patterns of the contraceptive utilization and reproductive health status of HIV-positive women living in rural regions of India. The level of education, knowledge of diverse contraceptive methods, occupation, income status, desire for children and partner's HIV status were the main influencing factors determining contraceptive preferences among included patient population. Only male condoms were highly utilized so people need to be educated about the importance of the different modern methods of contraception also. Efforts need to intensify at public health facilities by the policy-makers to encourage contraceptive utilization for improving family planning strategies.

Ethics statement

The study protocol was approved by the Institutional Ethics Committee of Rajendra Memorial Research Institute of Medical Sciences (RMRIMS), Patna (Reference No. 23/RMRI/EC/2018).

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Authors contribution

Conceived and designed the experiments: SS, AB, BP, MAD, KP, KM.
Collection of data: SS, KP.
Analyzed the data: SS, AB, MAD, BP.
Wrote the paper: SS, AB, BP, MAD, KP, KM.

Declaration of competing interest

There is no known conflict of interest associated with this publication.

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