High prevalence of unwanted pregnancies and induced abortions among HIV-infected women from Western India

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Published in:
Aids care : Psychological and socio-Medical aspects of aids/hiv

DOI:
10.1080/09540121.2015.1066750

Publication date:
2016

AIDS Care, 2016
Vol. 28, No. 1, 43–51, http://dx.doi.org/10.1080/09540121.2015.1066750

Routledge
Taylor & Francis Group

High prevalence of unwanted pregnancies and induced abortions among HIV-infected women from Western India: need to emphasize dual method use?

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(*Received 6 December 2014; accepted 23 June 2015*)

This study examines the prevalence, reasons, and predictors of unwanted pregnancies and induced abortions among ever married HIV-infected women attending a care facility in Maharashtra, Western India, and discusses its programmatic and policy implications. Retrospectively collected data of pregnancies conceived after the diagnosis of HIV were analyzed using descriptive and logistic regression techniques. Among the 622 women interviewed, 113 women had 158 pregnancies with known outcomes after HIV diagnosis. Among these pregnancies, 80 (51%) were unwanted and 79 (50%) were voluntarily terminated. Fear of transmitting HIV to the child was a frequently mentioned reason for an unwanted pregnancy (71.8%) and induced abortion (59.5%). Women from urban areas [OR 2.43 (95% CI 1.23–4.79)] and with two or more live births before HIV diagnosis [OR 3.33 (95% CI 1.36–8.20)] were significantly more likely to report an unwanted pregnancy. Women with two or more live births before HIV diagnosis [OR 3.16 (95% CI 1.20–8.35)], who did not know that HIV transmission to the baby can be prevented [OR 3.29 (95% CI 1.48–7.34)] and with an unwanted pregnancy [OR 4.82 (95% CI 2.33–10.00)], were significantly more likely to terminate the pregnancy. Despite increased coverage of antiretroviral treatment, effective provision of reproductive healthcare services to HIV-infected women remains challenging. A high prevalence of unwanted pregnancies and induced abortions and a low level of knowledge about prevention of mother to child transmission (PMTCT) underscore the need for preconception counseling and provision of comprehensive family planning services to HIV-infected women. Enrolling all HIV-infected pregnant women, irrespective of their decision to continue with their pregnancy, in the PMTCT program and discussing with HIV-infected women and their partners at HIV diagnosis a full array of contraceptive methods and not just consistent use of condoms might be helpful in reducing unwanted pregnancies.

Keywords: unwanted pregnancies; induced abortions; HIV; India; PMTCT

Introduction

While the recent global epidemiological data suggest a declining trend in the annual number of new HIV infections (UNAIDS, 2013), women are increasingly represented among those diagnosed with HIV infection. Globally, the HIV infection rate among young women aged 15–24 is twice as high as in young men (UNAIDS, 2012). Heterosexual activity is the main mode of HIV transmission among women (UNAIDS, 2013). Despite the increasing feminization of the AIDS epidemic, work to address the reproductive health issues of women living with HIV, particularly regarding an unwanted pregnancy and safe abortion care; is lagging behind (de Bruyn, 2012). Also within prevention of mother to child transmission (PMTCT) of HIV programs worldwide the focus remains on providing antiretroviral medicines (ARVs) to the mother–baby pair (Hairston, Bobrow, & Pitter, 2012), although prevention of unwanted pregnancies among HIV-infected women has been suggested as an essential strategy (Govender & Coovadia, 2014; Mahy et al., 2010; Mazzeo, Flanagan, Bobrow, Pitter, & Marlink, 2012; Wilcher, Petruney, & Cates, 2013).

Worldwide, among all the pregnancies that occur, the prevalence of unwanted pregnancies and induced abortions (41% and 20%, respectively in 2008) is unacceptably high (Sedgh, Bankole, Singh, & Eilers, 2013; Sedgh et al., 2012), and even higher in low- and middle-income countries (Singh, Sedgh, & Hussain, 2010). About half of the abortions are estimated to be unsafe (Sedgh et al., 2012), contributing significantly to maternal morbidity and mortality (Dragoman et al., 2014). Moreover, studies from Sub-Saharan Africa, Europe, and the USA suggest higher rates of unwanted pregnancies and induced abortion among HIV-infected women compared to HIV-uninfected women (Ammassari et al., 2013; Bui, Gammeltoft, Nguyen, & Rasch, 2010; Kaida et al., 2011), which could even amount to 55–65% (Abdala, Kershaw, Krasnoselskikh, & Kozlov, 2011; Decker et al., 2013;

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Liang, Meyers, Zeng, & Gui, 2013; Loutfy et al., 2012; Schwartz et al., 2012). Prominent determinants of unwanted pregnancies and induced abortion among HIV-infected women were the pregnancy being unintended and unplanned (Bui et al., 2010; Floridia et al., 2010), higher age of the woman at the time of pregnancy (Barbosa, Pinho, Santos, & Villela, 2012), low CD4 cell counts (Floridia et al., 2010), having previous children (Liang et al., 2013), and fear of transmitting HIV to the baby (Maccarthy, Rasanathan, Crawford-Roberts, Dourado, & Gruskin, 2014). However, overall knowledge is limited, particularly on the role of knowledge of PMTCT on pregnancy intentions and outcomes (Sutton, Patel, & Frazier, 2014).

This study sought to document the prevalence, reasons, and predictors of unwanted pregnancies and induced abortion among HIV-infected Indian women after their HIV diagnosis. There are few studies from India on unwanted pregnancies and induced abortion among HIV-infected women. The HIV epidemic in India, in contrast to the epidemic in Africa, is characterized by low HIV prevalence and geographically heterogeneous spread (NACO, 2011). More than 90% of the Indian women living with HIV are apparently monogamous and acquire HIV infection within marriage through their husbands (Gangakhedkar et al., 1997).

Methods

Study setting and data collection

The study was conducted among HIV-infected women attending a specialty HIV clinic run by a non-government organization in Pune, Maharashtra, Western India. From November 2010 until December 2011, all HIV-infected women attending the HIV clinic were screened for study eligibility ($N = 1023$). Ever married women aged 15–45 and who knew about their HIV positive status for more than 6 months were considered eligible and were informed about the study. Of the eligible women ($N = 820$), 99% ($N = 811$) were informed about the study and 622 (77%) participated and completed the interview.

Data on all the pregnancies that occurred after the woman was diagnosed to be HIV infected were collected separately for each pregnancy through a structured questionnaire. Women were asked retrospectively if they wanted to be pregnant (wanted then, later, and not wanted), the reasons for wanting/not wanting the pregnancy, and the reasons for opting to terminate the pregnancy. Knowledge about MTCT and PMTCT prior to conception was collected retrospectively. These data were linked with the data on other demographic variables such as education of the women, place of living (rural/urban), socio-economic status (Kuppuswamy scale; Sharma, 2012), and dates of HIV testing of the woman and her partner.

Ethics statement

The study protocol, consent forms, and data collection tools were reviewed and approved by Prayas' Independent Ethics Committee for Research (IECR) based in Pune, Maharashtra, India (registration number: ECR/146/Indt/MH/2014). Informed written consent was obtained from the women prior to data collection and confidentiality norms were strictly followed. Counseling support was available to women when required.

Data analysis

The two outcome variables (pregnancy intention and induced abortion) were dichotomized (yes/no). The pregnancies that were not wanted at all ($N = 76$) or the pregnancy was not wanted then (wanting but untimed; $N = 4$) were combined as pregnancy unwanted. Pregnancy outcome other than induced abortion [live birth ($N = 66$) and spontaneous abortion ($N = 13$)] were combined as not opted to terminate the pregnancy. Socio-demographic and HIV-related factors associated with the two outcome variables were analyzed using descriptive statistics and bivariate and multivariate binary logistic regression using SPSS (version 22.0). Since a retrospective evaluation of multiple pregnancies in the same woman can create a possibility of clustering answers, an additional analysis was conducted considering for each woman only the first pregnancy after HIV diagnosis.

Results

Of the 622 HIV-infected women interviewed, 113 women had 158 pregnancies with known outcomes after HIV diagnosis. A descriptive analysis of selected characteristics of the women who had at least one pregnancy after HIV diagnosis ($N = 113$) with respect to an unwanted pregnancy and induced abortion is given in Table 1. The mean age of women at the time of HIV diagnosis was 21.7 years [standard deviation (SD), 4.2 years] and the mean age at the time of interview was 30.3 years (SD, 4.5 years). Majority of the women had HIV-infected husbands and almost two-thirds of the women came to know about their HIV status within 3 years of their marriage. Majority (57.5%) used male condoms as the only method for contraception, 34.5% ever used other temporary modern methods (such as Intrauterine Device, oral contraceptive pills, and injectable hormonal

Table 1. Descriptive analysis of selected characteristics of the women who had at least one pregnancy after HIV diagnosis ($N = 113$).

		Unwanted pregnancy ($N = 58$)		Induced abortion ($N = 54$)	
Socio-demographic factors	*N* (%)	*N* (%)	*P* (χ^2)	*N* (%)	*P* (χ^2)
Woman's education					
Primary	27 (23.9)	15 (25.9)	0.585	14 (25.9)	0.363
Secondary and higher secondary	56 (49.6)	30 (51.7)		29 (53.7)	
University	30 (26.5)	13 (22.4)		11 (20.4)	
Woman's occupation					
Working	34 (30.1)	22 (37.9)	0.062	23 (42.6)	*0.006*
Not working	79 (69.9)	36 (62.1)		21 (57.4)	
Socio Economic Status of the household					
Lower class	47 (41.6)	21 (36.2)	0.233	20 (37.0)	0.347
Lower middle class	66 (58.4)	37 (63.8)		34 (63.0)	
Religion					
Hindu	103 (91.2)	56 (96.6)	*0.049*	51 (94.4)	0.238
Other	10 (8.8)	2 (3.4)		3 (5.6)	
Place of residence					
Rural	69 (61.1)	30 (51.7)	*0.037*	31 (57.4)	0.446
Urban	44 (38.9)	28 (48.3)		23 (42.6)	
Age at HIV diagnosis					
15–20	36 (31.9)	21 (36.2)	0.584	17 (31.5)	0.800
21–26	47 (41.6)	23 (39.7)		24 (44.4)	
> = 26	30 (26.5)	14 (24.1)		13 (24.1)	
Duration from marriage to HIV diagnosis					
<1 year	24 (21.2)	13 (22.4)	0.597	11 (20.4)	0.974
1–3 years	48 (42.5)	22 (37.9)		23 (42.6)	
>3 years	41 (36.3)	23 (39.7)		20 (37.0)	
HIV status of the husband					
Positive	101 (89.4)	55 (94.8)	0.069	53 (98.1)	*0.004*
Negative/not tested	12 (10.6)	3 (5.2)		1 (1.9)	
Ever use of modern temporary contraception					
Only a male condom	65 (57.5)	27 (46.6)	*0.045*	30 (55.6)	0.188
Other methods and a condom	39 (34.5)	26 (44.8)		22 (40.7)	
No contraception	9 (8.0)	5 (8.6)		2 (3.7)	

Note: Pearson Chi-square values of significance when the cell count in any of the cells is more than 5. Fisher's exact text when the cell count is less than 5.

contraceptive) and a condom, and 8% of the women never used any contraceptive method including a condom. Hence use of male condoms was the most common contraceptive method used after HIV diagnosis.

Analysis of all pregnancies conceived after HIV diagnosis (N = 158)

Among the 158 pregnancies conceived after HIV diagnosis, 80 (51%) were unwanted and 79 (50%) were voluntarily terminated, whereas 66 pregnancies (42%) resulted in live births and 13 (8%) in spontaneous abortions. Among unwanted pregnancies ($N = 80$), 76 pregnancies were not wanted at all, and 4 pregnancies were unwanted then (wanted but untimed). Almost 70% of the pregnancies were voluntarily terminated when the pregnancy was unwanted compared to 30% of voluntary termination when the pregnancy was wanted (Figure 1).

The mean age of women at pregnancy was 25.2 years (SD, 4.9 years). The median duration from HIV diagnosis to pregnancy was 2.7 years [inter-quartile range (IQR), 3 years]. For 18% of the pregnancies, women were receiving Antiretroviral therapy (ART) prior to conception. While majority of the women (95%) knew that HIV can be transmitted from mother to child (MTCT), relatively fewer (70%) women knew that MTCT can be prevented (PMTCT) (Table 2). The knowledge of MTCT was high from the first pregnancy whereas knowledge of PMTCT improved significantly after the 1st pregnancy

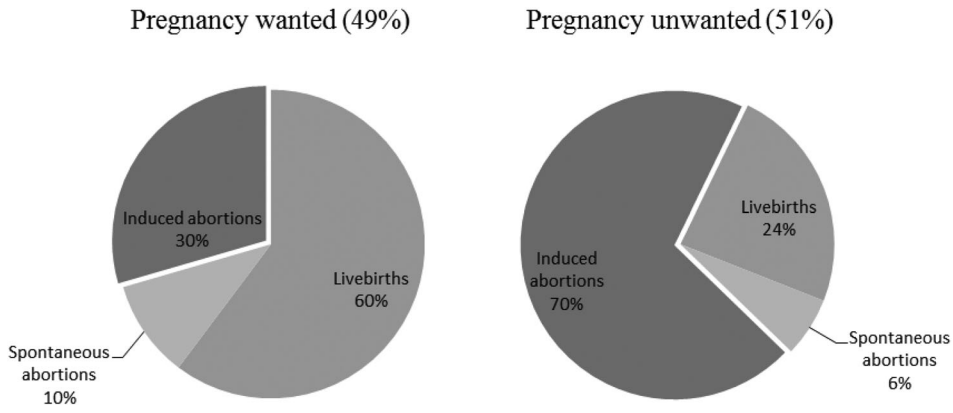

Figure 1. Outcome of pregnancies conceived after HIV diagnosis according to pregnancy intention ($N = 158$).

Table 2. Descriptive analysis of selected characteristics of all the pregnancies that occurred in the women after HIV diagnosis ($N = 158$).

	All pregnancies that occurred after HIV diagnosis ($N = 158$)					First pregnancy that occurred after HIV diagnosis ($N = 113$)				
		Unwanted pregnancy ($N = 80$)		Induced abortion ($N = 79$)			Unwanted pregnancy ($N = 53$)		Induced abortion ($N = 52$)	
	N (%)	*N* (%)	*P* (χ^2)	*N* (%)	*P* (χ^2)	*N* (%)	*N* (%)	*P* (χ^2)	*N* (%)	*P* (χ^2)
Gravidity										
No or one	94 (59.5)	37 (46.3)	*0.001*	36 (45.6)	*0.000*	86 (76.1)	36 (67.9)	0.055	34 (65.4)	*0.014*
2 or more	64 (40.5)	43 (53.8)		43 (54.4)		27 (23.9)	17 (32.1)		18 (34.6)	
Parity										
No or one	126 (79.7)	56 (70.0)	*0.002*	55 (69.6)	*0.002*	97 (85.8)	43 (81.8)	0.177	39 (75.0)	*0.002*
2 or more	32 (20.3)	24 (30.0)		24 (30.4)		16 (14.2)	10 (18.9)		13 (25.0)	
Duration from HIV diagnosis to pregnancy										
<1 year	25 (15.8)	16 (20.0)	0.221	13 (16.5)	*0.063*	24 (21.2)	16 (30.2)	*0.045*	12 (23.0)	*0.030*
1–3 years	65 (41.1)	34 (42.5)		39 (49.4)		51 (45.1)	24 (45.3)		29 (55.8)	
>3 years	68 (43.0)	30 (37.5)		27 (34.2)		38 (33.6)	13 (24.5)		11 (21.2)	
HIV testing in the previous Antenatal check-up										
Yes	79 (50.0)	39 (48.8)	0.750	40 (50.6)	0.874	58 (51.3)	29 (54.7)	0.498	27 (51.9)	0.907
No	79 (50.0)	41 (51.2)		39 (49.4)		55 (48.7)	24 (45.3)		25 (48.1)	
On ART preconception										
Yes	29 (18.4)	10 (12.5)	*0.054*	11 (13.9)	0.150	20 (17.7)	7 (13.2)	0.240	7 (13.5)	0.276
No	129 (81.6)	70 (87.5)		68 (86.1)		93 (82.3)	46 (86.8)		45 (86.5)	
Knowledge about MTCT										
Yes	150 (94.9)	76 (95.0)	1.000	75 (94.9)	1.000	105 (92.9)	49 (92.5)	0.855	48 (92.3)	0.815
No	8 (5.1)	4 (5.0)		4 (5.1)		8 (7.1)	4 (7.5)		4 (7.7)	
Knowledge about PMTCT										
Yes	111 (70.3)	55 (68.8)	0.676	48 (60.8)	*0.009*	73 (64.6)	33 (62.3)	0.625	28 (53.8)	*0.027*
No	47 (29.7)	25 (31.3)		31 (39.2)		40 (35.4)	20 (37.7)		24 (46.2)	
Preconception consultation										
Yes	43 (27.2)	1 (1.2)	*0.000*	6 (7.6)	*0.000*	32 (28.3)	1 (1.9)	*0.000*	4 (7.7)	*0.000*
No	115 (72.8)	79 (98.8)		73 (92.4)		81 (71.7)	52 (98.1)		48 (92.3)	
Enrolled in a PMTCT										
Yes	59 (37.3)	16 (20.0)	*0.000*	1 (1.3)	*0.000*	44 (38.9)	13 (24.5)	*0.003*	1 (1.9)	*0.000*
No	99 (62.7)	64 (80.0)		78 (98.7)		69 (61.1)	40 (75.5)		51 (98.1)	

Note: Pearson Chi-square values of significance when the cell count is more than 5. Fisher's exact test when the cell count is less than 5.

(64.6% in the 1st pregnancy; 84.4% in the 2nd and 84.6% in the 3rd and above pregnancies).

Fear of transmitting HIV to the child was mentioned by most women as a reason for not wanting the pregnancy (70.0%) and for opting to terminate it (59.5%) (Table 3). Despite increase in knowledge about PMTCT in subsequent pregnancies, fear of transmitting HIV to the child was consistently a major reason irrespective of the order of the pregnancy (66% in 1st, 75% in 2nd, and 85% in 3rd and higher pregnancies). However, other reasons such as having completed the desired family size (16.3%) and uncertainty of child's future (11.3%) were mentioned as reasons for not wanting the pregnancy and untimed pregnancy (21.5%) and lack of emotional and financial support from family (20.3%) were mentioned as reasons for opting to terminate the pregnancy (Table 3).

In bivariate analysis, women who were working [OR 2.09 (95% CI 1.02–4.27)], resided in urban areas [OR 2.39 (95% CI 1.24–4.60)], and who had two or more live births before diagnosis of HIV [OR 3.75 (95% CI 1.57–8.99)] were significantly more likely to report an unwanted pregnancy. Whereas working women [OR 2.16 (95% CI 1.06–4.43)], who had two or more live births before diagnosis of HIV [OR 3.87 (95% CI 1.62–9.28)], who did not know about PMTCT [OR 2.54 (95% CI 1.25–5.18)] and who reported that the pregnancy was unwanted [OR 5.58 (95% CI 2.82–11.04)], had a significantly higher chance of voluntarily terminating the pregnancy (Table 4). Consulting a healthcare provider (HCP) prior to conception was observed to be correlated with both the outcomes in the descriptive analysis (Table 2). All most all women who received preconception consultation reported that the pregnancy was wanted and did not opt for termination of pregnancy. Consulting a HCP, in the context when preconception consultation/counseling is not provided routinely, itself suggests women's desire and planning for pregnancy and thus can have a possible reverse causal relationship with the outcomes. We therefore did not include this variable in bivariate and multivariate analyses.

In multivariate analysis that included significant variables from the bivariate analysis and controlled for effect of variables included in the model, women who resided in urban areas [OR 2.43 (95% CI 1.23–4.79)] and had two or more live births before knowing about their HIV status [OR 3.33 (95% CI 1.36–8.20)] were significantly more likely to report an unwanted pregnancy. Women who had two or more live births before they came to know about their HIV [OR 3.16 (95% CI 1.20–8.35)], who did not know that HIV transmission to the baby can be prevented when they were pregnant [OR 3.29 (95% CI 1.48–7.34)] and who reported that the pregnancy was not wanted [OR 4.82 (95% CI 2.33–10.00)], were significantly more likely to voluntarily terminate the pregnancy (Table 4). The association of women's work status with reporting an unwanted pregnancy [OR 1.82 (95% CI 0.85–3.87)] and having an induced abortion [OR 1.64 (95% CI 0.72–3.72)] was not statistically significant after adjusting the effect of other variables in the model (Table 4).

Table 3. Reasons for not wanting the pregnancy and for opting to terminate it.

	N (category)	% Cases
Reasons for not wanting the pregnancy (N = 80)		
Fear that HIV will be transmitted to the child	56	70.0
Completed desired family size	13	16.3
Uncertainty of child's future	9	11.3
Concern about deteriorating heath due to pregnancy	6	7.5
Lack of financial and emotional support from family	6	7.5
Other	0	0
Total	90	112.5[a]
Reasons for opting to terminate the pregnancy (N = 79)		
Fear that HIV will be transmitted to the child	47	59.5
Pregnancy was too early (untimed)	17	21.5
Lack of financial and emotional support from family	16	20.3
Concern about deteriorating health due to pregnancy	6	7.6
Other	7	8.9
Total	93	117.8[a]

[a]Multiple answers were possible.

Analysis of the first pregnancy after HIV diagnosis (N = 113)

The sensitivity analysis that included only the first pregnancy after HIV diagnosis showed similar results to the analysis based on all pregnancies, with the exception of time from HIV diagnosis, which was significant in this analysis (Table 2). This suggests that the results of the analysis including all pregnancies are not biased due to the outcomes of subsequent pregnancies.

Discussion

This first study among HIV-infected women from Western India reported a high prevalence of unwanted pregnancies (51%) and induced abortions (50%)

Table 4. Crude and adjusted odds ratios and 95% confidence intervals for factors associated with unwanted pregnancies and induced abortions for all pregnancies that occurred after diagnosis of HIV infection ($N = 158$).

		Unwanted pregnancy		Induced abortion	
Variable	Category	Crude OR (95% CI)	Adjusted OR (95% CI)	Crude OR (95% CI)	Adjusted OR (95% CI)
Women's occupation	Not working[a]				
	Working	2.09 (1.02–4.27)	1.82 (0.85–3.87)	2.16 (1.06–4.43)	1.64 (0.72–3.72)
Place of residence	Rural[a]				
	Urban	2.39 (1.24–4.60)	2.43 (1.23–4.79)	–	–
Parity	≤1 live births[a]				
	≥2 live births	3.75 (1.57–8.99)	3.33 (1.36–8.20)	3.87 (1.62–9.28)	3.16 (1.20–8.35)
Knew about PMTCT	Yes[a]	–	–		
	No			2.54 (1.25–5.18)	3.29 (1.48–7.34)
Pregnancy wanted	Yes[a]	–	–		
	No			5.58 (2.82–11.04)	4.82 (2.33–10.00)

[a]Reference category.

among women who conceived after the diagnosis of HIV. This proportion of unwanted pregnancies is much higher than the proportion reported among HIV-uninfected women in India (21%) (IIPS Macro-International, 2007). Our findings are in line with the emerging literature from other parts of the world that reported a high prevalence of unwanted pregnancies (Gogna, Pecheny, Ibarlucia, Manzelli, & Lopez, 2009; Schwartz et al., 2012; Sutton et al., 2014) and induced abortions (Abdala et al., 2011; Ammassari et al., 2013) and point out the global lacuna in providing comprehensive sexual and reproductive health services to HIV-infected women.

Similar to earlier studies (Ammassari et al., 2013; Kanniappan, Jeyapaul, & Kalyanwala, 2008; Kirshenbaum et al., 2004; Maccarthy et al., 2014), fear of MTCT was reported as an important reason for not wanting the child and for opting to terminate the pregnancy. However, other reasons mentioned such as completion of desired family size, lack of emotional and financial support from the family, concern of deterioration of health due to pregnancy suggest that the pregnancy-related decisions of HIV-infected women are not solely determined by their HIV status (Maccarthy et al., 2014).

Women who resided in urban areas and who had two or more live births before their HIV diagnosis were significantly more likely to report an unwanted pregnancy. Higher parity has been consistently reported as a significant predictor of unwanted pregnancies among HIV-infected (Bankole et al., 2014; Liang et al., 2013) and -uninfected women (Dixit, Ram, & Dwivedi, 2012; Ikamari, Izugbara, & Ochako, 2013; Kassa, Berhane, & Worku, 2012). Significantly higher rates of unwanted pregnancies in urban areas were reported among HIV-uninfected women in India (Dixit et al., 2012) but not elsewhere (Kassa et al., 2012; Wado, Afework, & Hindin, 2013), suggesting a similarity in the vulnerabilities and constraints among Indian urban women irrespective of their HIV status.

Lack of knowledge about PMTCT was associated with induced abortion in our study. A recent study among Italian HIV-infected women identified fear of MTCT as an independent predictor of induced abortion (Ammassari et al., 2013). Interestingly, we observed that knowledge of PMTCT was increasing in subsequent pregnancies, whereas fear of MTCT did not reduce in subsequent pregnancies. Because PMTCT does not completely eliminate the risk of MTCT, the residual risk of MTCT even after ARVs (2–5%) (WHO, 2010) might get amplified among some women. Merely knowing about the availability of ARV for PMTCT, without individualized counseling, might thus not mitigate women's concern of MTCT.

In our study, all women who opted to terminate their pregnancy, except one, went to the clinics/hospitals for pregnancy termination, without enrolling in PMTCT programs. Only 43 (27%) women reported to have talked with the HCP prior to conception and these conversations were initiated by the women. Poor communication with the HCP has been reported in the studies from the USA and Brazil (Finocchario-Kessler et al., 2010, 2012; Steiner, Finocchario-Kessler, & Dariotis, 2013). HCP-initiated communication about pregnancy planning and contraceptive use at HIV diagnosis or before pregnancy could be helpful in reducing unwanted pregnancies (Barbosa et al., 2012; Rahangdale et al., 2014). Also informing all fecund HIV-infected women of the childbearing age group about MTCT and its prevention at the time of diagnosis should be considered for improving informed decision-making among women.

Majority of the women (57.5%) used male condoms as the only method for contraception. It is likely that these women never used any contraception before HIV diagnosis and started using condoms after HIV diagnosis as male condoms are advised to HIV-infected people irrespective of the HIV status of the partner to avoid (re)infection and pregnancies. One of the important limitations of this study is the lack of data on condom use at the time of pregnancy. However, based on the data of ever use of contraception it appears that use of temporary methods of contraception other than a condom is low and most women rely on a condom after HIV diagnosis to prevent pregnancy and avoid (re)infection.

Considering the high rates of unwanted pregnancies, it is important to assess women's perceived need to use other contraceptive methods and inconsistent use of a condom. The change in focus of contraception messages to HIV-infected women from "dual protection" by one method to "dual method" for effective protection (Lawani, Onyebuchi, & Iyoke, 2014) where condoms are promoted as part of a dual method (Akelo et al., 2013) and women are provided with a choice of another appropriate contraceptive method might prove effective.

Time from HIV diagnosis to pregnancy appeared statistically significant only in the analysis of the first pregnancy that occurred after HIV diagnosis. It appears that when the first pregnancy occurred within 1 year of diagnosis then it is more likely to be unwanted and likely to be voluntarily terminated. While this can be attributed to the initial period of turmoil of accepting the HIV diagnosis there is a lack of temporal understanding of the effect of HIV diagnosis on the reproductive decision-making among couples.

Some study limitations are noted. Our retrospective measurement of pregnancy intention could be unreliable due to post-pregnancy rationalization of the pregnancy behavior (Koenig, Acharya, Singh, & Roy, 2006). Our study of induced abortions in addition to unwanted pregnancies, however, gives a more reliable analysis of the situation. Further, we could not include pregnancy termination in the past as one of the predictor variables for analyzing the current pregnancy, whereas this could be an important factor. Also, due to unavailability of data, we could not assess whether unwanted pregnancies and induced abortions are more likely among women who are in an advanced stage of the disease as observed in a recent study from the USA (Sutton et al., 2014). This relationship needs further exploration among Indian woman.

Overall, our study findings highlight the need for comprehensive action to address the high prevalence of unwanted pregnancies and induced abortions among HIV-infected women in India. Providing counseling on reproductive health and PMTCT to all HIV-infected women of childbearing age at HIV diagnosis and enrolling all HIV-infected pregnant women in a PMTCT program irrespective of their decision to continue with their pregnancy might give the opportunity to all HIV-infected women to receive counseling and help program managers in monitoring unwanted pregnancies and induced abortions.

Acknowledgements

The authors would like to thank Ms Neha Vaidya and Ms Trupti Darak of Prayas Health Group, Pune, for their sensitive and sincere efforts of talking to HIV-infected women for data collection and their help in data entry and validation.

Disclosure statement

No potential conflict of interest was reported by the authors.

Funding

This study received financial support from Population Research Center, Faculty of Spatial Sciences, University of Groningen and Eric Bluemink Foundation, University of Groningen, The Netherlands.

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