



Research Article

ADHERENCE LEVEL AND ITS SOCIO-DEMOGRAPHIC DETERMINATIONS FOR PMTCT AMONG HIV POSITIVE PREGNANT WOMEN ON HAART AT IMO STATE SPECIALIST HOSPITAL OWERRI NIGERIA

G. N. Iwuoha¹, J. A. Ifeatu², U. Chukwuocha³, C. O. Amadi⁴, and C. O. A. Okereke⁵

¹⁻⁵Department of Public Health, School of Health Technology, Federal University of Technology, Owerri, Nigeria

Correspondence Author:

Greg Iwuoha

Email:gregiwuoha@gmail.com

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Abstract

Attainment of optimal adherence level to prevention of mother-to-child transmission (PMTCT) of HIV requires addressing salient factors posing challenges to HIV positive (HIV+) pregnant women in keeping the minimum required level of the treatment to highly active antiretroviral therapy (HAART). This study was aimed at assessing the adherence level and socio-demographic determinant factors of adherence to PMTCT among HIV+ mothers on HAART between June 2016 and October 2016 at Imo State Specialist Hospital, Owerri Nigeria. A semi-structured questionnaire was used to obtain information on HAART adherence, as well as socio-demographic factors of the participants. Self-reported adherence was used to assess the adherence level. Adherence was calculated from the percentage proportion of number of doses taken to that of doses prescribed, and taking at least 95% regimen was considered as the optimal adherence level. Descriptive method was used to represent the rate of adherence while socio-demographic factors were assessed as independent predictors in a multivariate logistic regression model. A total of 306 HIV+ women were used in the study and 74.5% adhered (non-adherent = 25.5%) to HAART. Among the non-adhered women, their reasons were forgetfulness (37.3%), cost (24.4%), feeling healthy (14.4%), side effects (9%), drugs were not working (6.4%), very ill (3.8%) and stigmatization (2.6%). Significant factors of non-adherent to were unmarried marital status ($p=0.002$, 95% CI for OR=1.51– 6.50) and wider parity of 5 and above ($p=0.033$, 95% CI for OR=1.11–10.61). Other socio-demographic of adherence were education level (secondary: $p<0.0001$, 95% CI for OR=0.12 – 0.55; tertiary: $p=0.001$, 95% CI for OR= 0.11-0.59) and occupation (civil service: $p=0.004$, 95% CI for OR=0.06 –0.59). Gaps of MTCT still remain among HIV+ pregnant women. To meaningfully achieve effective PMTCT, more attention should be given to the socio-demographic and other associating factors of non-adherence to HAART.

Keywords: Adherence, HIV, PMTCT, HAART

BACKGROUND

HIV/AIDS still remains a major challenge globally despite the huge investment on programmes to control the spread of the disease. HIV infection lowers the level of human CD4+ T cells leading to lost body immunity and progressively more vulnerable to opportunistic infections. Mother-to-child transmission (MTCT) is the vertical transmission of HIV from an infected mother to her unborn or newly born baby. HIV can be transmitted from a HIV positive woman to her child during pregnancy, childbirth and even after birth through breastfeeding [1]. MTCT accounts for over 90% of new HIV infections among children [2], and has been described as the largest source of HIV infection in children below the age of 15 years [3].

Proper use of HIV antiretroviral treatment (ART) reduced the risk of MTCT thereby boasting the drive towards prevention of mother-to-child transmission (PMTCT) on the disease. PMTCT is a comprehensive package of interventions with an aim of reducing mother to child transmission and consists of a range of interventions, including improved antenatal services, opt-out HIV counselling and testing for pregnant women, provision and administration of antiretroviral drug (prophylaxis) for HIV positive pregnant women and new-borns, referral to support groups and counselling on options for safer infant feeding practices [4-5]. The World Health Organization (WHO) described prevention of mother to child transmission of HIV as a highly effective intervention that has huge potential to

improve both maternal and child health of HIV positive mothers and their children [5]. Current report shows that since 1995, an estimated 1.6 million new HIV infections among children have been averted around the globe due to the provision of antiretroviral medicines [1]. HIV, MTCT transmission rates range from 15% to 45% if no intervention measures are applied but with effective intervention such as the highly active antiretroviral therapy (HAART) during periods of pregnancy, labour, delivery and breastfeeding, the risk in transmission rate can be reduced to below 5% [6-7].

The antiretroviral treatments consist of three or more antiretroviral agents to be taken in combination with the standard care for prevention of mother to child transmission of HIV (PMTCT-HIV). ART reduces immune suppression, slows disease progression and improves patients quality of life [8 -10]. Proper adherence to HAART leads to rising CD4 cell counts, undetectable viral loads and clinical improvement in patients [11-12] while non-adherence to the ARV leads to the exposure of the virus to inadequate concentrations of antiretroviral medications that could in turn lead to viral replication, development of body resistance to antiretroviral treatments, failing regimen, opportunistic infections and increased vertical transmission [8, 13-14]. Missing of few doses of antiretroviral medication could lead to drug resistant strains of HIV as well as uncertainty in treatment success [15, 16]. An adherence rate of at least 95% on ART is usually required to delay or prevent development of drug resistance strains of the disease and treatment failure [11, 17]. Obviously this intervention strategy is quite effective and of enormous value but has not been utilized enough in order to significantly reduce HIV/AIDS transmission rate on MTCT to the barest minimum.

Thus while mother to child transmission (MTCT) of HIV is preventable and achievable, the rate of adherence to achieve the prevention of mother to child transmission (PMTCT) strategy should be a matter of concern. It has been shown that getting the People Living with HIV (PLWH) adhere properly to HAART is a big challenge on achieving effective HIV treatments [18]. In some high income countries, mother to child transmission (MTCT) rates as low as 1%-2% has been achieved with combination of antiretroviral treatments during and after pregnancy [19], but that may not be the same in most low income nations. Nigeria alone, has accounted for 30% of the burden of MTCT [20]. In the year 2012 alone, up to 60,000 new HIV infections occurred among children in Nigeria, making Nigeria the country with the largest number of children acquiring HIV through MTCT [21]. The factors that increase the risk of mother to child transmission are usually high maternal viral load of HIV, low CD4 cell count in the mother, unhealthy behavioural practices such as smoking and illicit drug abuse, mode of delivery, inappropriate infant feeding practice and prolonged rupture of the membrane [22].

There is no gold standard with which to measure adherence, available methods include, self-reports

(including surveys, interviews and diaries), clinical assessments, pill counts, directly observed therapy (DOT), prescription refills, biological markers, therapeutic drug monitoring (TDM) and medication event monitoring system (MEMS) [23, 24]. In general the level of adherence is known to have been influenced by patients and providers' psychosocial related factors such as, depression, and nondisclosure of positive status to partners, stigmatization, and discrimination as well as clinical factors which may include pill burden, dosing frequency and adverse effects of medications [25].

Scanty number of studies has been narrowed down on the influence of socio-demographic factors in non-adherence to ART among HIV mothers. The benefits of this study cannot be under-estimated, since a high rate of adherence to PMTCT ARV will aid to decrease the incidence of HIV/AIDS infection in children, prevent the advancement of the infection in their mothers and achieve an HIV-free generation. The knowledge shall be useful in designing effective strategies to improve their level of adherence and ultimately minimize the mother to child transmission of HIV especially in high transmission countries. This study therefore aimed at the determination of the optimal level of adherence and the influence of socio-demographic factors of the level of adherence to HAART among HIV positive pregnant women accessing PMTCT services at Imo Specialist hospital Owerri, Nigeria.

MATERIALS AND METHODS

This study was conducted as a hospital-based cross sectional study carried out at PMTCT clinic (Heart-to-Heart Clinic) of Imo State Specialist Hospital Owerri (ISSHO), which it is one of the major PMTCT centers in South Eastern Nigeria. The hospital delivers PMTCT of HIV Infection services to pregnant women as well as other HIV related services to the adolescent youths, adult and pediatric in the state and across the region.

The study was designed to include only HIV+ mothers on HAART at ISSHO between June 2016 and October 2016. Only the subjects who have been on the ART for at least 3 months before the commencement of the study were included in the study. A total of 1189 women were on HAART in the hospital within the study period. The sample size was calculated using Cochran appropriate formula for sample size determination ($n = \frac{z^2 pq}{d^2}$) [26]. Similar study found the non-adherence rate at 21.7% [27], and after accounting for 5% attrition, a sample size of not less than 274 was found as the minimum sample size required. However more than the required minimum sample size was used in this study.

Data was obtained from the pregnant women via a semi structured questionnaire containing closed and open-ended questions. The reason for the use of open-ended questions was to allow for to freely expression of opinions among the women. The questionnaire contained information on socio-demographic characteristics of the respondents, antiretroviral drug medication, adherence pattern, likely reasons for non-adherent to drugs doses,

as well as factors that encourage adherence. The questionnaire was properly validated through face and construct validity. The socio-demographic characteristics of the study participants assessed include age, marital status, level of education and occupation education. Factors assessed for non-adherence were forgetfulness, transport cost, drug side effects, feeling healthy; believe that the drugs are not working, and stigma/discrimination from health workers. Study approval was obtained from the Imo State Specialist Hospital Management and informed consent was obtained from the participants before the questionnaire was administered to them.

The questionnaire was administered by the study researchers. Systematic sampling method was used in selecting the subjects using their sitting arrangements. At situations whereby the selected subject refused consent, the next subject rightwards was selected. Since there is no gold standard to measure adherence, this study considered self-reported adherence as ways of assessing the level of adherence. Adherence was calculated by expressing the percentage proportion of number of doses taken to the number of doses prescribed. Taking at least 95% of the ART regimen was considered as the optimal level of adherence; hence the number of missed doses over the last three months was assessed and dichotomized for a positive or negative 95% adherence to ART.

Preliminary analysis involved descriptive statistics such as charts, tables, percentages which was followed by bivariate analyses of the socio-demographic determinant factors of adherence. The significant socio-demographic factors at bivariate model were included in a multivariate logistic regression model, of which the socio-demographic factors were entered as independent predictor variables in the model. Marital status was reclassified into two and was entered as married and unmarried in the model. Probability value (p) at 5% level and 95% confidence interval (CI) were used to interpret the results. Hence $p < 0.05$ or 95% CI not containing zero were considered significant. Data analysis was performed on STATA version 13.0 (*Stata Corp, College Station, TX, USA*) while Microsoft Excel 2010 was used in drawing charts.

RESULTS

A total of 306, HIV positive mothers were used in the study. The socio-demographic characteristics of the respondents are shown in Table 1. The mean age along with the standard deviations of all the participants were 34.6 ± 5.1 years. There were 72 (23.5%) women, who were below 25 years of age, while 117 (38.2%) were aged 25–34 years. Two hundred and thirteen women (69.6%) were married and 188 (61.4%) had a parity of 2–3. All the women had at least primary education level, with 145 (47.4%) and 97 (31.7%) respectively for secondary and tertiary levels. The unemployed were 99 (32.4%) while 95 (31%) engage on trading and other business activities.

Table 1: Socio-Demographic Characteristics of Pregnant Women Used in the Study

Characteristics	Number of pregnant women (N= 306)	%
Age in years (Mean \pm SD = 34.6 \pm 5.1)		
< 25	72	23.5
25 -34	117	38.2
35-39	53	17.3
40+	64	20.9
Marital Status		
Single	47	15.4
Married	213	69.6
Separated/ divorced	46	15.0
Parity		
0-1	85	27.8
2-3	188	61.4
4+	33	10.8
Education Level		
Non formal	0	0.0
Primary education	64	20.9
Secondary education	145	47.4
Tertiary education	97	31.7
Occupation		
Unemployed	99	32.4
Trading / Business	95	31.0
Civil Servant	54	17.6
Students	35	11.4
Other (e.g. daily laborer)	23	7.5

The frequency of adherence was such that 228 (74.5%) adhered to the treatment regimen while 78 (25.5%) did not adhere (Figure 1). Adherence rate in the study was found to be far from the 95% level usually regarded as near perfect adherence.

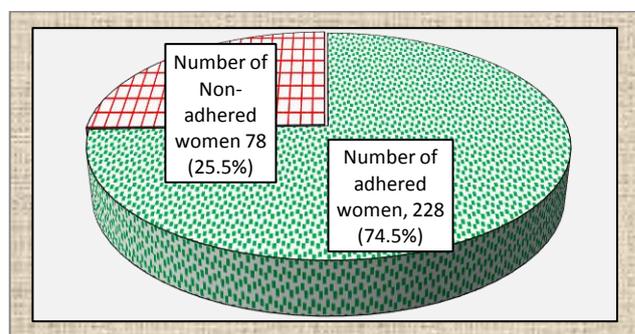


Figure 1: Overall level of adherence/non-adherence to HAART among HIV+ mothers at Imo Specialist Hospital Owerri, Nigeria

Among the total of 78 HIV positive women whose adherence level were below the recommended 95% cut off, 29 (37.3%) responded that forgetfulness was their reason for non-adherence, 19(24.4%) stated that they

could not adhere based on treatment cost such transport cost due to distance from the hospital, laboratory cost and cost for treatment of opportunistic infections. A total of 11 (14.4%) could not adhere due to the fact that they were feeling healthy and therefore wanted to stop being on drug regimen all the time, up to 7 (9%) blamed their non-adherence on some side effects of the drug. Five of the subjects (6.4%) believe that the drugs were not

working and thus willing declined taking the doses as advised. Another 3 (3.8%) stated that sometimes they are facing very ill situations and consequently miss the doses, 2 (2.6%) responded that they are sometimes being stigmatized by some healthcare workers and thus cannot trust them to adhere to the treatments. The remaining 2 (2.6%) of the patients said that drug taking is against their faith and culture (Figure 2).

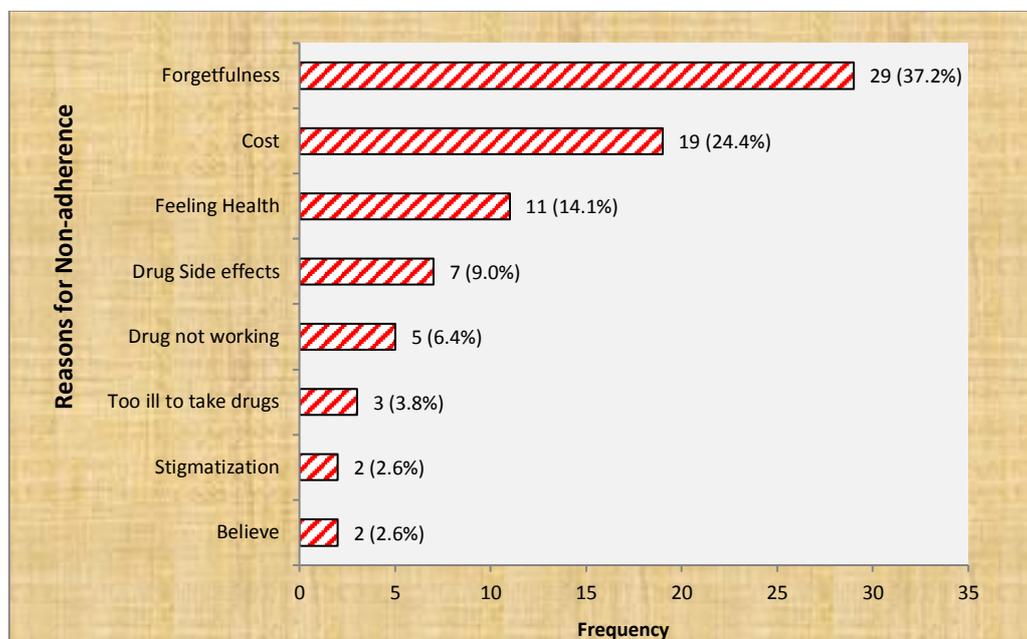


Figure 2: Reasons for non-adherence to HAART among non-adhered HIV+ women at Imo Specialist Hospital Owerri, Nigeria.

Significant socio-demographic factors influencing rate of adherence to HAART in this study include marital status, parity, level of education and occupation level (Table 2). The older patients are more likely to adhere to HIV/AIDS treatment doses than the younger ones. But age was not found as a significant factor of adherence in this study. The unmarried women were found to be over 3 times not likely to adhere to HAART compared to the married ones ($p < 0.002$, 95% CI for OR = 1.51 – 6.50). In terms of parity, having at least 5 children is a significant risk factor of non-adherence ($p = 0.026$, 95% CI for OR = 1.16 – 11.26) with higher odds of 3.62 times compared

to those with parity of 0-2. Low education level was also found as a significant factor of non-adherence ($p < 0.0001$). Secondary and tertiary education level patients respectively have 74% (95% CI for OR = 0.12 – 0.55) and 73% (95% CI for OR = 0.11 – 0.59) lower odds of non-adherence compared to those that have primary school education level. Civil Service job was significantly associated with rate of adherence ($p = 0.004$, OR = 0.19, 95% CI for OR = 0.06 – 0.59). Up to 85.2% of the women who are civil servant were able to adhere to the treatments compared to 71.7% rate found among the unemployed.

Table 2: Socio- Demographic Factors and Adherence to HART among HIV positive Pregnant Women

Socio- Demographic Factors	Total	adhered	Non adhered	Coef	S.e.	p-value	Odds ratio (OR)	95% C.I. for OR	
		No(%)	No(%)					Lower	Upper
Age in years									
Ref (< 25)	72	49 (68.1)	23 (31.9)						
25 -34	117	86 (73.5)	31(26.5)	0.086	0.463	0.839	1.09	0.47	2.51
35-39	53	44 (83.0)	9 (17.0)	-0.823	0.219	0.098	0.44	0.17	1.17
40+	64	49 (76.6)	15 (23.4)	-0.427	0.388	0.271	0.65	-1.19	0.33
Marital status									
Ref (Married)	213	164 (77.0)	49 (23.0)						
Unmarried	93	64 (68.8)	29 (31.2)	1.144	0.371	0.002	3.14	1.51	6.50

Parity									
Ref (0-2)	85	61 (71.8)	24 (28.4)						
3-4	188	147 (78.2)	41 (21.8)	-0.424	0.323	0.189	0.65	0.35	1.23
5+	33	20 (60.6)	13 (39.4)	1.231	0.576	0.033	3.42	1.11	10.61
Education Level									
Ref (\leq primary)	64	37 (57.8)	27 (42.2)						
Secondary education	145	116 (80.0)	29 (20.0)	-1.366	0.388	<0.0001	0.26	0.12	0.55
Tertiary	97	75 (77.3)	22 (22.7)	-1.364	0.426	0.001	0.27	0.11	0.59
Occupation									
Ref (Unemployed)	99	71 (71.7)	28 (28.3)						
Trading / Business	95	71 (74.7)	24 (25.3)	-0.615	0.414	0.137	0.54	0.24	1.22
Civil Servant	54	46 (85.2)	24 (14.8)	-1.643	0.568	0.004	0.19	0.06	0.59
Students	35	23 (65.7)	12 (34.3)	-0.534	0.536	0.319	0.59	0.21	1.68
Other (e.g., daily laborer)	23	17 (73.9)	6 (26.1)	-0.336	0.583	0.564	0.71	0.23	2.24

Ref = reference variable, Coef= coefficient, S.e. = standard error, sd = standard deviation

DISCUSSION

The level of adherence to HART among the HIV positive pregnant women studied was 74.5%, leading to a non-adherence rate of 25.5% found in this study. It implied that up to 25.5% of the pregnant women enrolled in the PMTCT programme at the study area are at increased risk of vertical transmission. The adherence level found in this study was slightly lower than 78.3% found in Nnewi South-Eastern Nigerian study [27] and 80.6% found in a Lagos study [28], but higher than 59.9% in Cross-river South-South Nigeria [29], 73.3% reported in Ilorin, South-western Nigeria [30] and 62.8% in Keffi Northern Nigeria [31]. When compared to studies done in countries of Sub-Saharan Africa, it is lower than, 87.1% rate in Tigray, Northern Ethiopia, 91% in Bwaila Hospital (Malawi) and 89% in Western Kenya [32-34]. While this result is comparable to another South-Eastern Nigerian study, it shows that not much improvement has been recorded over the last few years on achieving greater adherence within the study region despite the fact that high adherence level of up to 99% is achievable among pregnant women [35]. This result is a clear indication for the need for a more vigorous review of PMTCT pre commencement counselling services in the study area as well as in other areas of lower adherence.

Among the non-adhered subjects, major reasons for non-adherence were forgetfulness (37.2%), associating cost (24.4%), feeling healthy (14.1%) and drug side effects (9%). The first two factors alone contributed to more than half (61.6%) of the reasons. This study is of the opinion that reminding techniques such as the use of constant reminding calls, engagement of partner or neighbour reminders as well as the development and introduction of electronic reminding devices should be introduced and improved in the developing countries. In advanced countries, the use of electronic reminder devices has been shown to have reduced the rate of forgetfulness [36], while similar aim has been achieved

in the use of telephone calls [37]. Such devices usually rely on energy supply, and the extent of energy supply in most part of Nigeria has not been consistent, this study suggests that greater attention should be focused on engagement of partner or neighbor reminders in the less technology advanced countries to help in reducing the extent of forgetfulness among HIV patients on HAART. Though this study did not assess the effects of partner or neighbor involvements among the study group, it has been shown that encouraging HIV+ women to come along with a treatment supporter (preferably their partners) for counselling sessions prior to initiation of ART significantly improved adherence [28].

Another major factor for non-adherence found in this study is treatment associating costs. Although free drugs were given to the patients, other associating costs include transport cost to and from the hospital, hospital registrations cost, laboratory test cost and cost for diagnosis of other opportunistic infections. Financial constraint is a major deterrent factor to adherence in Oku *et al.*, study [29]. In another Nigerian study [27] patients living far from the hospital were likely to miss drug doses as they missed clinic attendance because they could not afford high cost of transportation. Many HIV positive patients are not usually working or have stopped going to work due to constant ill health and other reasons such as stigmatization [38]. Since it cannot be easy establishing ARV centres closer to all patients, this study recommends that the government should make available free transportation facilities that can convey the patients to and from the ARV facilities. There is also the need towards provision of free diagnosis in laboratory test for HIV opportunistic infections.

Feeling healthy contributed to 14.1% of non-adherence while drug side effects showed 9% among the non-adherent women in this study. It is a clear indication that many of the HIV positive pregnant women are not comfortable taking drugs at most times and thus some complained that they do believe that constant drug taking

is inappropriate for their unborn baby. This study is an indication on the need for constant counselling about the importance of adherent to doses among the HIV positive pregnant women.

In terms socio demographic factors, patients of at least 25 years tend to adhere to HAART than the younger ones but age was not found as a significant factor of adherence in this study. Married women are significantly more likely to adhere than the unmarried ones in this study. This study is of the opinion that a probable reason for this kind of result is that married women are more likely to get supports from partners or friends than the unmarried one and hence more likely to adhere. In Igwegbe et al. study [27], marital status was also a significant factor of adherence, but in a Brazilian study [38] poor adherence was obtained on marital status. Women with wider parity of 5 and above were close to 4 times not like to adhere compared to those of 0 -2. Most women of age 25 and above showed larger parity in the study than their counterparts of less than 25 but age has no effect on adherence in this study, this calls for further investigative studies.

Association was found between low educational level subjects and increased likelihood of non-adherence to HAART in this study. This is in line with previous report in Nnewi Nigerian study [27], for which the educational level of both the patents and their spouses showed strong association with patterns of adherence. Adherence rate increases at higher education levels in that study. The public servants among the pregnant women are more likely to adhere to treatment doses than the unemployed in his study. Possible reason for this result could be education level, since majority of the public servants had at least primary education. It may also be attributed to treatment associating cost involvements which are more likely to pose greater challenges to the unemployed than to the working public servants.

However, while factors such as marital status, education level and occupation were significant factors of adherence in this study, they were all non-significant factors in a Calabar South-South Nigerian study [29]. This study is of the view that the result differences in both studies are possible as a result of differences in gender. While the population in the present study was only on pregnant women on HART, that of the other study was on people living with HIV and AIDS (PLWHA), involving on both sexes. Gender has been found as an influencing factor of adherence to ARV in some studies [39 - 41]. Similarly women have been found to be less adherent to HAART than men in a HIV Epidemiological Research Outcome (HERO) study [12]. The limitations of this study is that while data on adherence was based on self-report for dose misses, the association between adherence rate and viral load was not examined in this study. The use of self-report as a measure of adherence could lead a likelihood occurrence of recall bias; but that notwithstanding, it has been shown that association exists between self-report data and viral load [12].

In spite of these limitations, this study is strengthened by the high proportion of HIV pregnant women in our sample which is quite higher than what has been used in other similar studies in the country. Hence the findings from this study will be very useful in designing strategies to strengthen adherence counselling in the PMTCT programmes of this country.

CONCLUSION

The study showed that while the rate of adherence to HAART is high among HIV-positive pregnant women it still leaves about a quarter gap (25.5%) that needed to be closed. Socioeconomic determinants of non-adherence include lower age, unmarried, low level of education, and wider parity. The identified factors should be properly addressed during adherence counselling programmes. The adherence counselling programmes should also be regular and sustained for all patients on antiretroviral therapy for its optimal achievement.

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