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Determinants of Treatment Adherence and Retention in Care among HIV Positive Pregnant and Breastfeeding Women in a Rural District in Zimbabwe

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Abstract

Background: *A preliminary review of St Albert's Mission Hospital data showed 15% of HIV positive pregnant and breastfeeding women (PPBW) missed drug pick-up appointments and 10% were lost to follow up. This affects Zimbabwe reaching 90% viral suppression target among those on antiretroviral therapy and increases HIV transmission risk to unborn fetus or breastfeeding infant. We determined factors associated with treatment adherence and retention in care among PPBW.*

Methods: *We conducted a cross-sectional analytic study among PPBW receiving care at the hospital. Women were sampled consecutively on presenting for antenatal or postnatal care. We used interviewer administered questionnaire to elicit information from consenting PPBW. We obtained ethical approval and written informed consent from PPBW.*

Results: *We interviewed 120 PPBW. The majority were breastfeeding women (60.0%). Over 95% PPBW disclosed their HIV status. The majority used this hospital because the health workers treated them with respect (66.7%), maintained client confidentiality (75.0%) and had good relations with their clients (70.8%). Skipping medication because of travel (adjusted odds ratio (AOR) 95% confidence interval (CI) 0.06 (0.005-0.79 and having an unpleasant experience while seeking care AOR (95% CI) 0.05 (0.002-0.93) were independently associated with lower medication adherence. Disclosure to avoid hiding taking medication AOR (95% CI) 22.07 (1.64-297.66 and attending this hospital because the health workers maintain confidentiality AOR (95% CI) 22.07 (1.64-297.66) were independently associated with higher retention in care.*

Conclusion: *Health system factors play an important role in adherence and retention of pregnant and breastfeeding women attending care at this facility.*

249 words

Key words: *adherence, retention, pregnant, breastfeeding, medication, disclosure.*

Introduction

The advent of antiretroviral therapy (ART) for treatment of HIV has drastically changed the lives of people living with HIV (PLHIV) by significantly decreasing their morbidity and mortality (Palella et al., 1998). However, in high burden HIV countries, HIV remains responsible for a large proportion of morbidity and mortality within this population and of concern being the large proportion of maternal morbidity and deaths (Abdool-Karim et al., 2010; Hogan et al., 2010; World Health Organization, UNICEF, United Nations Population Fund, & World Bank, 2010). In a systematic analysis of progress towards Millennium Development Goal (MDG) 5 made in 181 countries worldwide, HIV was reported to be reversing the gains in reducing maternal mortality (Hogan et al., 2010). In a secondary data analysis of demographic and surveillance data collected by Zaba B *et al* in 2012 in sub-Saharan Africa from 1989 to 2012, 17% of pregnant women were infected with HIV. The mortality rate was much higher among these women than among pregnant women without the virus (14 vs. 2 deaths per 1,000 person-years). Approximately 88% of deaths among pregnant and postpartum women with HIV were attributable to the virus (Zaba et al., 2013). Mathematical models show the proportion of maternal deaths that are attributable to HIV ranging from 6% to 25% globally.

In sub-Saharan Africa where the prevalence of HIV is highest, estimated impacts of HIV are 24 percent of pregnancy related deaths and about 6.4 percent of maternal deaths are due to HIV infection

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(Lozano et al., 2011; Say et al., 2014). HIV infected pregnant women are 2-8 times at higher risk of pregnancy related death than their uninfected counterparts (Calvert & Ronsmans, 2013).

In 2016, UNAIDS reported that globally around 76% [60–88%] of pregnant women living with HIV had access to antiretroviral medicines to prevent transmission of HIV to their babies. In the east and south African region 89% [71–95%] of pregnant women had access to antiretroviral medicines to prevent mother-to-child transmission of HIV (PMTCT) (UNAIDS, 2017). It has been demonstrated that ART is effective in reducing maternal morbidity and mortality among infected women but health systems in many countries struggle to maintain vibrant HIV and associated service needs due to a variety of reasons (Liotta et al., 2013). There are 3 major challenges: (i) getting the women initiated on ART (ii) ensuring they are adherent to treatment and (iii) they are retained in care. Initiation, adherence and retention are quite low in some places (Hoffman et al., 2010). The HIV epidemic cannot be ended if there is no control of new HIV infections and among those who are on treatment, unless high levels of adherence to treatment and retention in care are achieved and sustained. Adherence to ART has been shown to decrease viral load (Arnsten et al., 2001; Paterson et al., 2000) and the possibility of passing on the infection to partners and neonates (Cohen et al., 2011).

St. Alberts Mission Hospital in Centenary, Mashonaland Central Province of Zimbabwe has a catchment population of 10571. The hospital reports over 500 pregnancy bookings per year and approximately 4% women visiting ANC test positive at booking. The statistics on ART initiation by year at St. Alberts Mission Hospital are shown in Table 1.

Table 1. Statistics on initiation of ART among pregnant and breastfeeding women reporting at St. Alberts mission hospital by year

Variable/characteristic	2016	2017	2018 (Jan-Jun)
No of women initiating ART in pregnancy	32	20	9
No of women booking already on ART	28	33	40
Number of women initiating ART during breastfeeding	7	2	1
Total initiated on ART	**67**	**55**	**50**

A preliminary review of the data from St Albert's Mission Hospital showed that 15% of the HIV positive pregnant and breastfeeding women were missing their drug pick-up appointments and 10% were getting lost to follow up. The missed drug pick-ups rate and loss to follow up is a cause of concern as it affects the country's aim of reaching the target of 90% viral suppression among those initiated on ART. Missing drug pick-up is a proxy indicator for non-adherence to medication. Non-adherence leads to the development of drug resistance and necessitates change from cheaper first line drugs to the more expensive second- and third-line drugs. Loss to follow up is a reflection of poor retention and usually results in severe morbidity and mortality. For this group of clients, it may lead to transmission of HIV to the unborn fetus and or breastfeeding infant. It is therefore important to study the factors that are leading to the poor adherence and retention in this population. An in-depth understanding of these factors would help formulate strategies to reduce both poor retention and poor adherence.

Methods

Study design: we conducted an analytic cross-sectional study among HIV infected pregnant and breastfeeding women at St. Albert's Mission Hospital Centenary, Zimbabwe. Assuming a population of 529 pregnant and breast-feeding women in the catchment area of St Alberts Mission Hospital and 4% of women being HIV positive, 10% retained in care and using OpenEpi, Version 3 to calculate sample size using the following formulae:

Population size (for finite population correction factor or fpc) (N):	529
Hypothesized % frequency of outcome factor in the population (p):	7% +/-5
Confidence limits as % of 100 (absolute +/- %) (d):	5%

Design effect (for cluster surveys-DEFF):	1

Sample size (n)= [DEFF*Np(1-p)]/ [(d2/Z21-α/2*(N-1) +p*(1-p)], the sample size was 85 pregnant and breastfeeding women. Anticipating a loss to follow up/ non response rate of 15%, the final sample size was 98 pregnant and breastfeeding women.

We sampled HIV positive pregnant and breast-feeding women consecutively as they presented for antenatal and postnatal care for interviews. We used consecutive sampling because we did not anticipate to get as many eligible women during the short study period.

Inclusion and exclusion criteria

All HIV positive pregnant and breastfeeding women from the catchment area of the hospital were eligible participants and were included in the study. We excluded all HIV positive pregnant and breastfeeding women from outside the hospital catchment. Pregnant and breastfeeding women less than 16 years of age were excluded from this study.

We collected data through participants' interviews using an interviewer administered questionnaire. We conducted interviews either in English or Shona (the local language) depending on preference and literacy of study participant. The researcher and a trained assistant conducted interviews with the women. Pill counts were conducted to derive a pill count adherence ratio (PCAR) at enrolment into the study.

Data analysis

Data were analysed using EPI Info version 3.5.4 and exported to STATA software for further analysis. Data were analysed for frequencies and means. Bivariate analysis was done to generate odds ratios. Data were assessed for effect modification and confounding. Stepwise logistic regression was performed to determine independent factors for adherence and retention.

Permission and ethical considerations

This protocol was reviewed and approved by Medical Research Council of Zimbabwe (MRCZ/A/2457). Written informed consent was obtained from study participants for interviews. Permission to conduct the study was obtained from St Alberts Mission Hospital Management Committee and the community gate keepers (i.e. District Medical Officer, and the Provincial Medical Director).

Results

We enrolled 120 participants into the study and breastfeeding women were the majority (60.0%). More than eighty percent of the participants had attended school with most completing primary school education and were married and unemployed. The majority belonged to the apostolic religion. The median distance to the health facility was 5km and most participants reported absence of geographical barriers. Over 95% of the study participants had disclosed their HIV status to someone. The demographic characteristics of study participants are reported in Table 2.

The median weight was 58.5kg for pregnant women and 59.0kg for breastfeeding women. The majority of women had no CD4 cell count (55.0%) and viral load test done (70.8%). HIV diagnosis for most study participants was before they fell pregnant with the current baby (72.5%).

Less than 10% of the study participants had to skip meals because they had inadequate food. Some participants (35.8%) reported that taking medication without food worsened side effects. Thirteen participants (10.8%) reported skipping medication because they had travelled. Equal proportions (12.5%) of pregnant and breastfeeding women reported forgetting to take their medication. Most study participants (95.0%) reported they had not experienced any side effects from medication.

Most women disclosed to their husbands (90.0%), followed by their brother or sister (73.3%) and their in-laws or parents (48.3%). Some women also disclosed to their community health worker (40.0%). A larger proportion of women disclosed in order to get reminders to take medication (89.2%) as well as not wanting to hide the taking of medication and get social support (77.5%).

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The majority of participants (68.3%) were living with their husbands and children. Most participants (97.5%) reported that living arrangements did not affect their attendance to clinical appointments. More than 90% of participants perceived the pill burden as just right amount with most taking 3 tablets a day. Only two participants reported skipping pills during the past two weeks. Most women returned for care with at least some medication as shown by the median pill count 38 (range 10-60 for pregnant women and 25 (range 4-45) for breastfeeding women and most women (95.8%) had the perception of being healthy. The reported perception of being healthy did not their affect taking of medication and attendance of scheduled reviews. The pill count adherence ratio = 99.8 (range 93.3-100)

Less than half of the sampled population (43.3%) used this facility because they had no choice. The majority used St. Alberts Mission Hospital because the health workers treated them with respect (66.7%), maintained client confidentiality (75.0%) and had good relations with their clients (70.8%). Additionally, the facility always has drugs each time they need resupply (88.3%). A small proportion (10.0%) of women reported unpleasant experiences such as rudeness, being shouted at, unwanted disclosure and condemnation.

All the women reported ever receiving counseling on HIV. The majority had received counseling on importance of adherence to medication followed by dealing with stigma and discrimination and how to cope with side effects of medication. Over 85% reported the use of reminders to adhere to medication. The most common reminder used by pregnant and breastfeeding women was their mobile phone. Over 50% of the women reported having a treatment buddy. Among the pregnant and breastfeeding women, adherence and retention as measured by the review of outpatient record were above 90%.

The factors that were found to be associated with adherence and retention are shown in Table 3. Being unemployed, disclosure of HIV status to get adherence support and remove the need to hide when taking drugs, to get social support, coming to St. Albert's Mission Hospital because the maintain confidentiality and having a treatment buddy significantly increased the chances of adhering to medication. However, having had an unpleasant experience, experiencing side effects, forgetting, travelling and having geographical access barriers significantly reduced the chances of being adherent.

Disclosing to a brother or sister, disclosure to get adherence support, disclosure so that there is no need to hide taking of medication, disclosure to get social support, attending this facility because they maintained confidentiality, receiving counselling on HIV and having a treatment buddy significantly increased the chances of being retained in care. On the other hand, experiencing side effects, forgetting medication, skipping medication during period of travel, skipping meals because of inadequate food and having geographical access barriers to the health facility significantly decreased the chances of retention in care.

On conducting logistic regression, two factors respectively were independently associated with adherence and retention. A 'Yes' response to having had to skip medication because of travel and ever having an unpleasant experience while seeking care were significantly associated with reduced or lower adherence to medication whereas a 'Yes' response to having disclosed to avoid hiding the taking of medication and attending St. Albert's Mission hospital because the health workers maintain confidentiality was significantly associated with increased or higher retention in care (Table 4).

Discussion

The aim of this study was to determine the factors associated with adherence to medication and retention in care among HIV positive pregnant and breastfeeding women at St. Alberts Mission Hospital, Zimbabwe. Information on adherence and retention is important to understand as non-adherence to medication leads to drug resistance. Non-retention in care may result in increased morbidity and mortality among those living with HIV. It is also important to note that it can also result in passing on the infection either to the unborn baby or to the breastfeeding child which results in increased morbidity and mortality among infants if they do not receive the appropriate care in time. Adherence is critical for maximal and sustained suppression of viral replication, lower destruction of CD4 cells, prevention of the development of viral resistance, promotion of immune reconstitution, retard progression of disease and decrease MTCT rates (Bangsberg, 2006; Nachega et al., 2010).

The findings from review of patient's outpatient record show that over 90% of HIV positive pregnant and breastfeeding women were adherent to their medication. Similarly, findings from review of

patient's outpatient record show that over 90% of HIV positive pregnant and breastfeeding women were retained in care. These figures are in the desirable range as we consider the 90 90 90 targets that have been set. If women are adherent and retained, the chances are high that they may be virally suppressed and unlikely to pass on infection to both their sexual partners and their unborn and nursing babies. Unfortunately, most women in this study only had one VL load test done. The high level of adherence to medication could be attributed to the fact that most women knew the treatment for HIV was for life and were content with the pill burden. This could also be attributed to the reported high use of reminders and having treatment buddies.

Skipping medication because pregnant and breastfeeding women had travelled was independently associated with reduction in adherence to medication. There are chances that women forgot to take their medication with them when they travelled or because they may not have disclosed their status to others, they may find it difficult to take the medication in the presence of other people if the situation does not afford them privacy.

Reporting ever having an unpleasant experience while seeking care was independently associated with reduction in adherence to medication. Pregnant and breastfeeding women might delay returning to collect their resupplies for fear of another unpleasant experience. Patients who had unpleasant experiences (rudeness, scolding, condemnation) with the health providers, non-adherence increased (Kagee et al., 2012; Kip et al., 2009; Penn et al., 2011; Sanjobo et al., 2008; Skovdal et al., 2011).

Disclosure of HIV status so that one does not had to hide the taking of medication was independently associated with higher chances of retention in care. Several studies report that PLHIV hide or skip taking medication to avoid disclosure of their status and this resulted in non-adherence (Lyimo et al., 2014; Mbonye et al., 2013; Uzochukwu et al., 2009). A study by Ross et al (2011) reported disclosure to significant others was a critical factor for adherence.

Pregnant and breastfeeding women who came to this facility because health workers maintain confidentiality were more likely to be retained in care. Health workers influence patient adherence to medication. Studies by Penn et al (2011), Sanjobo et al (2008), Skovdal et al (2011), Kagee et al (2012) and Kip et al (2009) report that where there is a good relationship between patients and the health workers, adherence is better or higher compared to where patient health worker relationships are poor. Where health care workers are believed to keep patients information confidential, there is better adherence (Kagee et al., 2012; Kip et al., 2009; Penn et al., 2011; Sanjobo et al., 2008; Skovdal et al., 2011).

The study found that reporting ever forgetting medication was associated with poorer adherence and decreased retention in care though this did not remain significant after multivariate analysis. Some people are naturally forgetful and should either engage treatment buddy or treatment reminders for them to be adherent to medication and retained in care. On the other hand, when some individuals when they have feelings of being healthy, they may not place importance on the taking of drugs and therefore skip some doses.

Pregnant and breastfeeding women that reported having geographical access barriers were less likely to adhere to medication and be retained in care. Skovdal et al 2011 and Sanjobo et al 2008 found that distance to the clinic was a predictor of (non-)adherence and those living close to the health facility being more likely to adhere maybe due to lower transport costs. The presence of geographical barriers like flooded rivers, forests with wild animals and mountains makes access to the health facility more complex and increases the chances of non-adherence and lower retention. Patients in these scenarios might have to take alternative routes that may be costlier for them (Sanjobo et al., 2008; Skovdal et al., 2011).

No study is without limitations. Some key limitations of this study include recall bias and social desirability bias. We used data that were collected during routine provision of care. These data suffer from the weaknesses of being incomplete and inaccurate. Efforts were made to obtain the most complete data by using a variety of source documents. Despite the stated limitations, the study design enables us to draw conclusions for the HIV positive pregnant and breastfeeding women in this setting.

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Conclusion

Two factors respectively were independently associated with adherence and retention. Skipping medication because of travel and ever having an unpleasant experience while seeking care were significantly associated with reduced or lower adherence to medication. Disclosing HIV status to avoid hiding the taking of medication and attending St. Albert's Mission Hospital because the health workers maintain confidentiality was significantly associated with increased or higher retention in care. Health system factors play an important role in adherence and retention of pregnant and breastfeeding women attending care at this facility.

References

[1]. Abdool-Karim, Q., AbouZahr, C., Dehne, K., Mangiaterra, V., Moodley, J., Rollins, N., … de Zoysa, I. (2010). HIV and maternal mortality: Turning the tide. The Lancet, 375(9730), 1948–1949. https://doi.org/10.1016/S0140-6736(10)60747-7.

[2]. Adewuya, A. O., Afolabi, M. O., Ola, B. A., Ogundele, O. A., Ajibare, A. O., Oladipo, B. F., & Fakande, I. (2010). The Effect of Psychological Distress on Medication Adherence in Persons with HIV Infection in Nigeria. Psychosomatics, 51(1), 68–73. https://doi.org/10.1016/S0033-3182(10)70661-7.

[3]. Afolabi, M. O., Ijadunola, K. T., Fatusi, A. O., & Olasode, O. A. (2009). Determinants of adherence to antiretroviral drugs among people living with HIV/AIDS in the Ife-Ijesa zone of Osun state, Nigeria. African Journal of Primary Health Care & Family Medicine, 1(1). https://doi.org/10.4102/phcfm.v1i1.6.

[4]. Alakija Kazeem Salami, Fadeyi, A., Ogunmodede, J. A., & Desalu, O. (2010). Factors Influencing Adherence to Antiretroviral Medication in Ilorin, Nigeria. Journal of the International Association of Physicians in AIDS Care, 9(3), 191–195. https://doi.org/10.1177/1545109710368722.

[5]. Alemu, H., Haile Mariam, D., Tsui, A. O., & Shewamare, A. (2011). Correlates of highly active antiretroviral therapy adherence among urban Ethiopian clients. African Journal of AIDS Research, 10(3), 263–270. https://doi.org/10.2989/16085906.2011.626297.

[6]. Amberbir, A., Woldemichael, K., Getachew, S., Girma, B., & Deribe, K. (2008). Predictors of adherence to antiretroviral therapy among HIV-infected persons: A prospective study in Southwest Ethiopia. BMC Public Health, 8(1). https://doi.org/10.1186/1471-2458-8-265.

[7]. Arnsten, J. H., Demas, P. A., Farzadegan, H., Grant, R. W., Gourevitch, M. N., Chang, C., … Schoenbaum, E. E. (2001). Antiretroviral Therapy Adherence and Viral Suppression in HIV-Infected Drug Users: Comparison of Self-Report and Electronic Monitoring. Clinical Infectious Diseases, 33(8), 1417–1423. https://doi.org/10.1086/323201.

[8]. Bangsberg, D. R. (2006). Less Than 95% Adherence to Nonnucleoside Reverse-Transcriptase Inhibitor Therapy Can Lead to Viral Suppression. Clinical Infectious Diseases, 43(7), 939–941. https://doi.org/10.1086/507526.

[9]. Bastard, M., Fall, M. B. K., Lanièce, I., Taverne, B., Desclaux, A., Ecochard, R., … Etard, J.-F. (2011). Revisiting Long-Term Adherence to Highly Active Antiretroviral Therapy in Senegal Using Latent Class Analysis: JAIDS Journal of Acquired Immune Deficiency Syndromes, 57(1), 55–61. https://doi.org/10.1097/QAI.0b013e318211b43b.

[10]. Beyene, K. A., Gedif, T., Gebre-Mariam, T., & Engidawork, E. (2009). Highly active antiretroviral therapy adherence and its determinants in selected hospitals from south and central Ethiopia. Pharmacoepidemiology and Drug Safety, 18(11), 1007–1015. https://doi.org/10.1002/pds.1814.

[11]. Bezabhe, W. M., Chalmers, L., Bereznicki, L. R., Peterson, G. M., Bimirew, M. A., & Kassie, D. M. (2014). Barriers and Facilitators of Adherence to Antiretroviral Drug Therapy and Retention in Care among Adult HIV-Positive Patients: A Qualitative Study from Ethiopia. PLoS ONE, 9(5), e97353. https://doi.org/10.1371/journal.pone.0097353.

[12]. Bhat, V. G., Ramburuth, M., Singh, M., Titi, O., Antony, A. P., Chiya, L., … Msengana, M. (2010). Factors associated with poor adherence to anti-retroviral therapy in patients attending a rural health centre in South Africa. European Journal of Clinical Microbiology & Infectious Diseases, 29(8), 947–953. https://doi.org/10.1007/s10096-010-0949-4.

[13]. Boyer, S., Clerc, I., Bonono, C.-R., Marcellin, F., Bilé, P.-C., & Ventelou, B. (2011). Non-adherence to antiretroviral treatment and unplanned treatment interruption among people living with HIV/AIDS in Cameroon:

Individual and healthcare supply-related factors. Social Science & Medicine, 72(8), 1383–1392. https://doi.org/10.1016/j.socscimed.2011.02.030.
[14]. Brinkhof, M. W. G., Pujades-Rodriguez, M., & Egger, M. (2009). Mortality of Patients Lost to Follow-Up in Antiretroviral Treatment Programmes in Resource-Limited Settings: Systematic Review and Meta-Analysis. PLoS ONE, 4(6), e5790. https://doi.org/10.1371/journal.pone.0005790.
[15]. Calvert, C., & Ronsmans, C. (2013). The contribution of HIV to pregnancy-related mortality: A systematic review and meta-analysis. AIDS, 27(10), 1631–1639.
https://doi.org/10.1097/QAD.0b013e32835fd940
[16]. Chi, B. H., Cantrell, R. A., Zulu, I., Mulenga, L. B., Levy, J. W., Tambatamba, B. C., … Stringer, J. S. (2009). Adherence to first-line antiretroviral therapy affects non-virologic outcomes among patients on treatment for more than 12 months in Lusaka, Zambia. International Journal of Epidemiology, 38(3), 746–756. https://doi.org/10.1093/ije/dyp004.
[17]. Cohen, M. S., Chen, Y. Q., McCauley, M., Gamble, T., Hosseinipour, M. C., Kumarasamy, N., … Fleming, T. R. (2011). Prevention of HIV-1 Infection with Early Antiretroviral Therapy. New England Journal of Medicine, 365(6), 493–505. https://doi.org/10.1056/NEJMoa1105243
[18]. Dzangare, J., Takarinda, K. C., Harries, A. D., Tayler-Smith, K., Mhangara, M., Apollo, T. M., … Mugurungi, O. (2016). HIV testing uptake and retention in care of HIV-infected pregnant and breastfeeding women initiated on 'Option B+' in rural Zimbabwe. Tropical Medicine & International Health, 21(2), 202–209. https://doi.org/10.1111/tmi.12637
[19]. Eholi??, S.-P., Tanon, A., Polneau, S., Ouiminga, M., Djadji, A., Kangah-kofﬁ C., … Bissagnen?, E. (2007). Field Adherence to Highly Active Antiretroviral Therapy in HIV-infected Adults in Abidjan, C??te d???Ivoire: JAIDS Journal of Acquired Immune Deficiency Syndromes, PAP. https://doi.org/10.1097/QAI.0b013e31805d8ad0
[20]. Elul, B., Basinga, P., Nuwagaba-Biribonwoha, H., Saito, S., Horowitz, D., Nash, D., … Asiimwe, A. (2013). High Levels of Adherence and Viral Suppression in a Nationally Representative Sample of HIV-Infected Adults on Antiretroviral Therapy for 6, 12 and 18 Months in Rwanda. PLoS ONE, 8(1), e53586. https://doi.org/10.1371/journal.pone.0053586
[21]. Erah, P. O., & Arute, J. E. (2008). Adherence of HIV/AIDS patients to antiretroviral therapy in a tertiary health facility in Benin City. Original Research, 2 (7), 145–152.
[22]. Etienne, M., Hossain, M., Redfield, R., Stafford, K., & Amoroso, A. (2010). Indicators of Adherence to Antiretroviral Therapy Treatment Among HIV/AIDS Patients in 5 African Countries. Journal of the International Association of Physicians in AIDS Care, 9(2), 98–103. https://doi.org/10.1177/1545109710361383
[23]. Fox, M. P., Brennan, A., Maskew, M., MacPhail, P., & Sanne, I. (2010). Using vital registration data to update mortality among patients lost to follow-up from ART programmes: Evidence from the Themba Lethu Clinic, South Africa. Tropical Medicine & International Health. https://doi.org/10.1111/j.1365-3156.2010.02473.x
[24]. Fox, M. P., & Rosen, S. (2010). Patient retention in antiretroviral therapy programs up to three years on treatment in sub-Saharan Africa, 2007-2009: Systematic review: Patient retention in antiretroviral therapy programs. Tropical Medicine & International Health, 15, 1–15. https://doi.org/10.1111/j.1365-3156.2010.02508.x
[25]. Geng, E. H., Glidden, D. V., Bangsberg, D. R., Bwana, M. B., Musinguzi, N., Nash, D., … Petersen, M. L. (2012). A Causal Framework for Understanding the Effect of Losses to Follow-up on Epidemiologic Analyses in Clinic-based Cohorts: The Case of HIV-infected Patients on Antiretroviral Therapy in Africa. American Journal of Epidemiology, 175(10), 1080–1087. https://doi.org/10.1093/aje/kwr444
[26]. Geng, Elvin H., Glidden, D. V., Bwana, M. B., Musinguzi, N., Emenyonu, N., Muyindike, W., … Martin, J. N. (2011). Retention in Care and Connection to Care among HIV-Infected Patients on Antiretroviral Therapy in Africa: Estimation via a Sampling-Based Approach. PLoS ONE, 6(7), e21797. https://doi.org/10.1371/journal.pone.0021797
[27]. Goudge, J., & Ngoma, B. (2011). Exploring antiretroviral treatment adherence in an urban setting in South Africa. Journal of Public Health Policy, 32(S1), S52–S64. https://doi.org/10.1057/jphp.2011.22
[28]. Hardon, A. P., Akurut, D., Comoro, C., Ekezie, C., Irunde, H. F., Gerrits, T., … Laing, R. (2007). Hunger, waiting time and transport costs: Time to confront challenges to ART adherence in Africa. AIDS Care, 19(5), 658–665. https://doi.org/10.1080/09540120701244943

DOI: 10.21522/TIJPH.2013.07.04.Art032
ISSN: 2520-3134

[29]. Hegazi, A., R.L. Bailey, Ahadzie, B., Alabi, A., & Peterson, K. (2010). Literacy, education and adherence to antiretroviral therapy in The Gambia. AIDS Care, 22(11), 1340–1345. https://doi.org/10.1080/09540121003693514

[30]. Hodgson, I., Plummer, M. L., Konopka, S. N., Colvin, C. J., Jonas, E., Albertini, J., … Fogg, K. P. (2014). A Systematic Review of Individual and Contextual Factors Affecting ART Initiation, Adherence, and Retention for HIV-Infected Pregnant and Postpartum Women. PLoS ONE, 9(11), e111421. https://doi.org/10.1371/journal.pone.0111421

[31]. Hoffman, R. M., Black, V., Technau, K., van der Merwe, K. J., Currier, J., Coovadia, A., & Chersich, M. (2010). Effects of Highly Active Antiretroviral Therapy Duration and Regimen on Risk for Mother-to-Child Transmission of HIV in Johannesburg, South Africa: JAIDS Journal of Acquired Immune Deficiency Syndromes, 54(1), 35–41. https://doi.org/10.1097/QAI.0b013e3181cf9979

[32]. Hogan, M. C., Foreman, K. J., Naghavi, M., Ahn, S. Y., Wang, M., Makela, S. M., … Murray, C. J. (2010). Maternal mortality for 181 countries, 1980–2008: A systematic analysis of progress towards Millennium Development Goal 5. The Lancet, 375(9726), 1609–1623. https://doi.org/10.1016/S0140-6736(10)60518-1

[33]. Kagee, A., Nothling, J., & Coetzee, B. (2012). The perspectives of users of antiretroviral therapy on structural barriers to adherence in South Africa. South African Family Practice, 54(6), 540–544. https://doi.org/10.1080/20786204.2012.10874289

[34]. Kekwaletswe, C., & Morojele, N. (2014). Alcohol use, antiretroviral therapy adherence, and preferences regarding an alcohol-focused adherence intervention in patients with human immunodeficiency virus. Patient Preference and Adherence, 401. https://doi.org/10.2147/PPA.S55547

[35]. Kip, E., Ehlers, V. J., & van der Wal, D. M. (2009). Patients' Adherence to Anti-Retroviral Therapy in Botswana. Journal of Nursing Scholarship, 41(2), 149–157. https://doi.org/10.1111/j.1547-5069.2009.01266.x

[36]. Kisenyi, R. N., Muliira, J. K., & Ayebare, E. (2013). Religiosity and Adherence to Antiretroviral Therapy Among Patients Attending a Public Hospital-Based HIV/AIDS Clinic in Uganda. Journal of Religion and Health, 52(1), 307–317. https://doi.org/10.1007/s10943-011-9473-9

[37]. Kunutsor, S., Evans, M., Thoulass, J., Walley, J., Katabira, E., Newell, J. N., … Ikoona, E. (2010). Ascertaining Baseline Levels of Antiretroviral Therapy Adherence in Uganda: A Multimethod Approach: JAIDS Journal of Acquired Immune Deficiency Syndromes, 55(2), 221–224. https://doi.org/10.1097/QAI.0b013e3181e255ec

[38]. Liotta, G., Mancinelli, S., Nielsen-Saines, K., Gennaro, E., Scarcella, P., Magid, N. A., … Marazzi, M. C. (2013). Reduction of Maternal Mortality with Highly Active Antiretroviral Therapy in a Large Cohort of HIV-Infected Pregnant Women in Malawi and Mozambique. PLoS ONE, 8(8), e71653. https://doi.org/10.1371/journal.pone.0071653

[39]. Lozano, R., Wang, H., Foreman, K. J., Rajaratnam, J. K., Naghavi, M., Marcus, J. R., … Murray, C. J. (2011). Progress towards Millennium Development Goals 4 and 5 on maternal and child mortality: An updated systematic analysis. The Lancet, 378(9797), 1139–1165. https://doi.org/10.1016/S0140-6736(11)61337-8

[40]. Lubinga, S. J., Kintu, A., Atuhaire, J., & Asiimwe, S. (2012). Concomitant herbal medicine and Antiretroviral Therapy (ART) use among HIV patients in Western Uganda: A cross-sectional analysis of magnitude and patterns of use, associated factors and impact on ART adherence. AIDS Care, 24(11), 1375–1383. https://doi.org/10.1080/09540121.2011.648600

[41]. Lyimo, R. A., Stutterheim, S. E., Hospers, H. J., de Glee, T., van der Ven, A., & de Bruin, M. (2014). Stigma, Disclosure, Coping, and Medication Adherence Among People Living with HIV/AIDS in Northern Tanzania. AIDS Patient Care and STDs, 28(2), 98–105. https://doi.org/10.1089/apc.2013.0306

[42]. Malama, C., Kvalsund, M. P., Kaile, T., Malama, K., Birbeck, G. L., Sinyama, A. M., … Byers, P. A. (2011). Neuropsychiatric and Socioeconomic Status Impact Antiretroviral Adherence and Mortality in Rural Zambia. The American Journal of Tropical Medicine and Hygiene, 85(4), 782–789. https://doi.org/10.4269/ajtmh.2011.11-0187

[43]. Maqutu, D., & Zewotir, T. (2011). Optimal HAART adherence over time and time interval between successive visits: Their association and determinants. AIDS Care, 23(11), 1417–1424. https://doi.org/10.1080/09540121.2011.565028

[44]. Maqutu, D., Zewotir, T., North, D., Naidoo, K., & Grobler, A. (2010). Factors affecting first-month adherence to antiretroviral therapy among HIV-positive adults in South Africa. African Journal of AIDS Research, 9(2), 117–124. https://doi.org/10.2989/16085906.2010.517478

[45]. Marcellin, F., Boyer, S., Protopopescu, C., Dia, A., Ongolo-Zogo, P., Koulla-Shiro, S., … the EVAL Study Group*. (2008). Determinants of unplanned antiretroviral treatment interruptions among people living with HIV in Yaoundé, Cameroon (EVAL survey, ANRS 12-116). Tropical Medicine & International Health, 13(12), 1470–1478. https://doi.org/10.1111/j.1365-3156.2008.02170.x

[46]. Mbonye, M., Seeley, J., Ssembajja, F., Birungi, J., & Jaffar, S. (2013). Adherence to Antiretroviral Therapy in Jinja, Uganda: A Six-Year Follow-Up Study. PLoS ONE, 8(10), e78243. https://doi.org/10.1371/journal.pone.0078243

[47]. Memiah, P., Shumba, C., Etienne-Mesubi, M., Agbor, S., Hossain, M. B., Komba, P., … Biadgilign, S. (2014). The Effect of Depressive Symptoms and CD4 Count on Adherence to Highly Active Antiretroviral Therapy in Sub-Saharan Africa. Journal of the International Association of Providers of AIDS Care (JIAPAC), 13(4), 346–352. https://doi.org/10.1177/2325957413503368

[48]. Muya, A. N., Geldsetzer, P., Hertzmark, E., Ezeamama, A. E., Kawawa, H., Hawkins, C., … Spiegelman, D. (2015). Predictors of Nonadherence to Antiretroviral Therapy among HIV-Infected Adults in Dar es Salaam, Tanzania. Journal of the International Association of Providers of AIDS Care (JIAPAC), 14(2), 163–171. https://doi.org/10.1177/2325957414539193

[49]. Nachega, J. B., Mills, E. J., & Schechter, M. (2010). Antiretroviral therapy adherence and retention in care in middle-income and low-income countries: Current status of knowledge and research priorities: Current Opinion in HIV and AIDS, 5(1), 70–77. https://doi.org/10.1097/COH.0b013e328333ad61

[50]. Naidoo, P., Peltzer, K., Louw, J., Matseke, G., Mchunu, G., & Tutshana, B. (2013). Predictors of tuberculosis (TB) and antiretroviral (ARV) medication non-adherence in public primary care patients in South Africa: A cross sectional study. BMC Public Health, 13(1). https://doi.org/10.1186/1471-2458-13-396

[51]. Nam, S. L., Fielding, K., Avalos, A., Dickinson, D., Gaolathe, T., & Wenzel Geissler, P. (2008). Corrigendum to: "The relationship of acceptance or denial of HIV-status to antiretroviral adherence among adult HIV patients in urban Botswana" [Soc. Sci. Med. 67 (2008) 301–310]. Social Science & Medicine, 67(11), 1934. https://doi.org/10.1016/j.socscimed.2008.09.023

[52]. Navario, P. (2009). PEPFAR's biggest success is also its largest liability. The Lancet, 374(9685), 184–185. https://doi.org/10.1016/S0140-6736(09)61312-X

[53]. Negash, T., & Ehlers, V. (2013). Personal Factors Influencing Patients' Adherence to ART in Addis Ababa, Ethiopia. Journal of the Association of Nurses in AIDS Care, 24(6), 530–538. https://doi.org/10.1016/j.jana.2012.11.004

[54]. Newman, J., Iriondo-Perez, J., Hemingway-Foday, J., Freeman, A., Akam, W., Balimba, A., … Kiumbu, M. (2012). Older Adults Accessing HIV Care and Treatment and Adherence in the IeDEA Central Africa Cohort. AIDS Research and Treatment, 2012, 1–8. https://doi.org/10.1155/2012/725713

[55]. Palella, F. J., Delaney, K. M., Moorman, A. C., Loveless, M. O., Fuhrer, J., Satten, G. A., … Holmberg, S. D. (1998). Declining Morbidity and Mortality among Patients with Advanced Human Immunodeficiency Virus Infection. New England Journal of Medicine, 338(13), 853–860. https://doi.org/10.1056/NEJM199803263381301

[56]. Paterson, D. L., Swindells, S., Mohr, J., Brester, M., Vergis, E. N., Squier, C., … Singh, N. (2000). Adherence to Protease Inhibitor Therapy and Outcomes in Patients with HIV Infection. Annals of Internal Medicine, 133(1), 21. https://doi.org/10.7326/0003-4819-133-1-200007040-00004

[57]. Peltzer, K., Friend-du Preez, N., Ramlagan, S., & Anderson, J. (2010). Antiretroviral treatment adherence among HIV patients in KwaZulu-Natal, South Africa. BMC Public Health, 10(1). https://doi.org/10.1186/1471-2458-10-111

[58]. Penn, C., Watermeyer, J., & Evans, M. (2011). Why don't patients take their drugs? The role of communication, context and culture in patient adherence and the work of the pharmacist in HIV/AIDS. Patient Education and Counseling, 83(3), 310–318. https://doi.org/10.1016/j.pec.2011.02.018

[59]. Ramadhani, H. O., Thielman, N. M., Landman, K. Z., Ndosi, E. M., Gao, F., Kirchherr, J. L., … Crump, J. A. (2007). Predictors of Incomplete Adherence, Virologic Failure, and Antiviral Drug Resistance among HIV-Infected Adults Receiving Antiretroviral Therapy in Tanzania. Clinical Infectious Diseases, 45(11), 1492–1498. https://doi.org/10.1086/522991

[60]. Ross, A. J., Aung, M., Campbell, L., & Ogunbanjo, G. A. (2011). Factors that positively influence adherence to antiretroviral therapy by HIV and/or AIDS patients and their caregivers. African Journal of Primary Health Care & Family Medicine, 3(1). https://doi.org/10.4102/phcfm.v3i1.196

DOI: 10.21522/TIJPH.2013.07.04.Art032
ISSN: 2520-3134

[61]. Sanjobo, N., Frich, J. C., & Fretheim, A. (2008). Barriers and facilitators to patients' adherence to antiretroviral treatment in Zambia: A qualitative study. SAHARA-J: Journal of Social Aspects of HIV/AIDS, 5(3), 136–143. https://doi.org/10.1080/17290376.2008.9724912
[62]. Say, L., Chou, D., Gemmill, A., Tunçalp, Ö., Moller, A.-B., Daniels, J., … Alkema, L. (2014). Global causes of maternal death: A WHO systematic analysis. The Lancet Global Health, 2(6), e323–e333. https://doi.org/10.1016/S2214-109X(14)70227-X
[63]. Shisana, O., Human Sciences Research Council, United States, & Centers for Disease Control and Prevention (U.S.) (Eds.). (2014). South African national HIV prevalence, incidence and behaviour survey, 2012. Cape Town, South Africa: HSRC Press.
[64]. Skovdal, M., Campbell, C., Nhongo, K., Nyamukapa, C., & Gregson, S. (2011). Contextual and psychosocial influences on antiretroviral therapy adherence in rural Zimbabwe: Towards a systematic framework for programme planners: INFLUENCES ON ART ADHERENCE IN RURAL ZIMBABWE. The International Journal of Health Planning and Management, 26(3), 296–318. https://doi.org/10.1002/hpm.1082
[65]. Tiyou, A., Belachew, T., Alemseged, F., & Biadgilign, S. (2010). Predictors of adherence to antiretroviral therapy among people living with HIV/AIDS in resource-limited setting of southwest ethiopia. AIDS Research and Therapy, 7(1), 39. https://doi.org/10.1186/1742-6405-7-39
[66]. Tumwine, C., Neema, S., & Wagner, G. (2012). Reasons Why High Religiosity Can Co-exist with and Precipitate Discontinuation of Anti-retroviral Therapy among Different HIV Clients in Uganda: An Exploratory Study. Religions, 3(3), 817–832. https://doi.org/10.3390/rel3030817
[67]. Tweya, H., Gugsa, S., Hosseinipour, M., Speight, C., Ng'ambi, W., Bokosi, M., … Phiri, S. (2014). Understanding factors, outcomes and reasons for loss to follow-up among women in Option B+ PMTCT programme in Lilongwe, Malawi. Tropical Medicine & International Health, 19(11), 1360–1366. https://doi.org/10.1111/tmi.12369
[68]. UNAIDS. (2017). Regional Antiretroviral Therapy. Retrieved from http://www.unaids.org/sites/default/files/media_asset/UNAIDS_FactSheet_en.pdf
[69]. Unge, C., Södergård, B., Marrone, G., Thorson, A., Lukhwaro, A., Carter, J., … Ekström, A. M. (2010). Long-Term Adherence to Antiretroviral Treatment and Program Drop-Out in a High-Risk Urban Setting in Sub-Saharan Africa: A Prospective Cohort Study. PLoS ONE, 5(10), e13613. https://doi.org/10.1371/journal.pone.0013613
[70]. Uzochukwu, B. S. C., Onwujekwe, O. E., Onoka, A. C., Okoli, C., Uguru, N. P., & Chukwuogo, O. I. (2009). Determinants of non-adherence to subsidized anti-retroviral treatment in southeast Nigeria. Health Policy and Planning, 24(3), 189–196. https://doi.org/10.1093/heapol/czp006
[71]. Vreeman, R. C., Wiehe, S. E., Pearce, E. C., & Nyandiko, W. M. (2008). A Systematic Review of Pediatric Adherence to Antiretroviral Therapy in Low- and Middle-Income Countries: The Pediatric Infectious Disease Journal, 27(8), 686–691. https://doi.org/10.1097/INF.0b013e31816dd325
[72]. Wanyama, J., Castelnuovo, B., Wandera, B., Mwebaze, P., Kambugu, A., Bangsberg, D. R., & Kamya, M. R. (2007). Belief in divine healing can be a barrier to antiretroviral therapy adherence in Uganda: AIDS, 21(11), 1486–1487. https://doi.org/10.1097/QAD.0b013e32823ecf7f
[73]. Watt, M. H., Maman, S., Jacobson, M., Laiser, J., & John, M. (2009). Missed Opportunities for Religious Organizations to Support People Living with HIV/AIDS: Findings from Tanzania. AIDS Patient Care and STDs, 23(5), 389–394. https://doi.org/10.1089/apc.2008.0195
[74]. Weiser, S., Wolfe, W., Bangsberg, D., Thior, I., Gilbert, P., Makhema, J., … Marlink, R. (2003). Barriers to Antiretroviral Adherence for Patients Living with HIV Infection and AIDS in Botswana: JAIDS Journal of Acquired Immune Deficiency Syndromes, 34(3), 281–288. https://doi.org/10.1097/00126334-200311010-00004
[75]. Whetten, K., Shirey, K., Pence, B. W., Yao, J., Thielman, N., Whetten, R., … for the CHAT Research Team. (2013). Trauma History and Depression Predict Incomplete Adherence to Antiretroviral Therapies in a Low Income Country. PLoS ONE, 8(10), e74771. https://doi.org/10.1371/journal.pone.0074771
[76]. World Health Organization, UNICEF, United Nations Population Fund, & World Bank. (2010). Trends in maternal mortality: 1990 to 2008: estimates. Geneva: World Helath Organization.
[77]. Zaba, B., Calvert, C., Marston, M., Isingo, R., Nakiyingi-Miiro, J., Lutalo, T., … Ronsmans, C. (2013). Effect of HIV infection on pregnancy-related mortality in sub-Saharan Africa: Secondary analyses of pooled community-based data from the network for Analysing Longitudinal Population-based HIV/AIDS data on Africa (ALPHA). The Lancet, 381(9879), 1763–1771. https://doi.org/10.1016/S0140-6736(13)60803-X

Table 2. Demographic characteristics of the pregnant and breastfeeding women receiving care at St. Albert's Mission Hospital, Zimbabwe

Participant type		**Pregnant N (%)**	**Breastfeeding N (%)**	**Total**
		48 (40.0)	72 (60.0)	
Mean age (standard deviation)		29.5 (6.9)	30.1 (6.7)	
Marital status	Single	3 (6.3)	5 (6.9)	8
	Married	43 (89.6)	59 (81.9)	102
	Widowed	0 (0.0)	1 (1.4)	1
	Divorced	2 (4.2)	5 (6.9)	7
	Cohabiting	0 (0.0)	2 (2.8)	2
Mean number of children		2.4 (1.7)	3.1 (1.6)	
Attended school	Yes	42 (87.5)	67 (93.1)	109
	No	6 (12.5)	5 (6.9)	11
Highest level of education attained	None	6 (12.5)	5 (6.9)	11
	Primary	18 (37.5)	36 (50.0)	54
	O level	20 (41.7)	30 (41.7)	50
	A Level	3 (6.3)	1 (1.4)	4
	Tertiary	1 (2.1)	0 (0.0)	1
Employment status	Employed	3 (6.3)	1 (1.4)	4
	Unemployed	45 (93.8)	71 (98.6)	116
Occupation	Housewife	38 (79.2)	55 (76.4)	93
	Vendor	3 (6.3)	3 (4.2)	6
	Farmer	4 (8.3)	11 (15.3)	15
	Teacher /Nurse	1 (2.1)	0 (0.0)	1
	Other	2 (4.2)	3 (4.2)	5
Religion	None	2 (4.2)	2 (2.8)	4
	Apostolic	30 (62.5)	45 (62.5)	75
	Pentecostal	10 (20.8)	17 (23.6)	27
	Traditional	3 (6.3)	2 (2.8)	5
	Orthodox	3 (6.3)	5 (6.9)	8
	Islam	0 (0.0)	1 (1.4)	1
Median monthly income $ (IQR)		55 (30-200)	40 (20-100)	50 (20-100)
Median distance to health facility (km) (IQR)		5.0 (3.0-8.0)	5.0 (2.0-7.5)	5.0 (2.5-8.0)
Median cost of transport to health facility $ (IQR)		3.0 (0.5-5.0)	0.0 (0.0-4.0)	2.0 (0.0-4.0)
Geographical barriers to access health facility	Yes	5 (10.4)	4 (5.6)	9
	No	43 (89.6)	68 (94.4)	111
Disclosed HIV status	Yes	47 (97.9)	71 (98.6)	118
	No	1 (2.1)	1 (1.4)	2

Table 3. Factors associated with adherence and retention in care among pregnant and breastfeeding women receiving care at St. alberts mission hospital

Variable		**Adherent to medication**		**Odds Ratio (95% CI)**	**Retained in care**		**Odds Ratio (95% CI)**
		Yes	**No**		**Yes**	**No**	
Participant type	Breastfeeding	67	5	1.56 (0.43-5.70)	65	7	0.58 (0.11-3.13)
	Pregnant	43	5		46	2	
School attendance	Yes	101	8	2.81 (0.52-15.25)	104	5	4.62 (0.78-27.29)
	No	9	2		9	2	

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Education Level	Low	62	3	3.01 (0.74-12.27)	62	3	1.62 (0.35-7.58)
	High	48	7		51	4	
Marital status	Married	95	9	0.70 (0.08-5.96)	97	7	Undefined
	Single	15	1		16	0	
Employment status	Unemployed	108	8	**13.5 (1.67-108.87)**	110	6	6.11 (0.55-67.89)
	Employed	2	2		3	1	
Occupation	Housewife	87	6	2.52 (0.66-9.69)	88	5	1.41 (0.26-7.70)
	Other	23	4		25	2	
Had CD4 count done	Yes	52	2	3.59 (0.72-17.66)	53	1	5.30 (0.62-45.46)
	No	58	8		60	6	
Had Viral Load done	Yes	32	3	0.96 (0.23-3.94)	33	2	1.03 (0.19-5.58)
	No	78	7		80	5	
Walk to health facility	Yes	103	10	Undefined	106	7	Undefined
	No	7	0		7	0	
Had challenges to get to health facility	Yes	25	3	0.69 (0.17-2.85)	25	3	0.38 (0.08-1.80)
	No	85	7		88	4	
Had geographical access barriers	Yes	6	3	**0.13 (0.03-0.66)**	7	2	**0.17 (0.03-1.01)**
	No	104	7		106	5	
Had to skip meals because of inadequate food	Yes	7	2	0.27 (0.05-1.53)	7	2	**0.17 (0.03-1.01)**
	No	103	8		106	5	
Apostolic religion	Yes	69	6	1.12 (0.30-4.21)	71	4	1.27 (0.27-5.94)
	No	41	4		42	3	

Table 3. Factors associated with adherence and retention in care among pregnant and breastfeeding women receiving care at St. Alberts Mission Hospital (continued)

Variable		**Adherent to medication**		**Odds Ratio (95% CI)**	**Retained in care**		**Odds Ratio (95% CI)**
		Yes	**No**		**Yes**	**No**	
Had to skip mediation because of travel	Yes	8	5	**0.08 (0.02-0.33)**	10	3	**0.13 (0.03-0.66)**
	No	102	5		103	4	
Ever forgot to take medication	Yes	8	7	**0.03 (0.01-0.16)**	10	5	**0.04 (0.01-0.23)**
	No	102	3		103	2	
Experienced side effects	Yes	2	4	**0.03 (0.004-0.18)**	3	3	**0.04 (0.01-0.24)**
	No	108	6		110	4	
Has disclosed HIV status to someone	Yes	109	9	12.11 (0.70-210.21)	111	7	Undefined
	No	1	1		2	0	
Disclosed to brother or sister	Yes	83	5	4.15 (0.69-24.93)	85	3	**7.08 (1.03-48.82)**
	No	8	2		8	2	
Disclosure to get adherence support	Yes	100	5	**10.00 (1.47-68.24)**	102	3	**17.00 (2.19-131.95)**
	No	4	2		4	2	
Disclosure so that there is no need to hide when taking drugs	Yes	88	5	**8.80 (1.29-60.13)**	90	3	**15.00 (1.93-116.57)**
	No	4	2		4	2	
Disclosure so that they can get social support	Yes	80	2	**20.00 (2.21-180.91)**	81	1	**40.50 (3.00-546.35)**
	No	4	2		4	2	
Came to this health facility because health workers polite and treat with client's respect	Yes	74	6	1.37 (0.15-12.71)	76	4	2.11 (0.21-21.01)
	No	9	1		9	1	
Came to this health facility because they have no choice	Yes	47	5	0.94 (0.21-4.22)	48	4	0.77 (0.13-4.48)
	No	30	3		31	2	

Came to this health facility because health workers maintain confidentiality	Yes	85	5	**6.80 (1.05-44.19)**	87	3	**11.60 (1.56-86.01)**
	No	5	2		5	2	
Came to this health facility because health workers have good relationship with clients	Yes	79	6	1.65 (0.18-15.44)	81	4	2.53 (0.25-25.46)
	No	8	1		8	1	
Came to this health facility because the facility always has drugs	Yes	99	7	7.07 (0.57-87.88)	101	5	10.40 (0.78-131.04)
	No	2	1		2	1	

Table 3. Factors associated with adherence and retention in care among pregnant and breastfeeding women receiving care at St. Alberts Mission Hospital (continued)

Variable		**Adherent to medication**		**Odds Ratio (95% CI)**	**Retained in care**		**Odds Ratio (95% CI)**
		Yes	**No**		**Yes**	**No**	
Ever had an unpleasant experience while seeking care	Yes	9	3	**0.21 (0.05-0.95)**	11	1	0.65 (0.07-5.88)
	No	101	7		102	6	
Have feeling of being healthy	Yes	106	9	2.94 (0.30-29.21)	109	6	4.54 (0.44-47.17)
	No	4	1		4	1	
Received counselling on HIV	Yes	109	9	12.11 (0.70-210.21)	112	6	**18.67 (1.04-336.20)**
	No	1	1		1	1	
Used aids to remember time to take medication	Yes	100	7	4.29 (0.96-19.22)	102	5	3.71 (0.64-21.43)
	No	10	3		11	2	
Has a treatment buddy	Yes	68	2	**6.48 (1.31-31.97)**	69	1	**9.41 (1.09-80.82)**
	No	42	8		44	6	
Receiving support from government or non-governmental organization	Yes	4	1	0.34 (0.03-3.37	4	1	0.22 (0.02-2.29)
	No	106	9		109	6	

Table 4. Independent factors associated with adherence and retention in care among pregnant and breastfeeding women receiving care at St. Alberts Mission Hospital

Variable		**Adherent to medication**		**Odds Ratio (95% CI)**	**Adjusted Odds Ratio (95% CI)**
		Yes	**No**		
Had to skip mediation because of travel	Yes	8	5	**0.08 (0.02-0.33)**	**0.06 (0.005-0.79)**
	No	102	5		
Ever had an unpleasant experience while seeking care	Yes	9	3	**0.21 (0.05-0.95)**	**0.05 (0.002-0.93)**
	No	101	7		
		Retained in care			
Disclosed to brother or sister	Yes	85	3	**7.08 (1.03-48.82)**	**22.07 (1.64-297.66)**
	No	8	2		
Came to this health facility because health workers maintain confidentiality	Yes	87	3	**11.60 (1.56-86.01)**	**22.07 (1.64-297.66)**
	No	5	2		