

# Predictors of Non-Adherence to Combined Anti-Retroviral Therapy among Expectant and Breastfeeding Women Receiving Care through Test and Treat Model in Lusaka

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## Abstract

**Introduction:** To achieve viral suppression and reduce vertical transmission of HIV, more than eighty percent of pregnant or breastfeeding women in Zambia have been started on combined ART using the Test and Treat model. However, Chawama First Level Hospital in Lusaka had records which showed that 32 percent of pregnant or breastfeeding women were non-adherent to combined anti-retroviral therapy (cART). **Method:** A mixed-method study was conducted to establish predictors of non-adherence to cART by women in the Test and Treat model of care. For the quantitative component, 92 consenting Pregnant and breastfeeding women were randomly drawn from ART defaulter register and a semi-structured questionnaire was administered. Multiple logistic regression was conducted to improve predictive power and control for confounders. **Quantitative Results:** The mean age was 28years. The study established that housewives were 84 percent less likely to be non-adherent [AOR 0.16; 95% CI 0.12, 0.36] compared to women who were formally employed with a statistically significant P-value of 0.04. Pregnant or breastfeeding women who were several months away from home were 84.9 percent more likely to be non-adherent [AOR 15.11; 95% CI 13.9, 16.4] compared to women who had travelled away from home for several days. The associated P-value was 0.03. The study also established that pregnant and breastfeeding women who were counselled in individually enclosed units were 91 percent less likely to be non-adherent compared to those who were counselled in an open space as a group [AOR 0.09; 95% CI 0.02, 0.53] with an associated P-value of 0.01. **Conclusion:** The study established that predictors of non-adherence to cART among pregnant and breastfeeding women were: being a working-class client; being away from home or usual clinic for several months;

being counselled in open spaces, and negative staff attitude. Therefore, researcher can conclusively say that predictors of non-adherence to cART can be solved by training and re-training of health workers in Patient-Centred Care Model for effective patient engagement. Women should be counselled in private rooms. Furthermore, an improvement in patient's tracking system by the use of smart-care-cards for pregnant and breastfeeding women countrywide can reduce patient's non-adherence to cART.

## Keywords

Non-Adherence, HIV, Vertical Transmission, Elimination, Mother, Child, Test and Treat

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## 1. Introduction

Non-adherence to combined Anti-Retroviral Therapy (cART) by any pregnant and breastfeeding woman requires accelerated action from institutional caregivers, communities, and individual clients. To achieve viral suppression and reduce vertical transmission of HIV, effective adherence counselling for lifelong cART should be a prerequisite [1]. Evidence showed that pregnant or breastfeeding women, who consistently used cART did not only have their risk of vertical transmission of HIV reduced but also had improved quality of life [2]. Anti-retroviral drug adherence was a major requirement for successful elimination of HIV vertical transmission world over [3].

ART adherence is a strategy that could work to ensure accelerated reduction in vertical transmission of HIV among pregnant and breastfeeding women [4]. The World Health Organisation proposed a supper track intervention called Universal Test and Treat model which most countries adopted in managing HIV clients. To this effect, various literature proved that Universal Test and Treat Model was a strategy in HIV management that linked several HIV clients to care and treatment on the same day of diagnosis; among these clients were pregnant and breastfeeding women [5], the strategy was formulated to assist HIV client's gain access to lifelong ARVs in time. For pregnant and breastfeeding women, ARVs were also given to achieve HIV viral suppression by 95 percent and above which in turn reduced the risk of vertical transmission to their infants by up to less than two percent [2].

In most countries, HIV Test and Treat services were carried out in communities through outreach activities on selected days and on a daily basis in all Health facilities. These services included HIV testing, counselling and cART initiation. Women coming for antenatal, postnatal or family planning clinics could also choose to be access these services [3]. As the Model required ART initiation of lifelong treatment on the same day of diagnosis, some women needed to receive effective pre-ART initiation counselling in order for them to be prepared for lifelong cART retention [6].

In line with the Global HIV Strategy, in 2017 through the Ministry of Health, Zambia implemented the Test and Treat model as a strategy to reduce the number of new HIV infections from Mother to Child which was to be achieved by the year 2030 [4]. Following the launch of the Test and Treat model, the Zambian Government had been sustaining the strategy by training Health workers to manage HIV-positive pregnant and breastfeeding women. Furthermore, the Government has ensured no drug shortage by strengthening the medicine supply chain through Medical Stores Limited [7]. With this intervention, the Country had recorded 87 percent increment in the number of infected pregnant and postpartum women initiated into care compared with other previous years [8].

While Test and Treat Model is noticeably appreciated, Zambia had on the other hand seen sustainability challenges in some Hospitals where pregnant and nursing women failed to endure lifelong care. As a result, a number of exposed babies became infected with HIV infection.

At Chawama First-Level Hospital, statistics indicated that 344 pregnant and breastfeeding women enrolled into care from January 2017 to December 2018; and only 111 women were retained in MCH/ART by 2018. Pharmacy and clinical records show that 68 percent of women enrolled in care had not picked up drugs at this hospital consistently according to the way it should have been [9]. This data signified that only 32 percent of women adhered to cART which was below the national standard of 90 percent. The number of infants who were born from these women and tested HIV positive was reportedly high despite their mothers ever been initiated on cART. Statistics showed that from January to December 2018, 775 HIV exposed infants were tested using Early Infant Diagnosis (EID) testing protocols, 43 of them were positive with HIV Deoxyribo-Nucleic Acid (DNA) [8]. The figure represented a six percent infant positivity rate which was higher compared with the acceptable level of two percent or less as a national standard [10]. This positivity rate could have been because of ineffective cART administration by their mothers during pregnancy or while breastfeeding.

### **1.1. Study Aim**

The aim of the study was to establish what causes non-adherence to cART by pregnant and breastfeeding women who started care through the Test and Treat model at Chawama Hospital in Lusaka province of Zambia.

### **1.2. Conceptual Framework**

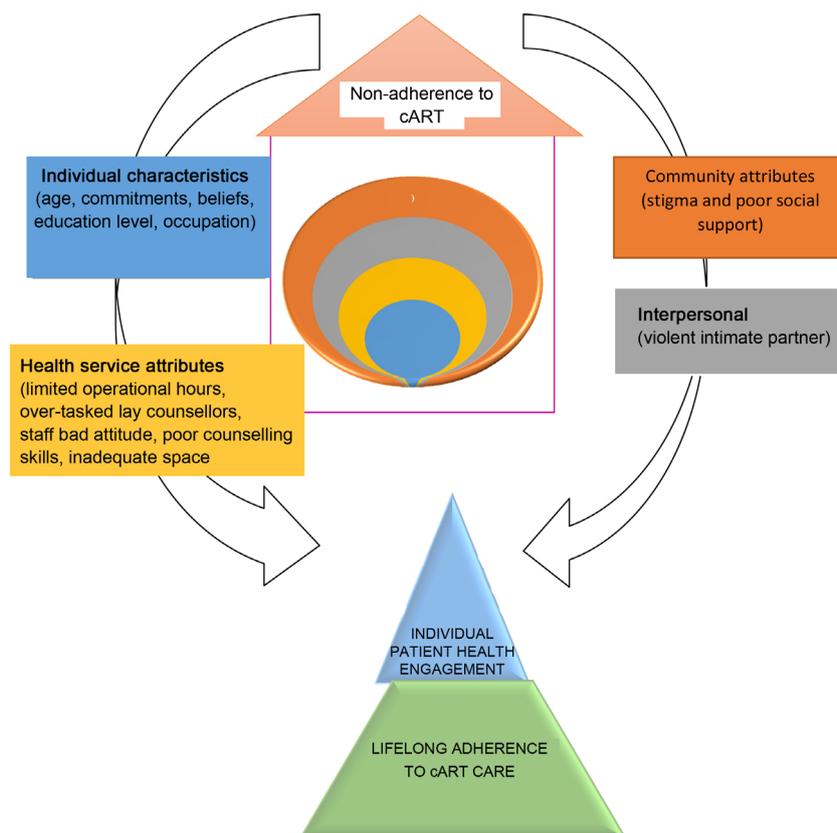
The conceptual framework used in the study was adapted from Social-Ecological Model (SEM) [11] and the Patient Health Engagement Model [12]. This study proposed this integration for a deeper understanding of link between individual characteristics and the Test and Treat counselling services patients received in MNCH facilities.

Originally, the Social-Ecological Model (SEM) had four factors that were formulated in layers which were: Individual, Relationship, Community and Societal

Factors. For this study, the researcher had modified these factors to suit the discussion and replaced societal factors with selected Health service attributes. This was because the study sought to understand the complex interplay between an individual, health service-related attributes and other factors. While the original SEM model suggested acting across multiple levels of the model at the same time, this study proposed acting on health services that may influence individual factors and improve pregnant and breastfeeding women's adherence to treatment.

As illustrated in **Figure 1** below, the adapted conceptual framework had an arrow running from the Social-Ecological factor model integrating with the Patient Health Engagement Model. The blend of these two models had been suggested because as recommended earlier, in order to resolve most individual factors identified in the Social-Ecological models, Midwives in Maternal Neonatal and Child Health/Anti-Retroviral Treatment MNCH/ART units needed to effectively engage individual clients in their health care if effective life long cART adherence by expectant and breastfeeding women was to be realised.

Patient Health Engagement (PHE) Model is a psychosocial concept that creates an understanding of clients' meaningful engagement in taking care of their own-health. Originally, the model had four pillars which included: Disengagement stage, Arousal stage, Adhesion and Eudaimonic stages [12]. As illustrated in



**Figure 1.** (SekMaiMay, 2021)'s Conceptual framework on women's non-adherence to cART adapted from SEM [11] and patient health engagement model [12].

**Figure 1**, SekMaiMay (2021)'s Conceptual framework had these four pillars merged into one and which was later called the Pillar of Patients Health Engagement (PPHE). There were variables such as the patient's beliefs about cART that an HIV diagnosed woman may have [6]. Using the Test and Treat model pregnant or breastfeeding, woman may feel overwhelmed and shocked upon being diagnosed with HIV and to be initiated on cART on the same day of diagnosis which may even worsen the client's shock. The conceptual framework suggested the need for a professional psychotherapist or a Midwife who could offer adherence counselling effectively by using all the four pillars of health engagement. For example, effective engagement of clients was important for them to disengage from previous beliefs of non-adherence to lifelong cART which were earlier identified by use of the social-ecological individual factor model [11].

Other than individual factors, the study used SekMaiMay (2021)'s Conceptual framework to identify other factors of non-adherence that include health facility-related activities such as the counselling services that were offered to individual clients in MNCH units. Furthermore, interpersonal factors in relation to the client's intimate partner's attitude were other factors that were identified. In the communities where these women came from, factors such as stigma were also known to have an effect on non-adherence to cART by pregnant and breastfeeding women.

## 2. Methods and Study Design

This was a mixed study with both quantitative and qualitative components used. This publication focused on the quantitative aspect of non-adherence to cART among pregnant and breastfeeding women who were initiated through Test and Treat model at Chawama first Level Hospital in Lusaka, Zambia.

### 2.1. Study Population and Sampling

The sampling frame for the 92 participants who were involved in the quantitative aspect of the study using ART defaulter register. By using a computational systematic randomization sampling technique, selection biases were minimized. Selection criteria was set for participants who had earlier been initiated in cART but during the course of care stayed without drugs as they missed their scheduled appointment for drug pick up without notifying the hospital. Following the random selection, arrangements with the facility were made through phone notification for these defaulting clients to physically come to the facility for drug collection as well as to participate in the study.

### 2.2. Data Analysis

Quantitative data analysis, STATA Software Version 14.0 SE (STATA Corporation College Station, TX, USA) was used. The outcome variable was categorized into two possible levels of non-adherence namely poor and very poor level. Sta-

tistical tests included: Chi-square was used to determine the association of non-adherence on a continuum and client-related characteristics. Fisher's exact test was used where observations were less than five. Univariate logistic regression was used to get unadjusted estimates. Multiple logistic regression was used to assess the relative contribution of each of the predictor variables. The variables with a large P-value greater than 0.05 were removed until only significant variables were left in the model.

### 2.3. Validity

Internal validity was maintained by ensuring that all aspects of variables relating to the study participants were included in the data collection instruments which were the Questionnaire. While random selection of participants for the quantitative component of the study also added to internal validity.

On the other hand, external validity in this study was ensured by selecting a sample group that was representative of the target population. Furthermore, the set inclusion and exclusion criteria were followed when selecting participants which assisted in getting the defined population from the sampling frame.

### 2.4. Reliability

To ensure the reliability of the study, a pilot before the main study was conducted.

Furthermore, the researcher ensured consistency by using the same questions to different respondents at different times. Additionally, an extensive literature search was done before designing the tools which were subsequently checked by Research Supervisors and HIV/AIDS Experts.

## 3. Results

### 3.1. Age Group

A total of 92 women were enrolled in the study. As illustrated in **Table 1** above, the oldest woman was aged 43 while the youngest was 18, thus, the age range was thus 25. The mean age was 28 with a standard deviation of 6.3. Generally, most expectant, and breastfeeding women were in the age category of 25 to 31 years at 42 percent (39/92); followed by those in the age category of 18 - 24 at 33 percent (29/92). The other age category of 32 to 38 years had a proportion of 15 percent (14/92). Lastly, the least number of women were in the 39 to 45 years age

**Table 1.** Description of the sample by age group (n = 92).

Age group	Frequency	Proportion
18 - 24 years	29	31.52%
25 - 31 years	39	42.4%
32 - 38 years	14	15.22%
39 - 45 years	10	10.87%
<b>TOTAL</b>	<b>92</b>	<b>100%</b>

category at 11 percent (10/92).

### 3.2. Level of Non-Adherence

The outcome variable was categorized into two possible levels of non-adherence namely poor and very poor level because the study wanted to detect the difference within the non-adherent group. The study established that 38 (41%) of women had poor adherence while 54 (59%) percent had very poor adherence to cART.

**Figure 2** illustrates the level of non-adherence while using the Test and Treat model.

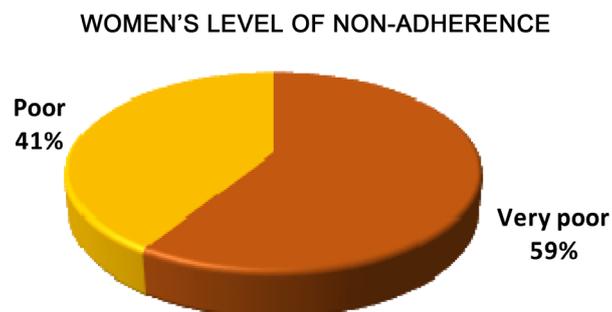
### 3.3. Client Demographic and Social Characteristics According to the Level of Non-Adherence to cART

As illustrated in **Table 2**, the study established that the majority of the respondents, 79.35 percent (73/92) were married while the remaining 20.65 percent (19/92) were single women. Concerning education, 57.6 percent (53/92) of the respondents had never been to school or went up to primary school level only and these were said to have been uneducated, while the remaining 42.4 percent (39/92) were educated respondents.

Regarding religious denominations, 40.2 percent (37/92) were Catholics, 34.8 percent (32/92) were protestants, while other denominations accounted for 16.3 percent (15/92) of the total respondents. Muslims accounted for 8.87 percent (8/92) of the respondents.

### 3.4. Client Related Predictors of Non-Adherence to cART

In the final model below, two client-related variables had significant associations with non-adherence because their P-values were less than 0.05 which was the cut-off point at 95 percent confidence interval. Firstly, client-related predictors of non-adherence to cART included the employment status of being a housewife, whereby, women who were housewives were 84 percent less likely to be non-adherent [AOR 0.16; 95% CI 0.12, 0.36] to cART compared to women who were formally employed. This difference was statistically significant with an associated P-value of 0.04 (**Table 3**).



**Figure 2.** Women's level of non-adherence.

**Table 2.** Client demographic and social characteristics according to level of non-adherence to cART (n = 92).

Characteristics	Level of non-adherence		Total	P-Value (chi-square)
	Poor (41.3%)	Very poor (58.7%)		
<b>Marital status</b>				0.66
Married	31 (33.7%)	42 (45.7%)	73 (79.35%)	
Single	7 (7.61%)	12 (13.0%)	19 (20.65%)	
<b>Total</b>	<b>38 (41.3%)</b>	<b>54 (58.7%)</b>	<b>92 (100%)</b>	
<b>Education</b>				0.37
Secondary or tertiary	14 (15.22%)	25 (27.17%)	39 (42.4%)	
Primary or never	24 (26.01%)	29 (31.52%)	53 (57.6%)	
<b>Total</b>	<b>38 (41.3%)</b>	<b>54 (58.7%)</b>	<b>92 (100%)</b>	
<b>Religion</b>				*0.98
Catholics	15 (16.3%)	22 (23.91%)	37 (40.2%)	
Protestant	13 (14.1%)	19 (20.65%)	32 (34.8%)	
Moslem	3 (3.3%)	5 (5.43%)	8 (8.7%)	
Other	7 (7.61%)	8 (8.7%)	15 (16.3%)	
<b>Total</b>	<b>38 (41.3%)</b>	<b>54 (58.7%)</b>	<b>92 (100%)</b>	

\*Fishers exact.

Secondly, the period that women stayed away from home and usual clinic for several months was a predictor of non-adherence to cART. In this study, it was found that women who were several months away from home and usual clinic were 84.9 percent more likely to be non-adherent to cART [AOR 15.11; 95% CI 13.9, 16. 4] compared to women who had been away from home for several days. The associated P-value was 0.03.

However, this study found that travelling away for several weeks was not a predictor of non-adherence to cART with the associated P-value of 0.22 which was way above the set point of 0.05.

In the regression model, the marital status; travel history; reasons for resuming visits; disclosure of status to partner; community perception and individual client's feeling were not predictors of non-adherence to cART by women receiving care under the Test and Treat model of HIV care at Chawama First Level Hospital in Lusaka.

### 3.5. Health Service Attributes and Non-Adherence to cART

Results of health service attributes that predicted non-adherence to cART among pregnant and breastfeeding women under the study are displayed in **Table 3**. When asked what room was offered to them for counselling women who were attended to from an enclosed unit, individually, were 91 percent less likely to be non-adherent compared to those who were counselled in an open space as a

**Table 3.** Univariate and multiple logistic regression (n = 92).

CHARACTERISTICS	Unadjusted OR (95% CI)	P-value	Adjusted OR (95% CI)	P-value
<b>Marital status</b>				
Married	Ref			
Single	1.27 (0.45, 3.58)	0.66	0.27 (0.04, 1.72)	0.17
<b>Employment status</b>				
Formally employed	Ref			
Self employed	1.04 (0.29, 3.73)	0.95	1.64 (0.29, 9.39)	0.58
Housewife	0.45 (0.13, 1.56)	0.21	0.16 (0.12, 0.36)	<b>0.04</b>
<b>Travel History</b>				
Yes	Ref			
No	0.69 (0.30, 1.59)	0.38	2.56 (0.41, 2.71)	0.45
<b>Period away from home</b>				
Several days	Ref			
Several weeks	1.07 (0.28, 4.04)	0.91	0.30 (0.02, 3.37)	0.22
Several months	2.81 (1.08, 7.35)	0.04	15.11 (13.9, 16.4)	<b>0.03</b>
<b>Reason for resuming clinic visits</b>				
Phoned by counsellor	Ref			
Identified by midwife When seeking care	0.23 (0.43, 1.20)	0.08	0.26 (0.03, 2.16)	0.21
Self-Reported	1.19 (0.30, 4.72)	0.8	0.99 (0.33, 12.04)	0.45
Feared baby could be infected	3.37 (0.10, 11.40)	0.05	4.06 (0.83, 19.86)	0.08
<b>Status disclosed to Partner</b>				
Yes	Ref			
No	1.86 (0.68, 5.10)	0.23	1.60 (0.29, 8.84)	0.59
<b>Community Perception</b>				
ARVs don't prevent MTCT	Ref			
ARVs prevent MTCT	2.23 (0.35, 14.02)	0.39	0.45 (0.16, 12.47)	0.63
<b>Individual Feeling about others knowing status</b>				
Comfortable	Ref			
Uncomfortable	0.68 (0.29, 1.56)	0.36	0.85 (0.21, 3.41)	0.81
<b>Affected by own negative feelings</b>				
Yes	Ref			
No	1.02 (0.44, 2.36)	0.96	0.22 (0.05, 1.04)	0.06
<b>Counselling space offered</b>				
Open area	Ref			
Enclosed unit	0.17 (0.05, 0.63)	0.008	0.09 (0.02, 0.53)	<b>0.01</b>

group [AOR 0.09; 95% CI 0.02, 0.53] with associated P-value of 0.01.

### 3.6. Women's Reasons for Non-Adherence to cART

The study established a varied number of reasons why women were non-adherent to cART. A summary of these responses by (n = 92) women was cited as reasons as depicted in **Figure 3**.

### 3.7. Summary of Quantitative Results

The study facilitated understanding the phenomenon of non-adherence among pregnant and breastfeeding women.

Summary of these findings was illustrated in **Figure 4**.

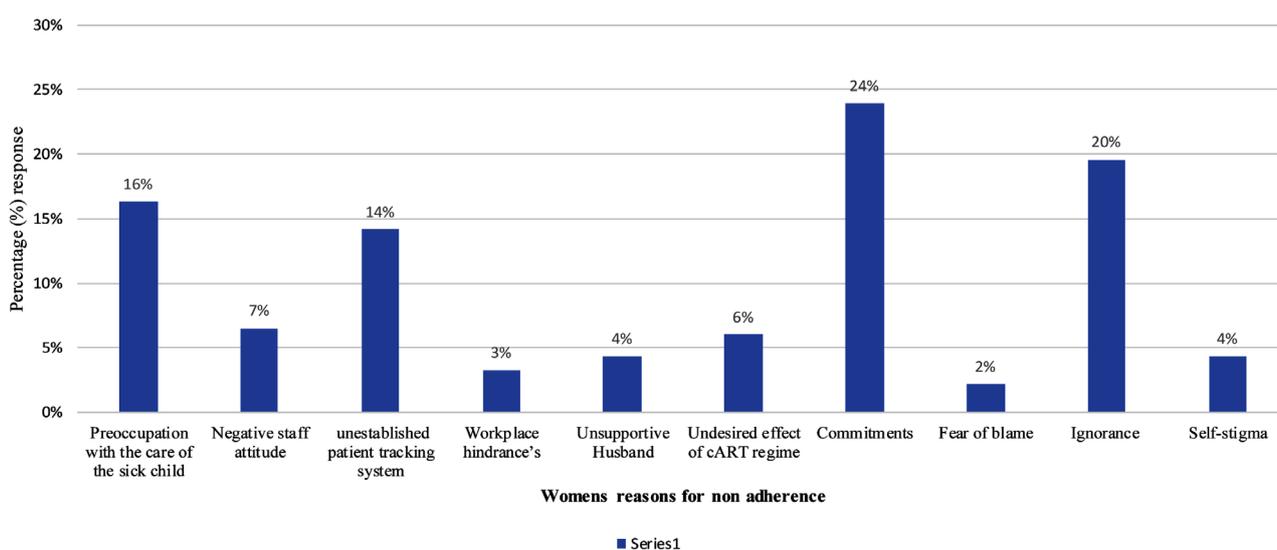
## 4. Discussion and Conclusion

Discussion and conclusion are based on the findings from the quantitative aspects of the study.

### 4.1. Client Related Predictors of Non-Adherence and Perceptions

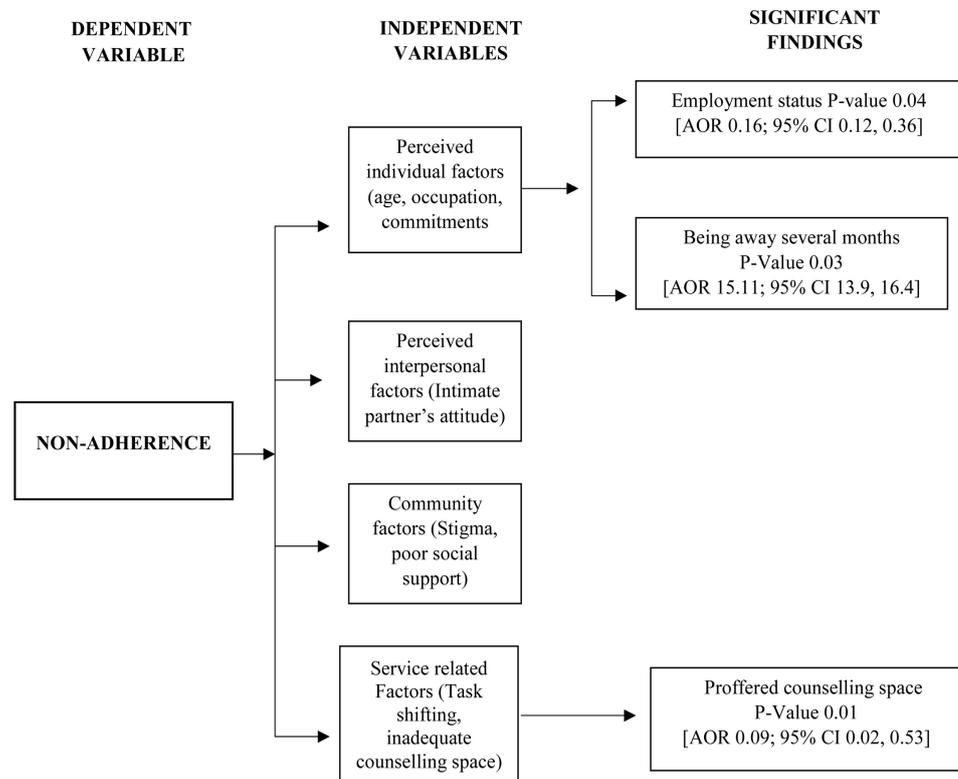
The quantitative component of this study revealed that age was not a predictor of non-adherence to cART because of the P-value which was way above 0.05 and was removed from the final adjusted model. This was contrary to [13] conducted a study in America and found that the younger the age at the time of cART initiation the more they were likely to be non-adherent to cART. In the triangulation of results, the qualitative component of the study, health workers noted that age influenced women's non-adherence to cART.

Concerning woman's employment status, the study findings revealed that the women who were employed were non-adherent compared to housewives, these study findings were consistent with [14], who concluded that clients who were employed were more likely to be non-adherent to cART compared to those that



**Figure 3.** Women's reasons for non-adherence to cART.

**RESULTS ON PREDICTORS OF NON-ADHERENCE TO COMBINED ANTE-RETRO VIRAL THERAPY AMONG PREGNANT AND BREAST-FEEDING WOMEN IN ZAMBIA**



**Figure 4.** Summary of quantitative findings.

were fulltime housewives. However, these findings were contrary to the findings of [15] in a cohort study conducted in Lesotho who concluded that women who were full-time housewives were more non-adherent compared to working women. To triangulate these findings, the qualitative aspect of the study noted perceptions by health workers which revealed that working women were seen to be more non-adherent to cART because they devoted themselves to other job commitments. When compared with those that were unemployed health workers further, revealed that some working-class women were denied permissions to attend cART clinic by their employers.

Another individual client level predictor of non-adherence that was significant was being away from the usual home, which was consistent with a study reported by [16] who established that some clients had medication breaks due to travelling away for business obligations which resulted in them missing their scheduled clinic appointments.

#### 4.2. Health Service Attributes and Non-Adherence to cART

Another predictor that was established from the study significant to cART non-adherence among women who were initiated in care through the Test and Treat model at Chawama level Hospital was that of the counselling rooms. Our findings showed that most patients did not favour the approach of receiving ad-

herence counselling in open spaces considering that some people may have the fear of being identified as HIV positive by other clients present during the counselling session. These findings were supported by other studies like [17] [18] who conducted studies in Malawi and Uganda and concluded that lack of individualised counselling rooms was a barrier that stopped some women from continuing cART care. To echo these sentiments, health service providers acknowledged that limited counselling space was a factor that influenced women's non-adherence to cART as they were counselled in an open space. Furthermore, health providers suggested the need for expansion to create more space for individualised adherence counselling.

### **4.3. Women's Reasons for Being Non-Adherent to cART**

In this study, a total of 92 women were asked to give reasons for missing their appointments. Their responses indicated barriers to access and utilisation of cART services. Individual factors were noticeable according to the responses that women gave and included the following sub-themes: patient other commitments, being unaware of the consequences of being non-adherent to cART which were like barriers identified by [16] who established that personal factors like being away for other commitments had an impact on one's adherence to cART.

Some women gave responses that were perceived to be barriers to utilisation of cART services such as were unsupportive husbands. This was similar to findings made by [19] who discovered that intimate partner's violence discouraged HIV-positive patient's ability to comply with treatment recommendations.

The poor referral system was the subtheme that was established with some women respondents reportedly having missed their appointments according to clinic records, yet others said that they had received drugs from other facilities. These findings point to the fact that the patient's electronic referral system had not been strengthened in most facilities offering cART Services.

Some clients had disrupted cART due to adverse pharmacological reactions that they had, when they were started on treatment. These women could not stand side effects of the drugs as they reportedly experienced hallucinations, tiredness, and weakness. This was similar to findings that were made by [20] who reported that some clients stopped therapy if counselling or management of side effects was not done upon cART initiation.

## **5. Conclusion**

The study has provided information that revealed that there was a need to improve adherence counselling if we were to retain women that initiated care through the Test and Treat model.

## **6. Recommendations**

Based on the study, recommendations implications for practice and policy levels were made as follows.

### **6.1. Implications of the Findings at the Practice Level Chawama Hospital Management and District Health Office**

Staff attitude towards HIV-positive clients should be improved because a bad attitude could facilitate non-adherence to cART among pregnant and breastfeeding women initiated into care through the Test and Treat model.

Midwives and clinicians should provide adherence counselling while considering individual client-related factors identified through skillful counselling at every visit.

### **6.2. Implications of the Findings at Policymakers Level**

Training and retraining of health workers in patient-centred Care model could be cardinal in facilitating effective patient health engagement and in turn, health workers will be able to provide confidential space for effective engagement with their clients when providing adherence counselling.

There is a need to expand counselling units in cART considering the growing population and the number of people accessing cART services.

Electronic referral systems should be established or improved to keep track of registered HIV-positive women accessing care to and from other facilities. This improved system could capture new clients who may be in care from other facilities while seeking care at Chawama First Level Hospital. Ultimately improved client tracking system may improve women's access to cART as they could access care anywhere in the country even without physically carrying patients' care cards with them.

### **6.3. Implications of the Findings to the Body of Researchers**

Furthermore, the study recommends that the future researchers should address non-adherence targeting specific age groups of pregnant or breastfeeding women, additionally, researchers should consider biomedical parameters such as the viral load as an indicator of non-adherence.

## **7. Study Limitations**

Ability to research within the planned time frame was impacted by the Covid-19 pandemic. However, to mitigate this setback, the researcher worked with the hospital staff in the scheduling of pregnant and breastfeeding women participants.

## **8. Informed Consent**

The study was explained to each participant and those who agreed to take part were asked to fill and sign the consent form. They were also allowed to withdraw at any time if they so wished.

### **8.1. Ethics Statement**

Permission was sought from ERES Converge IRB approval number 2019-Oct-006,

National Health Research Authority, Ministry of Health and Chawama First Level Hospital Management. Voluntary participation was granted to all participants and was all accorded with written consent. Since this was a sensitive issue that could affect some respondents emotionally, throughout the study, registers and any other material with client's information were kept confidential. Data collecting tools did not bear patient's names but rather were identified with serial numbers.

## 8.2. Conflicts of Interest Declaration

The authors have declared no conflicts of interest that may inappropriately influence writing or publication of this article.

## Acknowledgements

The study was conducted in the partial fulfilment of the requirement for the award of the master of science in midwifery women and Child's health degree at the University of Zambia, School of Nursing Sciences, Lusaka, Zambia.

## Author's Contribution

MSK conceptualised the research idea, drafted the manuscript, collected and analysed data.

MCM was the principal supervisor who helped in the refining of the research topic, reviewed the final draft for its intellectual content.

SM co-supervised the entire research process, helped in the refining of the research topic, reviewed the final draft for its intellectual content.

All authors reviewed and approved the final version.

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## Appendix

### SEMI-STRUCTURED QUESTIONNAIRE FOR PREGNANT AND BREASTFEEDING WOMEN

TOPIC: Predictors of Non-Adherence to combined Anti-Retroviral therapy among expectant and breastfeeding women receiving care through Test and Treat model in Lusaka

DATE: .....

PLACE: .....

NAME OF THE RESEARCHER .....

PLACE OF INTERVIEW: .....

SERIAL NUMBER: .....

INSTRUCTIONS TO THE RESEARCH ASSISTANT:

- 1) Introduce your self.
- 2) Explain the reason for the interview following the information guide.
- 3) Allow the participant to sign the informed consent provided.
- 4) Assure the participant of anonymity and confidentiality.
- 5) Circle appropriate responses and fill in responses in the space provided.
- 6) Provide time for the respondents to ask questions at the end of the interview.
- 7) Thank the participant at the end of the interview.

SECTION A. INDIVIDUAL CHARACTERISTICS: DEMOGRAPHIC DATA	For Admin use only
<p>Question 1. How old are you? (state age in years)..... years old</p> <p>Question 2. What is your marital status?</p> <p>1) Married <input type="checkbox"/></p> <p>2) Single <input type="checkbox"/></p> <p>Question 3. What is the level of your education?</p> <p>1) Educated (Secondary/Tertiary/University) <input type="checkbox"/></p> <p>2) Uneducated (Never been to school/Primary) <input type="checkbox"/></p> <p>Question 4. What is your religion?</p> <p>1) Catholic <input type="checkbox"/></p> <p>2) Protestant <input type="checkbox"/></p> <p>3) Moslem <input type="checkbox"/></p> <p>4) Other, specify <input type="checkbox"/></p> <p>Question 5. What do you do for your living?</p> <p>1) Formally employed <input type="checkbox"/></p> <p>2) Self-employed <input type="checkbox"/></p> <p>3) Housewife <input type="checkbox"/></p> <p>Question 6. Does your occupation make you travel away from home/usual clinic?</p> <p>1) Yes <input type="checkbox"/></p> <p>2) No <input type="checkbox"/></p> <p>Question 7. If the answer to the above question is Yes, then how long are you away from your home or usual clinic?</p> <p>1) Several days <input type="checkbox"/></p> <p>2) Several weeks <input type="checkbox"/></p>	

<p>3) Several months <input type="checkbox"/></p> <p>Question 8. Looking at your care -card when were you supposed to come for your review .....</p> <p>Question 9. Would you mind sharing your reasons for missing your appointment .....</p> <p>Question 10. Since you missed coming for your appointment at one time, tell me what happened for you to resume clinic visits again.</p> <p>1) Reminded by a counsellor on phone. <input type="checkbox"/></p> <p>2) Was discovered by a midwife during routine ANC /Postnatal check-up? <input type="checkbox"/></p> <p>3) Came through as I became unwell. <input type="checkbox"/></p> <p>4) I reported myself back as I realised that the baby could be infected if am not adhering to treatment. <input type="checkbox"/></p> <p>Question 11. Do you use traditional medicine for your HIV infection?</p> <p>1) Yes <input type="checkbox"/></p> <p>2) No <input type="checkbox"/></p> <p>Question 12. Do your religious beliefs deter you from taking conventional ARVs?</p> <p>1) Yes <input type="checkbox"/></p> <p>2) No <input type="checkbox"/></p>	
<p><b>SECTION B. INTERPERSONAL CHARACTERISTICS</b></p> <p>Question 13. Is your husband aware that you are HIV positive and you are taking ARV drugs for life?</p> <p>1) Yes <input type="checkbox"/></p> <p>2) No <input type="checkbox"/></p> <p>Question 14. Describe your current relationship with your partner/husband.</p> <p>1) Physically and Psychologically aggressive <input type="checkbox"/></p> <p>2) Non-aggressive, supportive and loving <input type="checkbox"/></p>	
<p><b>SECTION C. COMMUNITY PRACTICES</b></p> <p>Question 15. In the community where you stay, how do people feel about Pregnant or breastfeeding women taking ARVs for eMTCT?</p> <p>1) ARVs do not prevent mother to child transmission of HIV <input type="checkbox"/></p> <p>2) ARVs may prevent mother to child transmission of HIV <input type="checkbox"/></p> <p>Question 16. How do you feel about people knowing your HIV status?</p> <p>1) Comfortable <input type="checkbox"/></p> <p>2) Uncomfortable <input type="checkbox"/></p> <p>Question 17. Do you get affected negatively with what people from the community say about HIV positive clients?</p> <p>1) Yes <input type="checkbox"/></p> <p>2) No <input type="checkbox"/></p> <p>Question 18. Do you have people to remind you of the hospital schedule?</p> <p>1) Yes <input type="checkbox"/></p> <p>2) No <input type="checkbox"/></p> <p>Question 19. If yes then, what is the relationship with this person?</p>	

<p>1) Spouse <input type="checkbox"/></p> <p>2) Other family members <input type="checkbox"/></p> <p>3) A friend <input type="checkbox"/></p>	
<p><b>SECTION D: SELECTED HEALTH-RELATED ATTRIBUTES</b></p> <p>Question 20. In this facility which health worker would you be comfortable to attend to you?</p> <p>1) Midwives <input type="checkbox"/></p> <p>2) Lay counsellors <input type="checkbox"/></p> <p>Question 21. Give the reasons for the answer above</p> <p>-----</p> <p>-----</p> <p>Question 22. In your perception how can you describe staff attitude towards expectant or breastfeeding women accessing care in this facility?</p> <p>1) Accommodating <input type="checkbox"/></p> <p>2) Cruel <input type="checkbox"/></p> <p>Question 23. Is there any privacy in this facility which can enable you to confide to any midwife or counsellor?</p> <p>1) Yes <input type="checkbox"/></p> <p>2) No <input type="checkbox"/></p> <p>Question 24. Where is adherence counselling provided from?</p> <p>1) The open area in front of other clients <input type="checkbox"/></p> <p>2) In an enclosed unit on one on one <input type="checkbox"/></p> <p>Question 25. How much time do you spend in this facility when you come for your appointment?</p> <p>1) 1 hour <input type="checkbox"/></p> <p>2) 3 hours <input type="checkbox"/></p> <p>3) 5 hours <input type="checkbox"/></p> <p>Question 26. Do you receive sufficient information on the importance of good adherence concerning the vertical transmission of HIV?</p> <p>1) Yes <input type="checkbox"/></p> <p>2) No <input type="checkbox"/></p> <p>Question 27. If you can make recommendations on adherence care through Test and Treat in this facility what would you want to be changed?</p> <p>-----</p> <p>As we come to the end of this interview, I would like to thank you for your participation.</p>	