

**Tuberculosis treatment adherence among TB patients aged 18-60 years attending the TB Clinic at Murchison Bay Hospital, Luzira Prison.
A cross-sectional study.**

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Abstract

Background:

Despite ongoing efforts such as directly observed therapy, counselling, and the provision of free tuberculosis medication, adherence to TB treatment among inmates remains low. This study aimed to assess the individual factors influencing adherence to TB treatment among TB patients aged 18–60 years attending the TB clinic at Murchison Bay Hospital, Luzira Prison, Kampala District.

Methodology:

A descriptive cross-sectional study design was employed among 92 TB patients who were selected using random sampling. Data were collected using a researcher-administered questionnaire. The collected data were entered, summarized, and presented in tables and figures using Microsoft Excel 2016 and analyzed using frequencies and percentages.

Results:

Of the 92 respondents, 57 (62.0%) were male, and 35 (38.0%) were female. 47 (51.1%) reported that they had not missed any TB doses during the previous four weeks, while 45 (48.9%) had missed at least one dose. 49 (53.3%) had been on TB treatment for more than eight months. 41 (44.6%) reported having no chronic illness. The most commonly reported treatment-related side effect was body weakness, reported by 53 (57.6%). Regarding knowledge and perceptions, 70 (76.0%) believed that TB treatment should continue only until they felt well, while 74 (80.4%) did not know the consequences of stopping TB medication early. Additionally, 78 (84.8%) reported that no one helped them remember to take their medication, 84 (91.3%) reported that food was never enough, and 90 (97.8%) had never been regularly observed taking their medication.

Conclusion:

Individual factors that influenced TB treatment adherence included reported missed doses, treatment-related side effects such as body weakness, inadequate support in remembering to take medication, and misconceptions regarding the appropriate duration of TB treatment.

Recommendations:

The Ministry of Health should implement continuous and targeted TB education focusing on treatment duration, medication adherence, side effects, and the consequences of treatment interruption.

Keywords: Tuberculosis; Treatment adherence; Inmates; Individual factors; TB treatment.

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Background

Africa accounts for a quarter of global TB cases, with 2.5 million infections and 424,000 deaths in 2022 (WHO, 2026). TB prevalence in sub-Saharan African prisons ranges from 0.4% to 16.3% (Telisinghe et al., 2016). In East Africa, treatment coverage ranges from 90% in Tanzania to 74% in Kenya and 58% in the DRC (WHO, Global Tuberculosis Report, 2024), although non-adherence remains a concern - 26% in Kenya and 16.9% in Tanzania (Ochieng et al., 2024;

Kidenya et al., 2017; Molla et al., 2022). Uganda records about 91,000 TB cases annually, 32% co-infected with HIV, and MDR-TB affecting 2% of patients (WHO, 2023), and TB prevalence is significantly higher in prisons at 1,900 per 10,000 inmates (Ndyabahika, 2025). Studies report 11.6% non-adherence among MDR-TB patients and highlight the importance of directly observed therapy, monitoring, and family support, while lack of follow-up increases non-adherence (Batte et al., 2021; Berger et al., 2020).

In Luzira Prison, tuberculosis (TB) remains a major public health concern, with reports indicating that out of the 26,000 inmates, about 5,000 have been infected with TB, and 2,500 are co-infected with HIV (The New Humanity, 2019). Although most of these inmates are initiated on treatment, only 25% achieve a cure from TB, highlighting poor treatment adherence as a key challenge. Despite ongoing efforts such as directly observed therapy (DOT), counseling, and the provision of free TB medication, adherence to treatment among inmates remains low. This undermines TB control efforts, especially in high-risk environments such as prisons, where poor adherence increases the risk of treatment failure, drug resistance, and the dual burden of TB and HIV co-infection. If this challenge is not addressed, TB will continue to spread rapidly within Luzira Prison and pose a broader public health risk beyond the prison walls. Therefore, this study seeks to assess tuberculosis treatment adherence among TB patients aged 18-60 years attending the TB clinic at Murchison Bay Hospital, Luzira Prison, Kampala District. The study aims to assess the individual factors influencing adherence to TB treatment among TB patients aged 18-60 years attending the TB clinic at Murchison Bay Hospital, Luzira Prison, Kampala District.

Methodology

Study Design and Rationale

The study employed a descriptive cross-sectional study design utilizing quantitative methods of data collection. The study design was chosen because it helped in the collection of numerical data, collected at a single point in time, which was used in a statistical analysis with no need to follow up participants.

Study Area and Rationale

The study was carried out at Murchison Bay Hospital, found in Luzira Prison, in Kampala District. The facility serves as a national referral hospital for prisoners in the Uganda Prisons Service; it is located in Luzira Maximum Security Prison, in Nakawa Division of Kampala, approximately 9 kilometres (6 mi) south-east of the city's central business district and 12 kilometres (7 mi) by road, southeast of Mulago National Referral Hospital. The hospital serves the inmate population of Luzira Maximum Prison and some people from outside the prison and handles illnesses that include HIV, tuberculosis and mental illness. The hospital runs a TB clinic where screening, diagnosis, and treatment of TB are conducted for both inmates and TB patients residing outside the prison but around it. Given the high burden of TB among the inmates and coinfection with HIV, adherence to the treatment is compromised by a number of factors and challenges. Therefore, the hospital made an ideal study area for conducting a study assessing tuberculosis treatment adherence among TB patients attending the TB

clinic at Murchison Bay Hospital, Luzira Prison, Kampala District.

Study Population

The study population consisted of patients aged 18-60 years attending the TB clinic at Murchison Bay Hospital, Luzira Prison, Kampala District.

Sample Size Determination

The sample size was determined using the Kish-Leslie formula (1965) for cross-sectional studies with an assumed proportion of level of adherence to TB treatment among TB patients, which was 6.4% (The New Humanity, 2019)

Kish and Leslie (1965) given by; $n = \frac{z^2pq}{d^2}$ where;

n was the sample size required

p was the estimated level of adherence to TB treatment.

p=6.4% which was equivalent to 0.064

d was the confidence interval at 95% = 1.95

q=1-p

$$\text{Therefore, } n = \frac{z^2p(1-p)}{d^2},$$

$$n = \frac{(1.96 \times 1.96) \times 0.064 \times (1-0.064)}{0.05 \times 0.05}$$

n = 92 TB patients

Therefore, the researcher used a sample size of 92 TB patients attending the TB clinic at Murchison Bay Hospital.

Sampling Procedure

In this study, a simple random sampling method was used to sample the TB patients at the TB clinic at Murchison Bay Hospital. On each day of data collection, the researcher created a sampling frame by gathering all the TB patients at the TB clinic at Murchison Bay Hospital, which was used in the selection of participants. The researcher wrote 16 papers, with 8 written on "YES" and the other 8 written on "NO," folded them in a plastic cup, and allowed the patients to randomly pick a paper from the cup. All patients who picked papers written on "YES" were included in the study, and those who picked "NO" did not participate in the study. This was chosen because it gave an equal chance to all the TB patients to participate in the study.

Inclusion and Exclusion Criteria

Inclusion Criteria

The study included all TB patients aged 18-60 years attending the TB clinic at Murchison Bay Hospital, who were in a good health state, patients who had been on TB treatment for at least four months, and were ready to provide informed consent before participating in the study.

Exclusion Criteria

The study excluded TB patients aged 18-60 years attending the TB clinic at Murchison Bay Hospital who were unwilling to provide informed consent, critically ill at the time of data collection as determined by clinical assessment, patients who were newly initiated on TB treatment (less than 4 months), and those who were unable to freely move due to physical limitations.

Study variables

Dependent Variable

In this study, the dependent variable was tuberculosis treatment adherence among TB patients.

Independent Variables

The independent variables in this study included: The socio-demographic characteristics influencing adherence to TB treatment among TB patients aged 18-60 years attending the TB clinic, the individual factors influencing adherence to TB treatment among TB patients aged 18-60 years attending the TB clinic, and the institutional factors influencing adherence to TB treatment among TB patients aged 18-60 years attending the TB clinic.

Research Instruments

A researcher-administered pretested semi-structured questionnaire was used to collect data. The questionnaire included both closed- and open-ended questions. It consisted of three sections:

Section A: The socio-demographic characteristics influencing adherence to TB treatment among TB patients aged 18-60 years attending the TB clinic. Section B: The individual factors influencing adherence to TB treatment among TB patients aged 18-60 years attending the TB clinic. Section C: The institutional factors influencing adherence to TB treatment among the TB patients aged 18-60 years attending the TB clinic

Data Collection Procedures

Upon approval of the research proposal by the supervisor, principal and the institution research committee of Mildmay School of Nursing and Midwifery which offered an introductory letter to the researcher who used the letter to seek for permission from the administration of Murchison Bay hospital to conduct the study, by presenting the letter to the medical superintendent of the Hospital and explained the purpose of the study before being permitted to carry out the study.

The researcher received written permission in the form of an authorization letter, which was presented to the in-charge of the TB clinic, who introduced the researcher to the rest of the staff and the patients at the clinic. The researcher introduced herself to the patients and had them seated

around the waiting area having each of them at a distance from the others and wearing a mask to prevent cross-infection. After creating a sampling frame, the researcher randomly selected the participants to participate in the study. To each selected participant, the researcher explained the purpose of the study to all the selected patients in order for them to provide informed consent before participating in the study. The researcher then administered the questionnaire to them by reading the questions for them and helping them fill in their answers. Data collection took a period of 2 weeks, interviewing 8 participants per day.

Data Management and Data Analysis

Data management

For data management, data were checked for accuracy and completeness daily during the collection process by both the researcher and the research assistants, who coded and edited the questions in the filled questionnaires before handing them to another participant, and this helped the researcher to identify any errors and spaces left. The filled questionnaires were safely kept in a locked case for confidentiality of the data.

Data Analysis

Data were presented as tables, bar graphs, and pie charts and were descriptively analyzed, where all the variables of interest were descriptively analyzed by univariate analysis in the form of frequencies and percentages.

Quality assurance

Reliability

To ensure reliability, the researcher conducted a pilot study among 20 TB patients attending the Luzira Prison Staff Clinic to test for clarity and comprehensiveness of the questionnaire. All ambiguous questions were edited by the supervisor.

Validity

To ensure validity of the study, 7 research assistants were trained to ensure that the data collected is accurate and without bias.

Ethical Considerations

Ethical approval was obtained from the Institution Research Committee of Mildmay School of Nursing and Midwifery upon approval of the proposal, and an introductory letter was issued by the committee to the researcher, who used it to gain permission from the hospital's administration.

Each of the selected participants received an explanation about the purpose of the study and was requested to provide informed consent before taking part in the study. Confidentiality and anonymity were maintained during the study by using initials instead of the respondents' names,

and all the information collected was only accessible to the researcher and her supervisor. The study participants were free to withdraw from the study at any time and were

informed that the study was strictly academic and therefore no incentives were given to any participant for participating.

Results

The socio-demographic characteristics influencing tuberculosis treatment adherence among TB patients aged 18-60 years attending TB clinic

Table 1: The demographic characteristics of the participants n=92

Variable	Category	Frequency (n)	Percentage (%)
Age group	18–28 years	13	14.1
	29–39 years	40	43.5
	40–50 years	30	32.6
	Above 50 years	9	9.9
Sex	Male	57	62.0
	Female	35	38.0
Education level	No formal education	8	8.7
	Primary	23	25.0
	Secondary	43	46.7
	Tertiary	18	19.6
Residence before incarceration	Rural	24	26.1
	Urban	30	32.6
	Semi-urban	38	41.3
TOTAL		92	100

From Table 1, it is shown that most of the respondents, 40 (43.5%), were aged 29–39 years. This was followed by 30 (32.6%) aged 40–50 years, 13 (14.1%) aged 18–28 years, and 9 (9.9%) aged above 50 years. More than half, 57 (62%), of the respondents were male, while 35 (38%) were female. Most respondents, 43 (46.7%), had attained secondary

education, 23 (25%) had primary education, 18 (19.6%) had tertiary education, while the minority, 8 (8.7%), had no formal education. The majority, 38 (41.3%), of respondents lived in semi-urban areas before incarceration, followed by 30 (32.6%) from urban areas and 24 (26.1%) from rural areas.

The individual factors influencing adherence to TB treatment among TB patients aged 18-60 years attending the TB clinic

Table 2: Missing TB doses in the past 4 weeks, number of doses missed, duration of the TB treatment, and episode of TB

Variable	Category	Frequency (n)	Percentage (%)
Missed TB doses in past 4 weeks	Yes	45	48.9
	No	47	51.1
	Total	92	100
Number of doses missed (n = 45)	One dose	9	20.0
	Two doses	24	53.3
	Three–four doses	10	22.2
	More than four doses	2	4.5
	Total	45	100
Duration on TB treatment	5–6 months	20	21.7
	6–8 months	23	25.0
	More than 8 months	49	53.3
	Total	92	100
Episode of TB	First episode	43	46.7
	Repeat episode	49	53.3
	Total	92	100

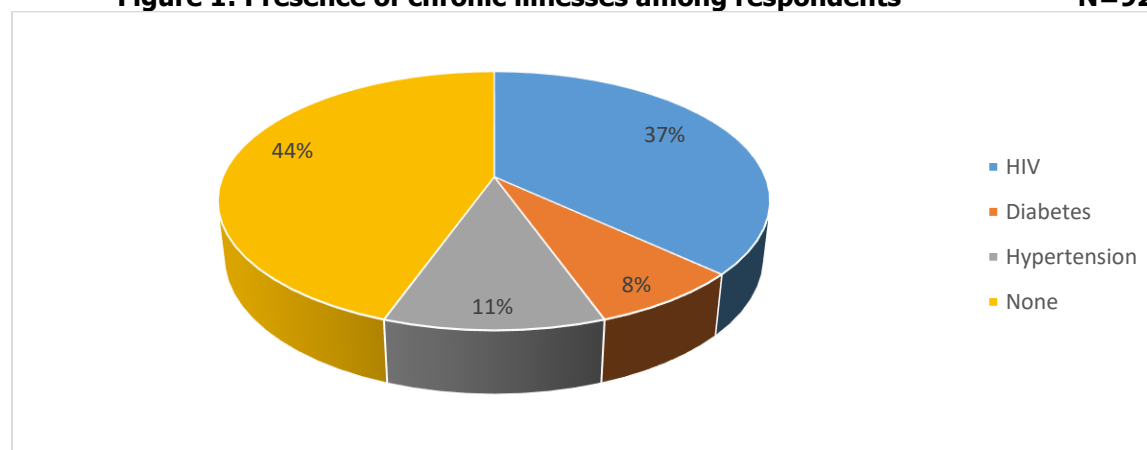
From Table 2, it is demonstrated that slightly more than half, 47 (51.1%), of the respondents had not missed any TB doses in the past four weeks, while 45 (48.9%) reported missing doses.

Among the 45 who missed doses, most, 24 (53.3%), missed doses twice, while 2 (4.5%) missed more than four doses.

More than half, 49 (53.3%), of the respondents had been on TB treatment for more than 8 months, 23 (25%) had been on treatment for 6–8 months, while 20 (21.7%) had been on treatment for 5–6 months. More than half, 49 (53.3%), of the respondents were experiencing a repeat episode of TB, while 43 (46.7%) were on their first episode.

Figure 1: Presence of chronic illnesses among respondents

N=92



Most, 41 (44.6%), of respondents reported no chronic illness; 34 (37%) had HIV; 10 (10.9%) had hypertension, while 7 (7.6%) had diabetes.

Table 3: Side effects experienced, perception of TB treatment duration, stopping treatment early, reminder to take medicine, food availability and DOTs by health worker. N=92

Variable	Category	Frequency (n)	Percentage (%)
Perceived duration of TB treatment	Less than 6 months	3	3.3
	6 months	19	20.7
	Until I feel well	70	76.0
Perceived consequence of stopping treatment early	Will get sick again	10	10.9
	Will make the sickness resistant	5	5.4
	Will continue being good	3	3.3
	I don't know	74	80.4
Who helps you remember to take medicine	Fellow inmate	12	13.0
	Health worker	2	2.2
	No one	78	84.8
Food availability before incarceration	Sometimes enough	2	2.2
	Rarely enough	6	6.5
	Never enough	84	91.3
Observed taking TB medicine by health worker	Regularly	0	0
	Sometimes	2	2.2
	Never	90	97.8
Attitude of TB clinic staff	Good	4	4.3
	Fair	12	13.0
	Poor	75	81.5
	Very poor	1	1.1
TOTAL		92	100

Table 3 reveals that the majority, 53 (57.6%), of the respondents experienced body weakness, 15 (16.3%) had tingling or numbness, and 2 (2.2%) experienced nausea or vomiting. Only 2 (2.2%) reported no side effects. Most, 70 (76%), of the respondents believed TB treatment should last until they feel well, while 3 (3.3%) thought it lasts less than six months. A very large proportion, 74 (80.4%), of respondents did not know what would happen if they stopped TB medication early, and 3 (3.3%) believed they would remain fine. Most, 78 (84.8%), said no one helps them remember to take their medication, and 2 (2.2%) said a health worker. A very high proportion, 84 (91.3%), reported that food was never enough, 6 (6.5%) said food was rarely enough, and 2 (2.2%) said food was sometimes enough. Almost all 90 (97.8%) had never been regularly observed taking their medication. Only 2 (2.2%) reported being sometimes observed.

Discussion

Nearly half of the respondents (45, 48.9%) reported missing TB doses in the past four weeks. Among them, 24 (53.3%) missed doses twice. This could be because of the side effects of TB medication, limited food availability, or lack of structured supervision in prison. This was in disagreement with a study conducted by Fekadu et al. (2020), which revealed that 73.3% of the patients adhered to their treatment regimen.

Most respondents (49, 53.3%) had been on TB treatment for more than 8 months, since (49, 53.3%) of the respondents had experienced previous TB episodes. This could be because prolonged treatment regimens are typical for TB therapy, and TB recurrence is common in prison settings due to overcrowding, inadequate nutrition, and high HIV prevalence. This was in line with a study conducted by Gwalani et al. (2025), which indicated that retreatment cases had higher odds of non-adherence to TB treatment as compared to new cases.

Regarding comorbidities, 34 (37%) of respondents were HIV positive. This could be because HIV infection compromises immunity, making individuals more susceptible to TB. This implies that integrated TB-HIV care is critical to enhance treatment adherence among co-infected inmates. This was in agreement with a study done by Iweama et al., (2021) which indicated that 78.2% of TB patients who were co-infected with HIV were 4 times more likely to be non-adherent to their medication. The study found that most respondents (53, 57.6%) experienced body weakness as a side effect of TB medication. This could be because TB drugs like isoniazid and rifampicin are known to cause fatigue and malaise, and a lack of proper nutrition to strengthen the body, as poor food availability was reported by 84 (91.3%). Findings were inconsistent with a study carried out by Alinaitwe et al., (2025), which

demonstrated that 63.8% of patients had experienced body pain, tingling, and numbness (47.6%).

The majority of respondents (70, 76%) believed TB treatment should last until they feel well, while 74 (80.4%) did not know the consequences of stopping treatment early. This could be due to low health literacy or inadequate counseling regarding standard TB treatment duration, showing that inadequate knowledge influences TB treatment adherence. The study findings were in agreement with a study conducted by Kimani et al., (2021) which revealed that lack of knowledge regarding the importance of TB treatment among 17.8% of the patients was associated with TB treatment interruptions.

A very high proportion (78, 84.8%) reported having no one to help remind them to take medication. This could be because of the limited support systems within the prison environment due to a lack of DOTs reported by 90 (97.8%), and family involvement is minimal. This was contrary to a study carried out by Gebremariam et al., (2021), which showed that 58.1% were monitored to take their drugs on time by their family members and 17.7% were observed by a health professional to take their treatment as recommended.

Conclusion

Reported missing doses, side effects such as body aches, lack of support to remind them to take medications, and incorrect perception of treatment among the respondents significantly influenced adherence

Limitations

The study was limited by localized generalizability as it focused among prisoners and therefore the results cannot be used for populations outside prisons or those in other prisons.

Recommendations

The Ministry of Health should develop specific guidelines for monitoring and supporting TB treatment adherence among inmates, including mandatory DOTS (Directly Observed Treatment, Short-course) in prisons.

The Ministry of Health should implement continuous and targeted education on TB treatment, side effects, and consequences of non-adherence tailored to inmates' literacy and socio-demographic backgrounds.

The administration of Luzira prison and the hospital need to conduct regular training for healthcare staff on patient-centered care and effective communication to foster a supportive environment that encourages adherence.

The TB patients need to take medications as prescribed, understanding that missed doses can lead to drug resistance and treatment failure, and inform healthcare staff of any

adverse effects or difficulties with treatment to receive timely support and adjustments.

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List abbreviation

TB:	Tuberculosis
HIV:	Human Immunodeficiency Virus
DOT:	Directly Observed Therapy
WHO:	World Health Organization
MDR-TB:	Multidrug-resistant TB

Source of funding

The study was not funded

Conflict of interest

The author did not declare any conflict of interest.

Data availability

Data are available upon request.

Author contribution

Susan Asingura collected data and drafted the manuscript of the study

Habert Mpamize supervised the study

Hasifa Nansereko supervised the study

Jane Frank Nalubega supervised the study

Immaculate Naggulu Prosperia supervised the study

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