

Assessment Of Medication Adherence And Associated Factors Among Tuberculosis Patients At A Specialist Hospital In Monrovia, Liberia: A Cross-Sectional Study

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Abstract:

Background: Tuberculosis (TB) remains a major global public health challenge, with sub-Saharan Africa bearing a disproportionate burden. Medication non-adherence is a critical driver of poor treatment outcomes, including drug resistance and mortality. In Liberia, there is a paucity of data on adherence to TB treatment. This study aimed to assess the level of medication adherence and associated factors among TB patients at a specialist hospital in Monrovia, Liberia.

Methods: A descriptive cross-sectional study was carried out among 100 TB patients recruited through convenience sampling at the TB Hospital, Monrovia. Data collection involved a structured questionnaire that included socio-demographic information, the 4-item Morisky Medication Adherence Scale (MMAS-4), and questions related to treatment needs and overall health perception. The data were analyzed using descriptive statistics, and Pearson correlation tested associations, with significance set at $p < 0.05$.

Results: The respondents' mean age was 37.0 ± 11.6 years, with 70% being male. The average MMAS-4 adherence score was 3.6 ± 0.89 , reflecting high adherence levels, with 93% classified as adherent. Most participants reported good general health (83%), understood their medication regimens (90%), and were satisfied with their treatment (87%). Challenges included the inability to purchase all medicines simultaneously (63%) and financial barriers to obtaining TB medicines (27%).

Conclusion: The patients exhibited high medication adherence and positive health perceptions. Nevertheless, financial constraints remain. These findings highlight the importance of patient-centered strategies, such as improved social support and financial aid programs, to maintain high adherence and reduce the risks of treatment default and drug-resistant organisms.

Keywords: Tuberculosis, Medication Adherence, Morisky Scale, Public Health, Treatment Outcomes.

I. INTRODUCTION

Tuberculosis (TB), an airborne infectious disease caused by *Mycobacterium tuberculosis*, remains one of the top ten

causes of death worldwide, with Sub-Saharan Africa being a high-burden region for TB and drug-resistant TB [1]. Despite global efforts, the prevalence of TB continues to rise in many African communities, largely fueled by poor access to health,

resource distributions, and political instability. The lack of basic determinants of health and, by extension, poor sociodemographic characteristics, are significant factors that promote the transmission of TB in resource-challenged environments [2]. With the previously mentioned, adherence is also a major factor in reducing the burden of TB.

Adherence to the long and often complex TB drug regimen is multifaceted and influenced by drug side effects, forgetfulness, lack of social support, poverty, and distance to health facilities [5, 6]. However, non-adherence to treatment leads to prolonged illness, increased transmission, higher mortality, and the development of drug-resistant organisms like Multidrug-Resistant TB (MDR-TB) and Extensively Drug-Resistant TB (XDR-TB). The development of drug-resistant strains poses a serious public health threat and significant economic burden on the patients and healthcare systems [3, 4].

In Liberia, data on TB treatment adherence are scarce. The effectiveness of the national TB control program, which includes the Directly Observed Therapy Short-course (DOTS) strategy, depends on a clear understanding of local adherence patterns and barriers. This study, therefore, aimed to assess medication adherence and its associated factors among TB patients at a specialist hospital in Monrovia, Liberia.

II. METHODS

A descriptive cross-sectional study was conducted at the TB Hospital in Congo Town, Monrovia, Liberia. This facility is a major referral center for TB treatment in the country. The study population consisted of all patients receiving anti-TB treatment at the hospital during the study period. A convenient sample of 100 participants was recruited. The inclusion criteria were: (1) confirmed diagnosis of TB and currently on treatment, (2) aged 18 years or older, and (3) willingness to provide informed consent. Patients too ill to participate were excluded.

DATA COLLECTION INSTRUMENT AND MEASURES

Data were collected using a structured, self-administered questionnaire. For participants unable to read, the researcher administered the questionnaire verbally. The instrument had three sections:

- ✓ Socio-demographic Data: Age, gender, education, marital status, occupation, area of residence, and health insurance status.
- ✓ Medication Adherence: Measured using the 4-item Morisky Medication Adherence Scale (MMAS-4). Each "yes" response was scored 0 and "no" as 1. The scores were summed, with a total score of >2 indicating good adherence and a score of ≤ 2 indicating poor adherence [8].
- ✓ Treatment Needs and Health Perception: This section assessed factors such as the ability to purchase medicines, understanding of the treatment regimen, and satisfaction. General health perception was assessed using an item adapted from the SF-12 health survey, rated on a scale

from 1 (poor) to 4 (very good). A mean score of ≥ 3 was classified as "good" health.

DATA ANALYSIS

All data were analyzed according to the objectives of the study using IBM SPSS Statistics version 25. Descriptive statistics (frequencies, percentages, means, and standard deviations) were used to summarize socio-demographic characteristics, adherence scores, and other variables. The association between adherence and general health perception was analyzed using Pearson's correlation coefficient. A p-value of less than 0.05 was considered statistically significant.

ETHICAL CONSIDERATIONS

Ethical approval was obtained from the Institutional Review Board of the TB Specialist Hospital. Oral informed consent was obtained from all participants before enrolment, and confidentiality was maintained throughout the study.

III. RESULTS

A total of 100 participants were enrolled in the study. The mean age was 37.0 ± 11.6 years. The majority were male (70%, $n=70$), resided in a city (77%, $n=77$), and did not have health insurance (70%, $n=70$). Nearly half (47%, $n=47$) had secondary level education, and 53% ($n=53$) were unemployed (Table 1).

Characteristic	Category	Frequency (n)	Percent age (%)
Sex	Male	70	70.0
	Female	30	30.0
Highest Education	Informal	20	20.0
	Primary	30	30.0
	Secondary	47	47.0
	Tertiary	3	3.0
Marital Status	Single	83	83.0
	Married	17	17.0
Occupation	Unemployed	53	53.0
	Farmer	10	10.0

Characteristic	Category	Frequency (n)	Percentage (%)	MMAS-4 Question	Response	Frequency (n)	Percentage (%)
Area of Residence	Civil Servant	13	13.0	In the last 4 weeks, when you felt better, did you ever stop taking?	Yes	10	10.0
	Public Servant	23	23.0				
	Other	1	1.0		No	90	90.0
Area of Residence	City	77	77.0	When you feel sick, do you ever stop taking?	Yes	7	7.0
	Town	23	23.0				
Health Insurance	Yes	30	30.0	Average Adherence Score (Mean ± SD)	No	93	93.0
	No	70	70.0				
Mean Age (Years ± SD)		37.0 ± 11.6				3.6 ± 0.89	p=0.03

Table 1: Socio-demographic Characteristics of Respondents (N=100)

MEDICATION ADHERENCE

The average MMAS-4 adherence score was 3.6 ± 0.89 . Based on the defined cutoff (93%, n=93), the respondents were classified as adherent to their TB medications. The most common reason for non-adherence was problems remembering to take medicine (17%, n=17), followed by stopping medication when feeling better (10%, n=10) (Table 2).

MMAS-4 Question	Response	Frequency (n)	Percentage (%)
In the last 4 weeks, have you ever forgotten to take your medicine?	Yes	7	7.0
	No	93	93.0
In the last 4 weeks, have you had problems remembering?	Yes	17	17.0
	No	83	83.0

Overall Adherence Classification	Response	Frequency (n)	Percentage (%)
Overall Adherence Classification	Adherent	93	93.0
	Non-adherent	7	7.0

Table 2: Assessment of Patients' Adherence to TB Medications (n=100)

GENERAL HEALTH PERCEPTION AND TREATMENT NEEDS

Most respondents (83%, n=83, p=0.03) rated their general health as "good". Most participants understood what their medicines were for (90%, n=90) and when to take them (93%, n=93). However, a significant finding (63%, n=63, p=0.02) indicated that most were unable to purchase all their required medicines at once, while (27%, n=27) reported that they had to buy their TB medicines, indicating a serious financial burden (Table 3).

Category	Response	Frequency (n)	Percentage (%)
Do you have to buy your TB medicines?	Yes	27	27.0
	No	73	73.0
Understand what your medicines are for?	Yes	90	90.0

Category	Response	Frequency (n)	Percentage (%)
Understand when to take your TB medicine?	No	10	10.0
	Yes	93	93.0
Is it easy to take your TB medicines?	No	7	7.0
	Yes	87	87.0
Able to purchase all medicines at once?	Yes	37	37.0
	No	63	63.0
Take only medicines prescribed by the doctor?	Yes	63	63.0
	No	37	37.0
Happy with the present TB medicines?	Yes	87	87.0
	No	13	13.0

Table 3: Medication Treatment Needs and Perceptions (N=100)

IV. DISCUSSION

This study provides a critical picture of adherence to TB medication in a treatment center in Liberia. The population was relatively young and unemployed, highlighting that TB affects the economically challenged segment of the Liberian population. The high unemployment rate and low health insurance coverage are significant socioeconomic findings. These factors create a precarious environment where financial shocks can easily disrupt treatment, a concern reflected in our data, where most patients reported an inability to purchase all their medicines simultaneously.

The high self-reported adherence rate was encouraging and was higher than rates in similar previous data reported in some sub-Saharan African studies [9, 10]. This could be attributed to the effectiveness of the DOTS strategy and the focused counseling provided at the facility. The high level of

understanding regarding medication purpose and timing suggests effective patient education and counseling at the site.

In the current study, the aggregate adherence was high, but the reported reasons for lapses align with global literature. Forgetting and stopping medication when feeling better are well-documented behavioral challenges in long-term therapy [5]. This underscores the need for continuous reinforcement counseling, even for patients who appear to be doing well.

The finding that more than a quarter of patients had to purchase their TB medicines was alarming, as WHO guidelines stipulate that TB diagnosis and treatment should be provided free of charge [1]. This points to a potential health system barrier, such as stock-outs or informal charges, that could severely undermine adherence and promote drug resistance if not addressed. Furthermore, almost half of the patients admitted to taking non-prescribed medicines alongside their TB treatment raises concerns about potential drug interactions and underscores the need for better patient counselling.

The positive general health perception reported by most patients was a good indicator and may be an outcome of good adherence. However, self-reported health and adherence are susceptible to social desirability bias, a limitation of this study. The use of convenience sampling also limits the generalizability of the findings to the wider TB patient population in Liberia.

V. CONCLUSION

Adherence to medication among TB patients was good at the TB hospital in Monrovia. The patients demonstrated good understanding of their treatment and reported positive health outcomes. However, significant structural barriers, primarily financial constraints and health system issues related to medicine access, threaten to undermine this progress.

Based on these findings, we recommend:

- ✓ *Strengthen Health Systems:* The Liberian National TB Control Program should investigate and address the reasons why patients are required to purchase TB medicines to ensure truly free access to treatment.
- ✓ *Enhance Support Mechanisms:* Implement targeted financial and social support for vulnerable patients, particularly the unemployed, to mitigate the burden of ancillary costs (e.g., transport, food).
- ✓ *Sustain Patient Education:* Continue and intensify counseling efforts that specifically address common behavioral lapses, such as forgetting doses and stopping treatment upon symptom improvement.
- ✓ *Future Research:* Conduct larger, multi-center studies that employ mixed methods approaches to better understand adherence and qualitatively explore the complex socio-economic and health system barriers faced by TB patients in Liberia.

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