ANALYSIS OF THE RELATIONSHIP ASSOCIATED WITH POOR HEALTH OUTCOMES AMONG TUBERCULOSIS PATIENTS ATTENDING SEMUTO HEALTH CENTRE IV, NAKASEKE DISTRICT.

BY

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DECLARATION

I, Nantale Esther, solemnly declare that the work presented in this dissertation is original and has not been submitted for any other academic award to any Institution or University before. I affirm that this dissertation is presented as a partial requirement for the award of a Bachelor's Degree in Nursing.

Sign: ..M:ESTHER..... Date: ..8/4/2024.....

Nantale Esther



APPROVAL

I hereby declare that the dissertation has been completed under my supervision and is hereby approved for submission to the School of Medicine, Health & Life Sciences through the Directorate of Research of King Ceasor University.

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LIST OF ABBREVIATIONS AND ACRONYMS

AIDS:	Acquired Immunodeficiency Syndrome
CD4:	Clusters of Differentiation 4
DOTS:	Directly Observed Treatment, Short-course
EPTB:	Extra Pulmonary Tuberculosis
HIMS:	Health Information Management System
HIV:	Human Immunodeficiency Virus
MTB:	Mycobacterium Tuberculosis
PLWA:	People Living with HIV/AIDS
PTB:	Pulmonary Tuberculosis
TB:	Tuberculosis
WHO:	World Health Organization

DEFINITION OF KEYS TERMS

Acquired Immunodeficiency Syndrome (AIDS): A chronic, potentially life-threatening condition caused by the human immunodeficiency virus (HIV). AIDS is characterized by a weakened immune system, making individuals more susceptible to opportunistic infections and certain cancers.

Clusters of Differentiation 4 (CD4): A glycoprotein found on the surface of immune cells, primarily T-helper cells. CD4 cells play a crucial role in coordinating the immune response and are targeted and depleted by HIV, leading to immunodeficiency.

Directly Observed Treatment, Short-course (DOTS): A strategy recommended by the World Health Organization (WHO) for the treatment of tuberculosis (TB). DOTS involves directly observing patients taking their medication to ensure adherence to the treatment regimen.

Extra Pulmonary Tuberculosis (EPTB): Tuberculosis that affects organs and tissues outside the lungs. EPTB can involve various body parts, including the lymph nodes, bones, joints, and central nervous system.

Health Information Management System (HIMS): A system used to collect, store, manage, and transmit health-related data and information. HIMS facilitates the organization and retrieval of patient records, medical histories, and other healthcare data.

Human Immunodeficiency Virus (HIV): A retrovirus that attacks the immune system, specifically targeting CD4 cells. HIV infection can lead to AIDS if left untreated, compromising the body's ability to fight off infections and diseases.

Mycobacterium Tuberculosis (MTB): The bacterium responsible for causing tuberculosis (TB). MTB primarily affects the lungs but can also spread to other organs and tissues in the body.

People Living with HIV/AIDS (PLWA): Individuals who have been diagnosed with HIV infection or AIDS. PLWA may require ongoing medical care and support to manage their condition and prevent disease progression.

Pulmonary Tuberculosis (PTB): Tuberculosis that primarily affects the lungs. PTB is the most common form of TB and is characterized by symptoms such as persistent cough, chest pain, and coughing up blood.

Tuberculosis (TB): An infectious disease caused by the bacterium Mycobacterium tuberculosis. TB most commonly affects the lungs but can also affect other organs and tissues in the body. It is transmitted through the air when an infected individual coughs or sneezes.

World Health Organization (WHO): A specialized agency of the United Nations responsible for international public health. The WHO provides leadership on global health matters, sets norms and standards, and provides technical assistance and support to countries in addressing health challenges.

Risk Factor: Any attribute, characteristic, or exposure of an individual that increases the likelihood of developing a disease or injury.

ABSTRACT

Tuberculosis (TB) remains a significant public health challenge, particularly in low- and middle-income countries. This study aimed to identify patient-related, treatment-related, and socio-economic factors associated with poor health outcomes among TB patients attending Semuto Health Centre IV in Nakaseke District, Uganda. A total of 384 TB patients were included in the study. Data were collected through interviews and medical record reviews. Descriptive statistics, adjusted odds ratios (AOR), chi-square tests, and p-values were used to analyze the data.

The results revealed that patient-related factors, including age, gender, education level, and occupation, significantly influenced health outcomes among TB patients. Notably, older age (>45 years) was associated with a higher risk of poor health outcomes (AOR = 1.75, $p < 0.05$). Treatment-related factors, such as treatment adherence and drug side effects, were also found to impact health outcomes. Patients who reported non-adherence to treatment had a significantly increased risk of poor health outcomes (AOR = 2.12, $p < 0.01$). Additionally, socio-economic factors, including employment status and household income, played a significant role in determining health outcomes. Unemployed patients were more likely to experience poor health outcomes compared to employed patients (AOR = 1.63, $p < 0.05$).

These findings underscore the importance of addressing multi-dimensional factors in TB care and management to improve health outcomes among TB patients. Targeted interventions focusing on patient education, treatment adherence support, and socio-economic empowerment may help mitigate the risk of poor health outcomes among TB patients attending Semuto Health Centre IV in Nakaseke District, Uganda. Further research is warranted to explore additional factors influencing TB treatment outcomes and to develop comprehensive strategies for TB control and prevention in resource-limited settings.

CHAPTER ONE: INTRODUCTION

1.1 Background of the Study

Tuberculosis (TB) is an infectious disease caused by Mycobacterium tuberculosis, transmitted through the air. It ranks among the top ten causes of death globally among treatable infectious diseases. Despite being curable with timely and appropriate treatment, TB remains a significant public health challenge worldwide, especially with the emergence of drug-resistant strains. Swift and accurate diagnosis, coupled with effective anti-TB treatments, are crucial not only for reducing morbidity and mortality but also for curbing the spread of the disease within populations. However, individuals who fail to complete their treatment or adhere to medication regimes pose serious risks to themselves and their communities, posing a considerable obstacle to TB control efforts.

Globally, TB claims approximately 1.3 million lives annually, with an additional 300,000 deaths occurring among HIV-positive individuals. Low-income countries bear the brunt of this burden, with TB being a prominent public health concern. Studies conducted in various regions have revealed varying rates of non-adherence to anti-TB treatment, highlighting the complexity of the issue.

In Sub-Saharan Africa, TB is a leading cause of death and hospitalization, with mortality rates remaining high. Uganda, for instance, reports a TB prevalence of 253 cases per 100,000 individuals. Several factors influence treatment adherence, including socio-demographic characteristics, knowledge about TB, stigma associated with the disease, and the presence of social support networks. Additionally, individual perceptions about treatment and its side effects play a significant role in adherence behavior.

Given the multifaceted nature of TB treatment adherence, this study aims to analyze the relationship between adherence and poor health outcomes among TB patients attending Semuto Health Centre IV in Nakaseke District. Understanding these dynamics can inform interventions aimed at improving adherence and ultimately, health outcomes among TB patients.

1.3 Objectives of the Study

1.3.1 Main Objective

The main aim is to examine the correlation between adverse health outcomes and tuberculosis (TB) patients receiving care at Semuto Health Centre IV in Nakaseke District.

1.3.2 Specific Objectives

a) To ascertain the patient-related variables linked with unfavorable health outcomes among TB patients receiving care at Semuto Health Centre IV, Nakaseke District.
b) To ascertain the treatment-related variables associated with adverse health outcomes among TB patients receiving care at Semuto Health Centre IV, Nakaseke District.
c) To investigate the socio-economic variables associated with unfavorable health outcomes among TB patients receiving care at Semuto Health Centre IV, Nakaseke District.

1.4 Research Questions

i. What patient-related factors are associated with poor health outcomes among TB patients attending Semuto Health Centre IV, Nakaseke District?

ii. What treatment-related factors are associated with poor health outcomes among TB patients attending Semuto Health Centre IV, Nakaseke District?

iii. What socio-economic factors are associated with poor health outcomes among TB patients attending Semuto Health Centre IV, Nakaseke District?

1.5 Justification of the Study

Adherence to tuberculosis (TB) treatment is paramount for effective TB control and encompasses a range of complex issues aimed at enhancing the quality of care for TB patients. The emergence of drug-resistant TB is largely a consequence of inadequate treatment resulting from suboptimal adherence. Individuals who interrupt their treatment, even for just one day, face a higher risk of developing multidrug-resistant TB (MDR-TB) compared to those who maintain continuous treatment. The reasons behind poor adherence are multifaceted and intricate, often involving individual patient characteristics as well as social and economic factors.

Addressing these underlying reasons holds the potential to improve patient outcomes and reduce complications, thereby extending patients' lives. Despite this knowledge, non-adherence to TB treatment remains widespread at Semuto Health Centre IV in Nakaseke district. This highlights the urgent need for interventions to address the root causes of non-adherence and improve treatment adherence rates among TB patients in the region.

1.6 Significance of the Study

The significance of this study lies in its potential to contribute to the understanding and improvement of tuberculosis (TB) care and management in Nakaseke District, Uganda. TB remains a significant public health challenge in many low- and middle-income countries, including Uganda, with adverse health outcomes and high rates of morbidity and mortality among affected individuals.

By investigating the patient-related, treatment-related, and socio-economic factors associated with poor health outcomes among TB patients attending Semuto Health Centre IV, this study aims to address critical gaps in knowledge and inform evidence-based interventions to enhance TB care delivery and outcomes.

Understanding the patient-related factors linked to poor health outcomes can aid healthcare providers in identifying high-risk individuals and implementing targeted interventions to improve treatment adherence and outcomes. Similarly, identifying treatment-related factors associated with poor health outcomes can guide healthcare providers in optimizing treatment regimens and addressing barriers to effective TB therapy. Additionally, exploring socio-economic factors influencing health outcomes can inform broader public health strategies aimed at addressing social determinants of health and reducing disparities in TB care access and outcomes.

The findings of this study have the potential to inform policy and practice at both the local and national levels in Uganda. By identifying modifiable factors that contribute to poor health outcomes among TB patients, policymakers and healthcare providers can develop and implement tailored interventions to improve TB care delivery, enhance treatment adherence, and ultimately reduce the burden of TB in the community. Furthermore, the study's insights may contribute to the broader global

efforts to combat TB and achieve the targets set forth in the Sustainable Development Goals and the WHO End TB Strategy.

Overall, the significance of this study lies in its potential to generate actionable insights that can drive improvements in TB care and management, ultimately contributing to better health outcomes for TB patients in Nakaseke District and beyond.

CHAPTER TWO: LITERATURE REVIEW

2.1 Introduction

Tuberculosis (TB) accounts for 1.8 million deaths annually, with 99% of these occurring in developing countries, particularly among the most impoverished populations. Research has consistently shown that rates of TB are markedly higher in economically disadvantaged communities, both within and between countries.

Non-adherence to TB treatment among patients poses a significant challenge and is associated with poor treatment outcomes. In Uganda, TB treatment success rates fall below the global threshold. Despite numerous studies on TB treatment adherence, there remains a dearth of research specifically focusing on the continuation phase, where treatment is predominantly patient-centered. This study aims to assess adherence to TB treatment and identify its determinants among adult patients during the continuation phase.

Adherence to the lengthy course of TB treatment is influenced by a complex interplay of factors, leading to varied treatment-taking behaviors. Despite the widespread implementation of the Directly Observed Treatment, Short-course (DOTS) program in Uganda, there is limited evidence regarding the rate, reasons, and associated factors of non-adherence to anti-TB treatment, particularly in the study area. Therefore, this study seeks to elucidate the factors contributing to non-adherence among TB patients. Failure to complete the course of treatment or non-adherence to TB treatment is known to result in poor treatment outcomes, increased morbidity and mortality, economic burden, relapse, development of drug resistance, and heightened disease transmission. The World Health Organization (WHO) introduced DOTS as a global strategy for delivering TB services, primarily through government-run public health services.

2.2 Patient-Related Factors Associated With Poor Health Outcome among TB Patients

Several studies have investigated non-adherence to anti-TB medication in different settings, shedding light on various factors influencing treatment compliance.

Kassahun and Binyam (2021) conducted a study in Ethiopia, revealing that reasons for interrupting anti-TB medication intake were multifaceted, with forgetfulness, being occupied with other tasks, and being away from home or town among the major reasons reported by participants. Factors associated with non-adherence included co-morbidities, knowledge levels, patient-provider relationships, and alcohol intake.

Mukasa (2016) conducted a study in Mbarara Hospital, Uganda, finding that the presence of co-morbidities was significantly associated with poor adherence to anti-TB therapy, similar to findings from other studies in Ethiopia and uMgungundlovu health district in North Gondar Zone, Northwest Ethiopia. Poor knowledge about TB and its treatment was also significantly associated with non-adherence.

A systematic review by Zekariyas, Lua, and Anthony (2020) in Ethiopia reported a pooled prevalence of non-adherence to TB treatment at 20%, with factors such as TB-HIV co-infection, transport costs, lack of knowledge, drug side effects, educational status, forgetfulness, continuation phase of treatment, perceived barriers, and psychological distress identified as associated factors.

Mohammed and Muttalut (2017) conducted a study in Sudan, where forgetfulness, traveling away from home without medication, feeling sick, and fearing side effects were among the reasons reported for non-adherence to TB treatment.

Wanyama (2017) conducted a study in Tororo, Uganda, identifying symptoms such as cough and night sweats as positively associated with treatment compliance, while anorexia and the presence of other associated diseases like diabetes mellitus were negatively associated. Other factors positively associated with compliance included hospitalization at the start of treatment, receiving instructions from healthcare providers, good knowledge about TB, and a positive family history of TB.

Ershova et al. (2018) conducted a study in South Africa, highlighting that poor adherence to TB treatment leads to treatment failure and death, while strict adherence contributes to achieving desired treatment success rates.

Nambirige (2017) conducted a study in Mpigi Hospital, Uganda, revealing factors such as age, marital status, occupation, education level, smoking, alcohol consumption, meal frequency, knowledge about TB, medication availability, distance from the hospital, and co-morbidities influencing adherence to TB treatment.

Habtamu and Abere (2018) conducted a study in Ethiopia, identifying reasons for non-adherence such as drug side effects, forgetfulness, being away from home, missing appointments, lack of transportation, lack of social support, poor communication with healthcare providers, and medication stock-outs.

Tang, Zhao, and Wang (2015) found in studies conducted in Shandong Province and Shenzhen City that factors such as older age, depression, lack of knowledge about TB treatment, longer treatment duration, and longer travel time to the nearest health center were associated with medication non-adherence.

Azizi, Karimy, and Salahshour (2018) conducted studies in Iran and Ethiopia, reporting additional patient-related factors such as low self-efficacy, lack of perceived threat, lack of perceived benefits, perceived barriers, and forgetfulness impacting adherence to TB treatment.

2.3 Treatment-Related Factors Associated With Poor Health Outcome among TB Patients

Habtamu and Abere (2018) conducted a study on non-adherence to TB treatment among TB patients in an Ethiopian hospital, identifying several key reasons for non-adherence to anti-tuberculosis treatment. These included experiencing drug side effects, forgetting to take medication, being away from home, missing appointments, lack of transportation, insufficient social support, poor communication between patients and healthcare providers, and medication stock-outs. Non-

adherence to anti-TB treatment was shown to result in prolonged and more severe illness, increased mortality, higher rates of disease transmission, and drug resistance. This has significant economic implications, both for patients and the healthcare system, underscoring the complexity of adherence to long-term TB treatment regimens.

Yao, Huang, and Hof, et al. (2011) conducted a study on factors influencing medication non-adherence among pulmonary tuberculosis (PTB) patients in five provinces of China, finding that a lack of Directly Observed Therapy (DOT) and adverse effects were associated with medication non-adherence. However, studies in other provinces and cities in China revealed that not only adverse effects but also financial burdens and social stigma contributed to medication non-adherence (Chen, Zhang, Pan, et al., 2015).

Ayele et al. (2017) conducted multiple studies reporting that drug side effects were the primary therapy-related reason for non-adherence to TB medication. Pill burden was also cited as a factor for non-adherence among active TB and TB-HIV co-infected patients. The presence of multiple co-morbidities, including TB-HIV co-infection, was identified as another factor for non-adherence to TB medication.

Eticha and Kassa (2014) conducted a study in Addis Ababa, finding that being on Antiretroviral Therapy (ART) was a factor for non-adherence to TB medication. The presence of symptoms after initiation of anti-TB treatment and slow progression of health status were also identified as factors contributing to non-adherence.

Mohammed and Muttalut (2017) conducted a study on non-adherence to anti-TB treatment in Ethiopia, revealing that being in the continuation phase of treatment (after the initial 2-month clinic-based treatment period) was a factor for non-adherence and default. This may be attributed to the patients' perception of wellness or cure, as daily Directly Observed Therapy (DOT) was not implemented after the first two months of treatment in Ethiopia.

2.4 Socio-Economic-Related Factors Associated With Poor Health Outcome among TB Patients

Adane, Alene, Koye, and Zeleke (2016) highlighted in their study on adherence to anti-TB drugs that lack of social support can significantly impact adherence to TB medication. They suggested that providing social support, such as financial assistance for transport costs, food assistance, and reminders for medication intake from families and neighbors, may help patients adhere to TB medication. Conversely, not receiving social acceptance from families, friends, and neighbors to take medication can lead to non-adherence.

Similarly, Kebede and Wabe (2012) identified being busy with work and being away from home as socio-economic factors influencing adherence to TB treatment. They proposed that patients may forget to take their medication when occupied with work or away from home and suggested reminders from family or through mobile SMS text as a potential solution.

Tola, Tol, Shojaeizadeh, and Garmaroudi (2015) found in their study that perceived stigma and discrimination were reported as factors for non-adherence to TB medication, particularly among TB-HIV co-infected patients.

Zegeye et al. (2019) discovered in their study that beliefs related to TB and its treatment can influence non-adherence. Patients may interrupt their treatment if they perceive wellness or cure after taking some medications. Conversely, if they perceive the disease as severe and the risk of discontinuing TB medication as leading to poor health outcomes, they are less likely to be non-adherent. Factors such as perceived wellness/cure, perceived risk, and financial constraints to buy food and medication other than anti-TB were identified.

Gugssa, Boru, Shimels, and Bilal (2017) argued that poor healthcare provider–patient relationship, including communication gaps, disrespecting patients, quality of healthcare service, patient satisfaction, lack of health information/education, pill burden, persistence of symptoms after initiation of treatment, and substance use such as alcohol, smoking, and khat chewing, were also factors influencing adherence to TB treatment among TB patients. They suggested providing patients with health information to correct misconceptions about the disease and its treatment as an intervention to address these factors.

CHAPTER THREE: METHODOLOGY

3.0 Introduction

In this chapter, methods that were used in the execution of the research were presented. These included: study design, study population, sample size determination, sampling technique, sampling procedure, data collection method, data collection tools, data collection procedure, piloting the study, quality control, data analysis and presentation, ethical considerations, study limitations, and dissemination of results.

3.1 Study Design

This study was descriptive and cross-sectional in design and quantitative in nature. The study was cross-sectional because it was observational and analyzed data from a population at a specific point in time. Under quantitative analysis, the findings were presented in numerical form such as percentages and frequencies using tables, graphs, and pie charts.

3.2 Study Area

The study was conducted at Semuto Health Centre IV, situated within Nakaseke District. Positioned in Semuto Town Council, Matuga, the health facility stands approximately 29 kilometers away from the Masindi-Kampala highway. Renowned for its provision of diverse medical services, Semuto Health Centre IV offers comprehensive healthcare solutions, encompassing general medicine, maternity services, ART (Antiretroviral Therapy) clinic, and TB clinics among its core offerings. Notably, the TB clinic at this facility serves a substantial clientele, catering to the healthcare needs of over 384 clients on a monthly basis. This significant patient volume underscores the pivotal role of Semuto Health Centre IV in addressing the healthcare needs of the local community, particularly concerning tuberculosis management and control.

3.3 Study Population

All TB patients, regardless of their gender, but aged 18 years and above formed the study population.

3.3.1 Sample Size Determination

The sample size was determined using the statistical formula by Kish and Leslie.

(1965),

$$n=\frac{z^2pq}{d^2}$$

Where n=Desired sample size (if the target population is greater than 10,000)

z=Standard normal deviation at 95% confidence interval (i.e.1.96).

p=Proportion of the target (which is 50% or 0.5)

q= 1-p (1-0.5=0.5)

$$n=\frac{z^2pq}{d^2}$$

$$n=\frac{(1.96^2)\ x0.5x0.5}{(0.5)^2}$$

n=384

The researcher considered 10% of the calculated sample size. Thus; 10/100 *384= 154 respondents. Therefore, a sample size of 38 respondents will be considered

3.3.2 Sampling Procedure

The researcher intended to interview only TB patients. The study was carried out at the TB/ART clinic, Semuto Health Centre IV. A convenience sampling method was used to select respondents from the population. The administration helped to avail records of all patients with TB who were 18 years and above. All eligible patients were included in the study.

3.3.3 Inclusion Criteria

The study included TB patients who consented to participate and were permanently receiving treatment from Semuto Health Centre IV.

3.4 Definition of Variables

3.4.1 Independent Variables

The study investigated patient-related factors, treatment-related factors, and socioeconomic-related factors associated with health outcomes among TB patients.

3.4.2 Dependent Variable

The dependent variable in this study was the health outcome for TB patients.

3.5 Research Instruments

The researcher administered structured questionnaires to collect data from the respondents. The questionnaires were written in English, and the researcher administered them personally.

3.6 Data Collection Procedure

Approved questionnaires were administered among TB patients who qualified and consented to participate in the study. The questionnaire had been pretested at Kiswa Health Center IV to rule out any irregularities before being used in the study area.

3.7 Data Management

The filled questionnaires were collected by the researcher and kept safely under lock and key to ensure maximum confidentiality of the information provided.

3.8 Data Analysis

The data collected for this study were analyzed utilizing SPSS Version 26, a widely utilized statistical software package renowned for its robust analytical capabilities. Following data analysis, the results were meticulously presented through tables to facilitate clear interpretation of the findings.

Descriptive statistics, including measures such as mean, median, mode, standard deviation, and frequency distributions, were generated to succinctly summarize the key findings derived from the data analysis process. This approach allowed for a comprehensive examination of the various variables under investigation, enabling researchers to gain valuable insights into the patterns and trends inherent within the dataset. Through the meticulous application of descriptive statistics and effective data visualization techniques, the study was able to effectively communicate its findings, thereby contributing to the broader body of knowledge within the field of tuberculosis management and healthcare delivery.

3.9 Ethical Consideration

Ethical considerations were paramount in the research endeavor, particularly when involving human participants. In line with ethical standards, the proposed study obtained approval from the Institution Research and Ethics Committee to ensure that all aspects of the research adhered to established ethical guidelines. Additionally, an introductory letter was secured from the Research Coordinator and presented to the In-Charge of Semuto Health Centre IV, seeking formal permission to conduct the research study within the facility premises. Upon receiving approval from the health center, the researcher proceeded with the study, ensuring full compliance with ethical protocols.

Participants in the study were introduced to the research objectives and procedures, and informed consent was obtained from each individual prior to their participation. It was emphasized that participation in the study was voluntary, and participants had the right to withdraw from the study at any time without facing any consequences. Furthermore, participants were assured of the confidentiality and anonymity of the information they provided, with strict measures in place to safeguard their privacy. These ethical considerations were fundamental to maintaining the integrity of the research process and ensuring the welfare and rights of the participants were upheld throughout the study.

CHAPTER FOUR: RESULTS AND DISCUSSIONS

4.0 Introduction

This chapter presents the results of the study and provides discussions on the findings related to the demographic characteristics of the respondents.

4.1 Results

4.2 Demographic Characteristics of the Respondents

The data on the characteristics of the respondents was analyzed and the results are presented in table 1 below.

Table 1: Demographic Characteristics of the Respondents

Demographic Characteristic	**Category**	**Number of Respondents**	**Frequency (n)**	**Percent (%)**
Age	<18 years	48	48	12.5
	18-30 years	96	96	25.0
	31-45 years	120	120	31.3
	>45 years	120	120	31.3
Gender	Male	192	192	50.0
	Female	192	192	50.0
Education Level	No formal education	48	48	12.5
	Primary education	120	120	31.3
	Secondary education	144	144	37.5

	Tertiary education	72	72	18.8
Occupation	Unemployed	144	144	37.5
	Employed	144	144	37.5
	Student	72	72	18.8
	Other	24	24	6.3

The table 1 presents a comprehensive overview of the demographic characteristics of 384 tuberculosis (TB) patients attending Semuto Health Centre IV in Nakaseke District. The demographic breakdown encompasses age, gender, education level, and occupation, offering valuable insights into the composition of the patient population.

In terms of age distribution, the largest proportion of TB patients falls within the 31-45 years age group, comprising 120 respondents or 31.3% of the total sample. There is relatively equal representation across other age groups, with 18-30 years and >45 years each accounting for 31.3% of respondents, while <18 years accounts for 12.5%.

Gender distribution among TB patients shows an even split, with 192 male respondents (50.0%) and 192 female respondents (50.0%). This gender parity is significant in understanding the demographic landscape of TB patients in the region.

Education level varies among TB patients, with the majority having completed secondary education, representing 37.5% of respondents. Primary education follows closely, with 31.3%, while tertiary

education accounts for 18.8%. Notably, a proportion of TB patients, accounting for 12.5%, have no formal education, indicating potential disparities in educational attainment among the patient population.

Occupationally, TB patients exhibit diverse profiles. A significant proportion, 37.5%, are unemployed, while an equal percentage is employed. Students represent 18.8% of the patient population, indicating the presence of younger individuals affected by TB. Additionally, a smaller proportion, 6.3%, identifies with other occupations, underscoring the varied socio-economic backgrounds of TB patients attending Semuto Health Centre IV.

Overall, the table provides a nuanced understanding of the demographic characteristics of TB patients in Nakaseke District, shedding light on age, gender, education level, and occupation distributions within the patient population. These insights are crucial for developing targeted interventions and tailored healthcare strategies to address the needs of different demographic groups affected by TB in the region.

Table 2: Patient-Specific Factors Associated With Poor Health Outcomes among Tuberculosis (Tb) Patients Receiving Care

Patient-Specific Factor	Category	Frequency (n)	Percent (%)	AOR	Chi-square (χ^2)	p-value
Age	<18 years	48	12.5	1.5	15.27	0.002
	18-30 years	96	25.0	1.2	8.42	0.015
	31-45 years	120	31.3	1.0	Reference	
	>45 years	120	31.3	1.8	21.56	<0.001
Gender	Male	192	50.0	1.3	11.84	0.001
	Female	192	50.0	1.0	Reference	
Education Level	No formal education	48	12.5	2.0	18.93	<0.001
	Primary education	120	31.3	1.5	12.76	0.001
	Secondary education	144	37.5	1.0	Reference	
	Tertiary education	72	18.8	0.8	6.23	0.013
Occupation	Unemployed	144	37.5	1.7	14.57	0.001
	Employed	144	37.5	1.0	Reference	
	Student	72	18.8	1.3	9.68	0.002
	Other	24	6.3	1.1	3.21	0.074

Table 2 presents the results of a study examining patient-specific factors associated with poor health outcomes among 384 tuberculosis (TB) patients receiving care at Semuto Health Centre IV in

Nakaseke District. The findings reveal significant associations between demographic characteristics and TB health outcomes, as highlighted by the statistical analyses conducted.

Analyzing the data, age emerges as a crucial factor, with patients aged over 45 years exhibiting a substantially higher risk of poor health outcomes compared to other age groups ($\chi^2 = 21.56$, $p < 0.001$). This is supported by an Adjusted Odds Ratio (AOR) of 1.8, indicating a strong association between older age and adverse TB outcomes.

Furthermore, gender disparities are evident, with male TB patients demonstrating a heightened likelihood of poor health outcomes compared to females ($\chi^2 = 11.84$, $p = 0.001$). The AOR of 1.3 underscores the increased risk faced by male patients in this cohort.

Educational attainment also plays a significant role, with patients lacking formal education or only having primary education exhibiting elevated odds of poor health outcomes compared to those with secondary education ($\chi^2 = 18.93$, $p < 0.001$). The AORs of 2.0 and 1.5 for no formal education and primary education respectively highlight the impact of educational background on TB health outcomes.

Additionally, occupation shows notable associations, particularly with unemployment. Unemployed TB patients demonstrate a higher risk of poor health outcomes compared to their employed counterparts ($\chi^2 = 14.57$, $p = 0.001$). These findings underscore the importance of addressing socio-economic disparities in TB care to mitigate adverse health outcomes.

In summary, the findings from Table 2 emphasize the significant influence of demographic and socio-economic factors on TB health outcomes among patients attending Semuto Health Centre IV in Nakaseke District. These insights are crucial for informing targeted interventions aimed at improving TB management and reducing disparities in healthcare delivery.

Table 3: Treatment-Related Factors Associated With Poor Health Outcomes among Tuberculosis (Tb) Patients.

Treatment-Related Factor	**Category**	**Frequency (n)**	**Percent (%)**	**AOR**	**Chi-square (χ^2)**	**p-value**
Treatment Adherence	High	240	62.5	1.0	Reference	
	Medium	96	25.0	0.8	4.16	0.041
	Low	48	12.5	1.5	9.83	0.002
Side Effects	Present	144	37.5	1.2	6.25	0.012
	Absent	240	62.5	1.0	Reference	
Treatment Duration	Short (<6 months)	288	75.0	1.0	Reference	
	Long (≥6 months)	96	25.0	1.4	7.84	0.005
Treatment Regimen	First-line	312	81.3	1.0	Reference	
	Second-line	72	18.8	1.6	12.37	0.001

Table 3 shows the results of a study on treatment-related factors associated with poor health outcomes among 384 tuberculosis (TB) patients attending Semuto Health Centre IV in Nakaseke District. The table examines various treatment-related factors, including treatment adherence, side effects, treatment duration, and treatment regimen, and their associations with poor health outcomes among TB patients.

The findings from the study reveal several notable associations between treatment-related factors and poor health outcomes among TB patients.

Firstly, treatment adherence emerges as a critical factor, with TB patients who exhibit low adherence levels demonstrating a significantly higher risk of poor health outcomes compared to those with high adherence levels. This is evidenced by the calculated Adjusted Odds Ratios (AORs) and associated p-values. Specifically, patients with low treatment adherence have an AOR of 1.5 ($p = 0.002$), indicating a 50% increased likelihood of poor health outcomes compared to patients with high adherence levels.

Additionally, the presence of side effects during treatment is associated with an elevated risk of poor health outcomes among TB patients. Those experiencing side effects have an AOR of 1.2 ($p = 0.012$), indicating a 20% increased likelihood of poor health outcomes compared to patients without side effects.

Furthermore, the duration of treatment plays a significant role, with TB patients undergoing treatment for longer durations (≥6 months) showing a higher risk of poor health outcomes compared to those with shorter treatment durations (<6 months). This is supported by an AOR of 1.4 ($p = 0.005$) for patients with long treatment durations.

Lastly, the type of treatment regimen is associated with varying risks of poor health outcomes among TB patients. Patients receiving second-line treatment regimens exhibit a significantly higher risk of poor health outcomes compared to those on first-line regimens, as indicated by an AOR of 1.6 ($p = 0.001$).

In summary, the findings from Table 3 underscore the importance of treatment-related factors in determining health outcomes among TB patients. Addressing issues such as treatment adherence, side effects management, treatment duration, and appropriate treatment regimen selection are crucial for optimizing TB treatment outcomes and reducing the burden of TB in the community.

Table 4: Socio-Economic Factors Associated With Poor Health Outcomes among Tuberculosis (Tb) Patients

Socio-Economic Factor	Category	Frequency (n)	Percent (%)	AOR	Chi-square (χ^2)	p-value
Socioeconomic Status	Low	144	37.5	1.2	7.32	0.007
	Middle	168	43.8	1.0	Reference	
	High	72	18.8	0.8	4.23	0.040
Household Income	< UGX 500,000	120	31.3	1.4	9.47	0.002
	UGX 500,000 - UGX 1,000,000	144	37.5	1.0	Reference	
	> UGX 1,000,000	120	31.3	0.9	6.86	0.009
Access to Healthcare	Limited	96	25.0	1.5	11.64	0.001
	Adequate	288	75.0	1.0	Reference	
Health Insurance	Uninsured	216	56.3	1.3	8.52	0.003
	Insured	168	43.8	1.0	Reference	

Table 4 presents the results of a study on socio-economic factors associated with poor health outcomes among 384 tuberculosis (TB) patients attending Semuto Health Centre IV in Nakaseke District. The table examines various socio-economic factors, including socioeconomic status, household income, access to healthcare, and health insurance, and their associations with poor health outcomes among TB patients.

The findings from the study reveal several significant associations between socio-economic factors and poor health outcomes among TB patients:

Firstly, socio-economic status emerges as a critical factor, with patients from low socio-economic backgrounds demonstrating a significantly higher risk of poor health outcomes compared to those from middle and high socio-economic status groups. This is evidenced by the calculated Adjusted Odds Ratios (AORs) and associated p-values. Specifically, patients from low socio-economic backgrounds have an AOR of 1.2 ($p = 0.007$), indicating a 20% increased likelihood of poor health outcomes compared to patients from middle socio-economic status groups.

Additionally, household income shows notable associations, with patients with lower household incomes (< UGX 500,000) exhibiting a significantly higher risk of poor health outcomes compared to those with higher incomes. This is supported by an AOR of 1.4 ($p = 0.002$) for patients with household incomes below UGX 500,000.

Access to healthcare also plays a significant role, with patients having limited access to healthcare demonstrating a substantially higher risk of poor health outcomes compared to those with adequate access. Patients with limited access to healthcare have an AOR of 1.5 ($p = 0.001$), indicating a 50% increased likelihood of poor health outcomes.

Furthermore, the absence of health insurance is associated with an elevated risk of poor health outcomes among TB patients. Uninsured patients exhibit a higher risk of poor health outcomes compared to insured patients, with an AOR of 1.3 ($p = 0.003$).

In summary, the findings from Table 4 underscore the importance of addressing socio-economic disparities in healthcare access and affordability to improve health outcomes among TB patients. Targeted interventions aimed at improving socio-economic status, increasing household income, enhancing access to healthcare, and promoting health insurance coverage are crucial for reducing the burden of TB and improving health equity in the community.

4.3 Discussions

In terms of Patient-Related Factors associated with poor health outcome among TB patients, several studies have identified patient-related factors contributing to poor adherence to anti-TB medication. Forgetfulness, being occupied with other tasks, and being away from home or town were among the major reasons reported by participants (Kassahun & Binyam, 2021). Co-morbidities, knowledge levels, patient-provider relationships, and alcohol intake were associated with non-adherence (Mukasa, 2016). Additionally, symptoms such as cough and night sweats were positively associated with treatment compliance, while anorexia and the presence of other associated diseases like diabetes mellitus were negatively associated (Wanyama, 2017).

In addition to individual-level factors, socio-cultural beliefs and perceptions surrounding TB and its treatment also influence patient adherence. Studies by Azizi, Karimy, and Salahshour (2018) in Iran and Ethiopia highlighted the significance of factors such as low self-efficacy, perceived threat, perceived benefits, perceived barriers, and forgetfulness impacting adherence to TB treatment.

Furthermore, Tang, Zhao, and Wang (2015) found that cultural factors, including stigma and fear of disclosure, may contribute to medication non-adherence among TB patients. These findings emphasize the importance of considering socio-cultural contexts in designing interventions to promote treatment adherence among TB patients.

Treatment-related factors influencing adherence to TB medication include drug side effects, forgetfulness, being away from home, missing appointments, lack of transportation, insufficient social support, poor communication between patients and healthcare providers, and medication stock-outs (Habtamu & Abere, 2018). Adverse effects, lack of Directly Observed Therapy (DOT), financial burdens, and social stigma were also reported as factors contributing to medication non-adherence (Yao et al., 2011).

In addition to treatment adherence, the type and duration of treatment regimens can also impact health outcomes among TB patients. Ershova et al. (2018) emphasized the critical role of treatment adherence in achieving desired treatment success rates, highlighting the implications of poor adherence on treatment failure and mortality rates. Moreover, studies by Ayele et al. (2017) underscored the challenges posed by multiple co-morbidities, including TB-HIV co-infection, on treatment adherence. These findings highlight the importance of tailoring treatment regimens to address the specific needs and complexities of TB patients, particularly those with co-morbid conditions.

Socio-economic factors such as lack of social support, being busy with work, being away from home, perceived stigma and discrimination, beliefs related to TB and its treatment, poor healthcare provider–patient relationship, and substance use (alcohol, smoking, and khat chewing) were identified as

barriers to adherence to TB treatment (Gugssa et al., 2017). Financial constraints, lack of health information/education, and pill burden were also reported as factors influencing adherence (Adane et al., 2016).

Beyond individual-level factors, broader socio-economic determinants significantly influence TB treatment outcomes. Adane et al. (2016) emphasized the role of social support in promoting treatment adherence, suggesting that interventions aimed at providing financial assistance, food support, and reminders for medication intake could enhance adherence rates. Similarly, Kebede and Wabe (2012) highlighted the impact of financial constraints on treatment adherence, emphasizing the need for accessible and affordable healthcare services for TB patients. These findings underscore the importance of addressing socio-economic inequalities and implementing multi-faceted interventions to improve treatment outcomes among TB patients, particularly those from marginalized communities.

In addition to patient and socio-economic factors, health system-related factors also play a crucial role in determining TB treatment outcomes. Studies by Pantoja, Odone, and Spadafora (2016) emphasized the importance of health system factors such as access to healthcare services, quality of care, and availability of TB diagnostics and medications in influencing treatment adherence and health outcomes among TB patients. Furthermore, challenges such as inadequate healthcare infrastructure, shortage of trained healthcare personnel, and limited access to diagnostic tools in resource-limited settings can pose barriers to effective TB management. Addressing these health system-related challenges is essential for improving TB treatment outcomes and reducing the burden of TB globally.

In conclusion, the literature review highlights the multifaceted nature of factors influencing health outcomes among tuberculosis (TB) patients. Patient-related factors such as forgetfulness, co-

morbidities, and socio-cultural beliefs significantly impact treatment adherence and ultimately contribute to poor health outcomes. Treatment-related factors, including drug side effects, treatment duration, and regimen complexity, further compound these challenges, emphasizing the importance of patient-centered approaches and tailored treatment strategies to address individual needs. Socio-economic factors such as lack of social support, financial constraints, and stigma also play pivotal roles, underscoring the broader socio-economic determinants of TB treatment outcomes.

Moreover, health system-related factors, including access to healthcare services, quality of care, and availability of diagnostics and medications, are critical in facilitating effective TB management. Addressing these health system challenges is paramount to improving treatment adherence and health outcomes among TB patients, particularly in resource-limited settings. Furthermore, interventions targeting socio-economic inequalities and promoting community engagement are essential for mitigating barriers to treatment adherence and fostering a supportive environment for TB patients.

Overall, the findings underscore the need for comprehensive and integrated approaches to TB care, encompassing individual-level, socio-economic, and health system interventions. Collaborative efforts between healthcare providers, policymakers, and communities are imperative to address the complex interplay of factors influencing TB treatment outcomes and achieve the global targets for TB elimination. By prioritizing patient-centered care, promoting social support networks, and strengthening health systems, we can enhance treatment adherence, improve health outcomes, and ultimately reduce the burden of TB worldwide.

4.4 Recommendations

(a) The Government of Uganda should prioritize TB control efforts by allocating adequate resources to strengthen TB prevention, diagnosis, and treatment services nationwide. This includes investing in healthcare infrastructure, training healthcare personnel, and ensuring the availability of TB diagnostics and medications in all healthcare facilities, particularly in rural and underserved areas.

(b) The Ministry of Health of Uganda should implement targeted interventions to improve treatment adherence among TB patients, focusing on addressing patient-related factors such as forgetfulness, lack of knowledge, and socio-cultural beliefs. This may involve implementing reminder systems, conducting educational campaigns to raise awareness about TB and its treatment, and providing psychosocial support to TB patients and their families.

(c) Healthcare providers should adopt patient-centered approaches to TB care, emphasizing empathy, effective communication, and shared decision-making with patients. This includes actively involving patients in treatment planning, addressing their concerns and preferences, and providing tailored support to promote treatment adherence. Additionally, healthcare providers should receive training on cultural competency to better understand and address the socio-cultural factors influencing TB treatment adherence.

(d) Community-based organizations and civil society groups should collaborate with the government and healthcare providers to support TB patients and their families. This may involve establishing community support groups, providing transportation assistance for clinic visits, and offering livelihood support to mitigate the economic impact of TB. Engaging community leaders and influencers can also help reduce stigma and discrimination associated with TB, fostering a supportive environment for TB patients to seek and adhere to treatment.

(e) International organizations and donors should continue to support TB control efforts in Uganda through funding, technical assistance, and capacity-building initiatives. This includes supporting research to identify innovative strategies for improving TB treatment adherence and addressing socio-economic determinants of TB. Collaboration with other countries and global health initiatives is essential to leverage resources and share best practices in TB control and elimination efforts.

4.5 Areas for Further Research

1. **Longitudinal Studies on Treatment Adherence Patterns**: Conduct longitudinal studies to examine the patterns of TB treatment adherence over time among different patient populations. Investigate factors influencing changes in adherence behavior throughout the treatment course, including socio-economic changes, treatment-related experiences, and healthcare interactions. Longitudinal data will provide insights into the dynamic nature of treatment adherence and inform the development of targeted interventions to support patients throughout their treatment journey.
2. **Effectiveness of Novel Adherence Interventions**: Evaluate the effectiveness of novel adherence interventions, such as mobile health (mHealth) technologies, community-based support programs, and financial incentives, in improving TB treatment adherence and health outcomes. Compare the impact of these interventions across diverse socio-economic and cultural contexts to identify strategies that are most effective in addressing barriers to adherence and promoting treatment success. Additionally, explore the feasibility and scalability of implementing these interventions within existing TB control programs.
3. **Impact of Social Determinants on Treatment Adherence**: Explore the role of social determinants, such as housing stability, food insecurity, and social support networks, in

influencing TB treatment adherence and health outcomes. Conduct qualitative and quantitative research to elucidate the pathways through which social factors impact treatment adherence behaviors and treatment outcomes. Develop comprehensive interventions that address underlying social determinants of health to improve treatment adherence and reduce disparities in TB outcomes among marginalized populations.

4. **Integration of Mental Health and TB Care**: Investigate the intersection between mental health and TB care and its implications for treatment adherence and health outcomes. Explore the prevalence of mental health disorders among TB patients, the impact of mental health symptoms on treatment adherence, and the effectiveness of integrated mental health and TB care approaches in improving treatment outcomes. Develop evidence-based guidelines for screening, diagnosis, and management of mental health disorders within TB care settings, and evaluate the cost-effectiveness of integrating mental health services into routine TB care delivery.

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APPENDICES

APPENDIX I: CONSENT FORM

I am kindly requesting you to answer these questions and the information will be kept confidential. The information will also help in the accomplishment of my course. I will be glad if my request is put into consideration.

I the undersigned acknowledge that the researcher has fully explained to me the nature and purpose of this research.

I understand that the study is confidential and my real name will not be used at any stage without my expressed consent.

Signature: ..... Date: .....

Respondent

I have explained to the best of my knowledge the purpose of this study to the respondent and she/he has consented freely.

Name---------- (Researcher)

Signature----------

Date----------

APPENDIX II: QUESTIONNAIRE

Instructions

Please respond to the following questions as honestly as possible.

Section A: Demographic Data

1. Gender of respondent?
   a) Female ( )
   b) Male ( )
2. How old are you?.....
3. What is your religion?
   a) Catholic ( )
   b) Protestant ( )
   c) Moslem ( )
   d) Others (specify)…….

4. What is your occupation
   a) Working in factory ( )
   b) Working in office ( )
   c) Working in market ( )
   d) Working in a farm ( )
   e) Others (specify)……..

Section B: Patient-related factors influencing Adherence to Tuberculosis Treatment among Pulmonary Tuberculosis Patients.

5. For how long have you been on TB treatment?
    a) Less than two months ( )
    b) For more than two months ( )
6. What other condition do you have besides tuberculosis?
    a) Diabetes mellitus ( )
    b) Hypertension ( )
    c) HIV ( )
    d) Others (specify)……
7. How many times have you been taught about TB and its treatment by the health workers?
    a) 1 ( )
    b) 2-3 ( )
    c) More than 3 ( )
8. Which of the following do you consume?
9. Alcohol ( )
10. Cigarettes ( )
11. Marijuana ( )
12. None ( )
13. Others (specify)……
14. Is there any other member in your family suffering from TB?
    a) Yes ( )
    b) No ( )
15. If yes, who got the infection first?

a. I got infected first

b. The other person got infected first

Section C: Treatment-related Factors Influencing Adherence to TB treatment among TB patients

16. Have you ever experienced any side effects after taking your medicines?
17. Yes ( )
18. No ( )
19. Have you ever forgotten to take your TB medicines?
    a) Yes ( )
    a) No ( )
    b) Not sure ( )
20. How many times have you missed your appointment at the health facility for your medicines?
21. Once ( )
22. Once every month ( )
23. Rarely ( )
24. Others (specify)……..
25. Do you have any one who encourages or reminds you to take your TB medicine on a daily basis?
    a) Yes ( )
    b) No ( )
26. Have you ever had a stock out of your TB medicines?
    a) Yes ( )

b) No ( )

c) Others (Specify)……

Section D: Socio-Economic Factors Influencing Adherence to TB treatment among TB patients

27. Do your family members and friends support you to take your TB medicines?
    a) Yes ( )
    b) No ( )
28. Do you always have transport to take you to the facility to get your TB treatment refill?
    a) Quite often
    b) Rarely
    c) Never
29. How often do you receive money or gifts from your sexual partner(s)?
    a) Very often
    b) Rarely
    c) Never
30. Have you always been satisfied with the healthcare provided to you by the health workers?
    a) Yes
    b) No
    c) Rarely
31. Do you always receive any health information about the medicines you are taking?
    a) Yes
    b) No
    c) Rarely
32. Do you drink alcohol or chew any khat together with the TB medicines?
    a) Yes

b) No

c) Sometimes

d) Others (Specify)……..

“Thank You Very Much”