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Original Article

FACTORS CONTRIBUTING TO NON-ADHERENCE TO ANTI-TUBERCULOSIS DRUGS AMONG TUBERCULOSIS PATIENTS IN ARUA REGIONAL REFERRAL HOSPITAL ARUA DISTRICT. A CROSS-SECTIONAL STUDY.

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Abstract

Background

Tuberculosis is an infectious airborne bacterial disease. The study aims to assess the factors contributing to non-adherence to Ani-Tuberculosis drugs among Tuberculosis Patients.

Methodology

A cross-sectional study was designed at Arua Regional Referral Hospital in the Arua district using a Simple random sampling technique on 32 respondents including both males and females.

Results

The significant factors influencing adherence were forgetfulness, drug stockouts in facilities, the number and size of drugs to be taken, and social support. The main reason for non-adherence was that the respondent had forgotten to swallow the drug 8(34%), those who forgot because the drugs were big and that they became well accounted for 8(25%) each while other respondents gave other reasons 5(16%). 28(88%) reported that they were given TB drugs as prescribed while those who did not receive drugs said that there was a stock out of drugs 2(50%) while 2(50%) were referred to another facility when no drugs were given. The majority of patients 21(66%) reported having been given 1-2 types of drugs which they took 1-2 times a day 23(72%) as compared to those who took 2-4 times 9(28%). Most respondents received social support from their families and communities 29(91%), with up to 28(88%) having been escorted by at least a family relative for treatment despite 03(9%) and 1(3%) having started treatment after a month and more than a month respectively.

Conclusion

There is adequate general knowledge on TB however loss of employment, stigma and lack of social support, discrimination, poverty, having a comorbidity, medication side effects, and long treatment period posed as barriers to treatment adherence.

Recommendation

Preventing the need for retreatment in the first place is the best strategy given the patient, community, and national health consequences of poor initial TB treatment outcomes and non-adherence.

Keywords: *Non-adherence, Anti-Tuberculosis drugs, Arua Regional referral Hospital.*
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Background of the study

Tuberculosis (TB) is an infectious airborne bacterial disease caused by Mycobacterium tuberculosis that most often affects the lungs. Transmission of this disease occurs when a person inhales droplet nuclei (sputum splashes) that enter through the mouth or nose, upper respiratory tract, and bronchi until they reach the alveoli of the lungs and can also attack other organs. Pulmonary tuberculosis presents with classical symptoms like a productive cough usually exceeding two weeks, evening fevers, drenching night sweats, general body malaise, and weight loss (WHO, 2018). Tuberculosis (TB) continues to remain a major global health problem and is the second leading cause of death from infectious diseases worldwide and the leading preventable cause of death among people living with HIV. In 2015, there were an estimated 10.4 million new TB cases and 1.4 million TB deaths, with an additional 0.4 million deaths resulting from TB among HIV-positive people. In the same year, the TB case fatality rate varied widely from under 5% in some countries to more than 20% in most countries in the WHO African Region (Abera, 2015).

More than 90% of the global TB cases and deaths occur in the developing world the persistence of large inequities in access to high-quality diagnostic and treatment services, widespread poverty, poor treatment adherence, and lowered immunity in these countries where also 75% of the cases are in the most economically productive age group (15–54 years) (WHO, 2012).

In sub-Saharan Africa, the Human immunodeficiency virus (HIV) is one of the most important risk factors responsible for the progression of latent TB to active TB accounting for more than half of all the TB cases (WHO, 2020). People living with HIV have a 20-fold higher risk of developing TB than those without HIV, and the risk continues to increase as the vital immunity cells (CD4) count progressively decreases. HIV/TB co-infection is thus known as a ‘double trouble’ and a public health threat especially for regions where both diseases are endemic (Davy Mendez .T, 2019).

Successful treatment of tuberculosis involves taking anti-tuberculosis drugs for at least six months. Many countries subscribe to the internationally accepted WHO strategy for TB control which is tailored to 6 months of therapy. In the first two months of treatment (intensive phase), a combination dose of rifampicin (R), isoniazid (H), pyrazinamide (Z) and ethambutol (E) (2RHZE) was used daily followed by either 6 months of ethambutol and isoniazid (6EH) for the 8 months' regime; or 4 months of rifampicin and isoniazid (4RH) for the 6 months' regime. During the intensive phase of treatment, patients collect drugs from facilities weekly while monthly collections are done during the continuation phase. The treatment regime for retreatment patients is 8 months and includes Streptomycin (S) in the first 2 months (Uplekar M, 2015). WHO and other ministries of health recommendations emphasized that the Direct Observation of Treatment (DOT) be done by a health worker or other responsible persons, including household members or others with whom the patient has a close relationship, at least during the intensive phase of treatment. Some patients fail to adhere to treatment and eventually default before completing the course (Davy Mendez .T, 2019). Patients whose treatment is interrupted for 2 consecutive months or more, as defined by WHO, are reported as 'Out of Control' at the end of the treatment period indicating that patients with pulmonary TB who default may have sputum samples that are smear positive for acid-fast bacilli (AFB), indicating high risk of transmission to others. The ultimate diagnosis of treatment failure in TB patients occurs when resistance occurs to two of the most efficacious first-line drugs (isoniazid and Rifampicin) (Gwitira I, 2018).

Multidrug-resistant tuberculosis is an emerging problem in many parts of the world, and its levels among new TB patients are increasing in sub-Saharan Africa. In Ethiopia, MDR TB rate was estimated to be 1.8% among new cases and 19% among previously treated cases in Eritrea (Benson R K, 2014) The prevalence of MDR-TB among new cases ranges from 0.4% in Tanzania to 4.4% in Uganda, and among recurrent cases ranges from 3.9% in Tanzania to 17.7% in Uganda. About 500 new smear-positive MDR-TB cases are estimated to occur per year in Uganda (Kidenya B R, 2014). Poor adherence contributes to the worsening of the TB situation not only by increasing incidence but also by initiating drug resistance to MDR-TB. Resistance to anti-TB drugs has become a serious obstacle in the control of the disease. The WHO recommends at least an 85% cure rate for all diagnosed TB cases. To achieve this cure rate, adherence needs to be in the order of 85–90% (WHO, 2015). Adherence to long-term therapies of 6-8 months of taking anti–TB agents is a multidimensional phenomenon determined by the interplay of factors and dimensions namely; Patient factors, health care factors, and community factors. Improving treatment outcomes and designing effective interventions requires an understanding of the factors that prevent people from adhering and those that help in treatment completion (MOH, 2017). The study aims to assess the factors contributing to non-adherence to Ani-Tuberculosis drugs among Tuberculosis Patients in Arua Regional Referral Hospital Arua District.

Methodology

Study Design

A cross-sectional study design was employed. This is because it was carried out for a short period and did not require follow-up of respondents.

Study Area

The study was carried out at the Arua Regional Referral Hospital in the Arua district, located in the West Nile,

Uganda.

Study population

The study population for the study was TB patients receiving treatment at the Arua Regional Referral Hospital Arua district.

Sample size determination

Since this population was defined and pre-determined (finite), the process of determining the sample size was calculated by using Solvin's formula (1962) as shown below.

n

N= 2Where;

1+(E)

N = Number of respondents.

n =Target population, n=32 (number of treatment failures that end up to MDR-TB in Arua district. (IDI 2017, National TB Leprosy Program report 2017)

E = Fixed error, E= 0.05

N== 32

Therefore 32 TB respondents were recruited in the study.

Sampling technique

A simple random sampling technique was used to select respondents to participate in the study.

This is because it could not create bias among participants.

Data collection method

Using a questionnaire, the research assistants had TB patients approached and self-administered to them, after filling them, they were coded, sorted, organized, and then later decoded to get the information from them.

Data collection tool

Data was collected using a structured questionnaire which consisted of both open and closed-ended questions.

Data collection procedure

The letter was first received from the Kampala School of Health Sciences seeking permission to be granted at Arua Regional referral hospital, Arua district, then the acceptance letter was received from the hospital Director. Consent was obtained from patients by voluntary signing of the consent form, then information was obtained from patients by using a questionnaire. Confidentiality was also ensured.

Dependent variable

Non-adherence to anti-tuberculosis drugs among tuberculosis patients

Independent Variable

Individual factors, Health facility-related factors, and Community-related factors contribute to non-adherence to anti-tuberculosis drugs among tuberculosis patients.

Quality control

Pretesting of the questionnaire

To ensure quality control, questionnaires were pre-tested by administering the tool to volunteers, and adjustments were made accordingly before being given out to the patients.

Inclusion Criteria

All patients diagnosed with tuberculosis were currently on anti-TB drugs, either first-line or second, and were attending Arua regional referral hospital.

Exclusion criteria

TB patients who hadn't started on anti-TB therapy as well as those who did not consent to the research study

Data analysis and presentation

Data was collected using a questionnaire decoded and tallied then using Microsoft Excel 2007 the data was presented using tables, figures, and graphs.

Ethical consideration

A letter of approval from the research committee of Kampala School of Health Sciences was obtained together with approval from the hospital Director of Arua Regional Referral Hospital before data was collected. Initials were used to provide privacy and confidentiality of the patient's data. Before data collection, the objectives of the study were fully explained to the records manager and the research section of Arua Regional Referral Hospital to obtain their permission to do research at the hospital.

Table 1: Showing the socio- demographic data of the respondents (N=32).

Variable	Category	Frequency, (f)	Percentage (%)
Marital status	Single	09	28
	Married	20	63
	Widow	03	09
	Divorced	00	00
Sex	Female	13	41
	Male	19	59
Age	<18years	03	10
	18-30 years	09	28
	30-45years	18	56
	>45 Years	02	06
Tribe	Alur	08	25
	Acholi	03	09
	Lug bara	17	53
	Others	04	13
Education level	None	10	31
	Primary	08	25
	Secondary	11	34
	Tertiary	03	10
Residence	Urban	10	31
	Rural	22	69
Religion	Muslim	14	44
	Catholic	08	25
	Anglican	09	28
	Others	01	03
Number of occupants in a room	1-2 persons	26	81
	2 -4 persons	06	19
	>5 persons	00	00
Occupation	Peasant	22	69
	Civil servant	04	13
	Casual laborer	06	18
	Others	00	00
Income level	100,000-300,000	17	53
	300,000-500,000	10	32
	500,000-700,000	03	09
	700,000- above	02	06
Times taken the TB drug	First time	22	69
	More than once	14	31

Results

Socio – demographic data of the respondents

From Table 1, results for the socio-demographic data showed that majority of the respondents 19 (59%) were males while only 13(41%) females were enrolled in, of which 18(56%) were between the age group of 30 -45 years of age, few of less than 18 years 03(10%), most respondents were married 20(63%) while only 09(28%) were single. Muslims constituted of the highest number of respondents 14(44%), Lug bara 17(53%) were most tribe noted, of which, majority of them were from rural residences 22(69%).

Most of the respondents had no formal education 10(31%) while only 3(10%) had tertiary education, only 4(13%) were civil servants while majority were peasants 22(69%) earning less than 300,000 Ugx monthly 17(53%).

From the figure 1, 14(31%) of the respondents were taking the anti TB drugs for the first time while 75% were taking the drugs for the subsequent times

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Figure 1: The number of times respondents have taken the anti-TB drugs (N=32)

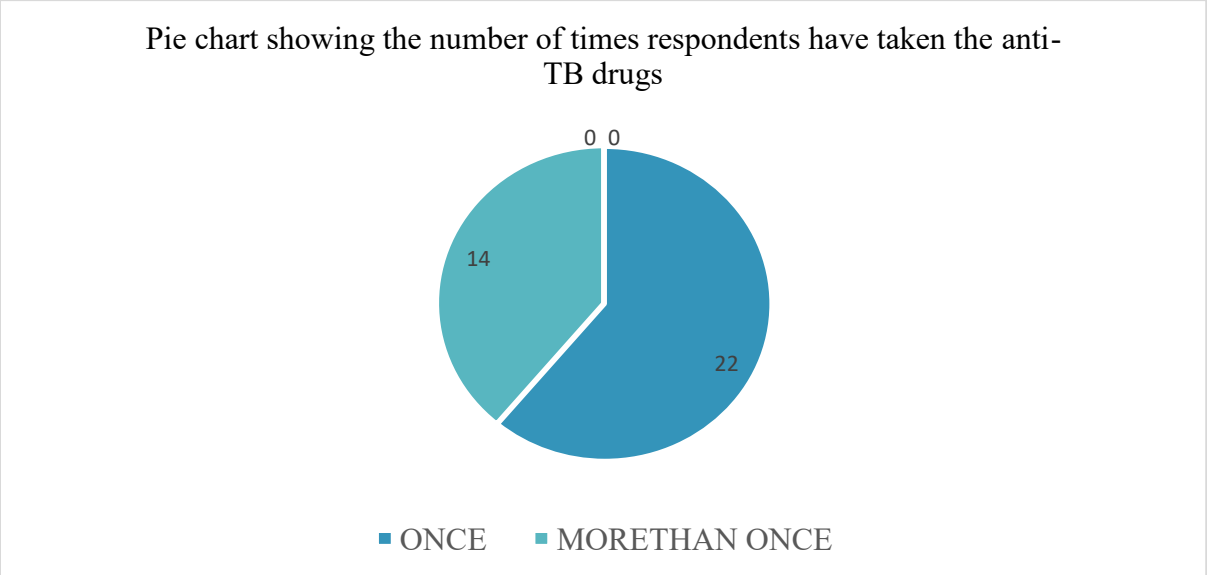
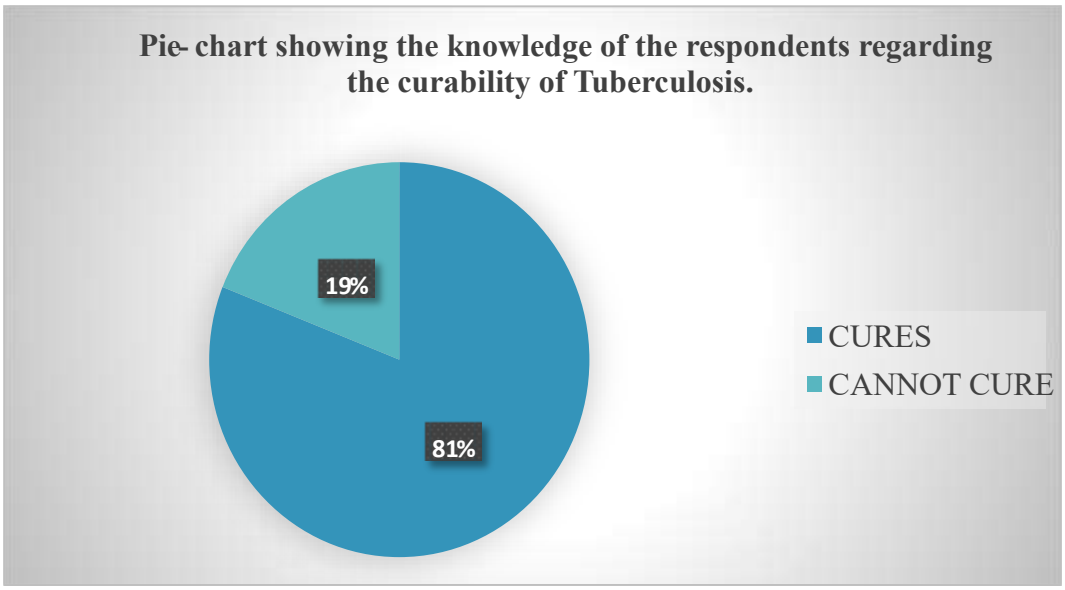


Table 2: Showing individual factors contributing to non-adherence of TB drugs among TB patients (N=32).

Variable	Category	Frequency, (f)	Percentage (%)
Knowledge of TB transmission	Air borne	29	91
	Sexual	01	03
	Through water	00	00
	Others	02	06
Knowledge on curability of TB	Yes	26	81
	No	06	19
Experience of side effects of TB drugs	Yes	32	100
	No	00	00
If yes, which side effects	Nausea and vomiting	06	19
	Diarrhea	02	07
	Skin rash	04	12
	General weakness	10	31
	Others	10	31
Where patient got treatment of side effects from	Hospital	15	47
	Herbalist	05	16
	Never treated	07	21
	Others	05	16
Presence of co infection/ morbidity	Yes	22	69
	No	10	31
If yes, which ones	Hypertension	03	14
	Diabetes	03	14
	Sickle cell anemia	00	00
	HIV/AIDS	16	72
Any allergies	Yes	01	03
	No	31	97
Smoking	Yes	11	34
	No	21	66
Alcohol use	Yes	14	44
	No	18	56

Figure 2: The knowledge of the respondents on the curability of Tuberculosis (N=32).



Individual factors contributing to non-adherence of TB drugs among TB patients

From the figure 2, Majority of the respondents 26(81%) acknowledged that Tuberculosis was curable while the minority 06(19%) did not concur with the fact that is it curable.

From figure 3, the main reason for non-adherence was that the respondent had forgotten to swallow the drug 8(34%), those who forgot because the drugs were big and that they became well accounted for 8(25%) each while other respondents gave other reasons 5(16%).

From figure 4, most 11(34%) of the respondents reported having been smoking while least 14(44%) reported to be using alcohol even while taking the drugs.

Health facility related factors contributing to the non-adherence of anti-TB drugs among TB patients.

From table 3, majority of the respondents 28(88%) reported that they were given TB drugs as prescribed while those who did not receive drugs said that there was a stock out of drugs 2(50%) while 2(50%) were referred to another facility when no drugs were given. Of those who received the medication of the TB drugs, 29(91%) reported having been given treatment advice and counselling for the drug while 9% weren't given and that the health workers were supportive (75%). Majority of patients 21(66%) reported having been given 1-2 types of drugs which they took 1-2 times a day 23(72%) as compared to those who took 2-4 times 9(28%). All respondents reported experiencing at least a side effect of drugs given with only 25(78%) reporting to the health worker while 05(16%) went to herbalist and 02(6%) went to church.

Figure 5 shows that, half of the of the total respondents 16(50%) reported staying and travel between 5-10km to access the hospital, only 10(31%) were from areas less than 5km while 2(6%) travelled more than 20 km to reach the service of hospital.

From the figure 6, most of the respondents 18(56%) reported waiting between 1-2 hours before being served while least 1(4%) reported having waited for more than 4 hours before service.

Figure 3: The Reason for not taking drugs (N=32).

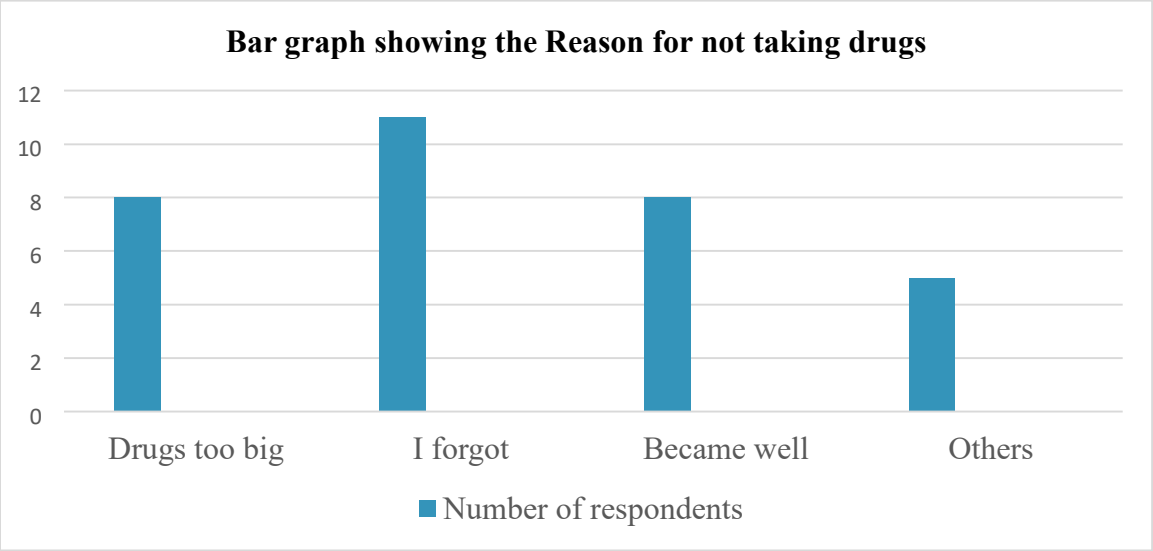


Figure 4: Social behaviors of smoking and alcohol intake among respondents (N=32).

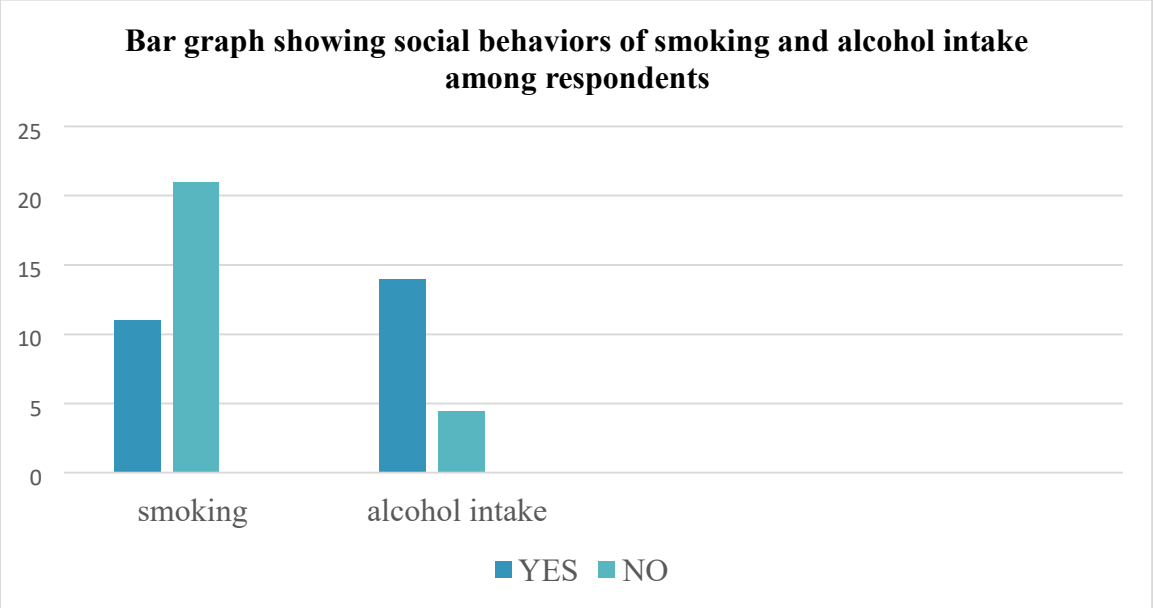


Table 3: Showing health facility related factors contributing to non- adherence of AntiTB drugs (N=32) .

Variable	Category	Frequency, N=32	Percentage (%)
Distance from hospital	Less than 5km	10	31
	5-10km	16	50
	10-20km	04	13
	More than 20 km	02	06
Did you receive drugs	Yes	28	88
	No	04	12
If no, why	No drugs at hospital	02	50
	Told to buy	00	00
	Was referred	02	50
Treatment advice/health education	Yes	29	91
	No	03	09
Number of drugs given	1-2 types	21	66
	2-4 types	10	31
	More than 4 types	01	03
Number of times drug taken	1-2 times a day	23	72
	2-4 times a day	09	28
	More than 4 times	00	00
Attitude of health worker/ hospital	Supportive	24	75
	Un supportive	04	12.5
	Over crowding	04	12.5
Any side effects of drugs	Yes	32	100
	No	00	00
Where they reported	Health worker	25	78
	Herbalist	05	16
	Church	02	06
Waiting time at TB clinic	Less than 30 mins	10	31
	1- 2 hours	18	56
	2-4 hours	03	09
	More than 4 hours	01	04

Figure 5: Showing distance from the hospital (N=32).

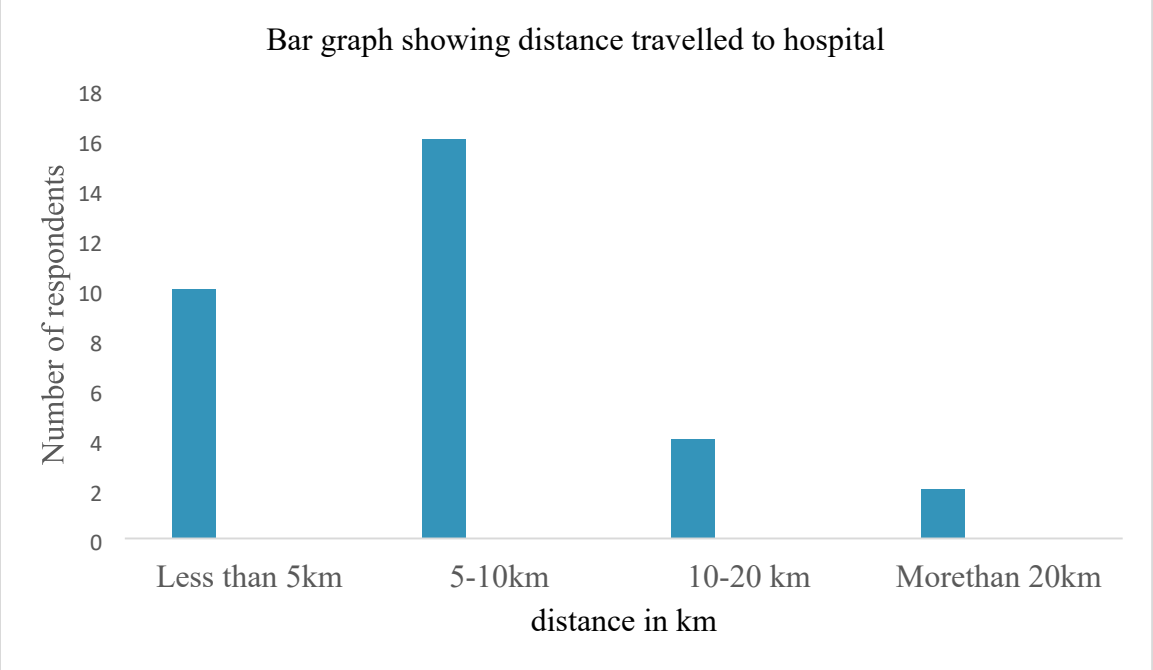


Figure 6: Waiting time at the TB clinic of the hospital before services (N=32).

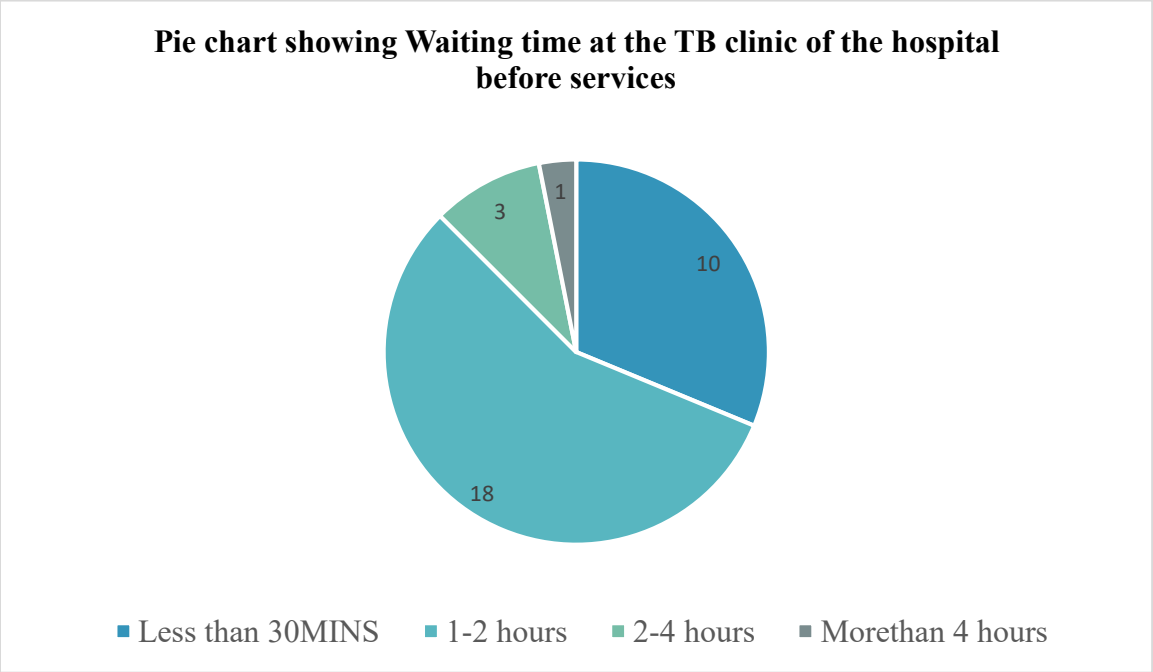
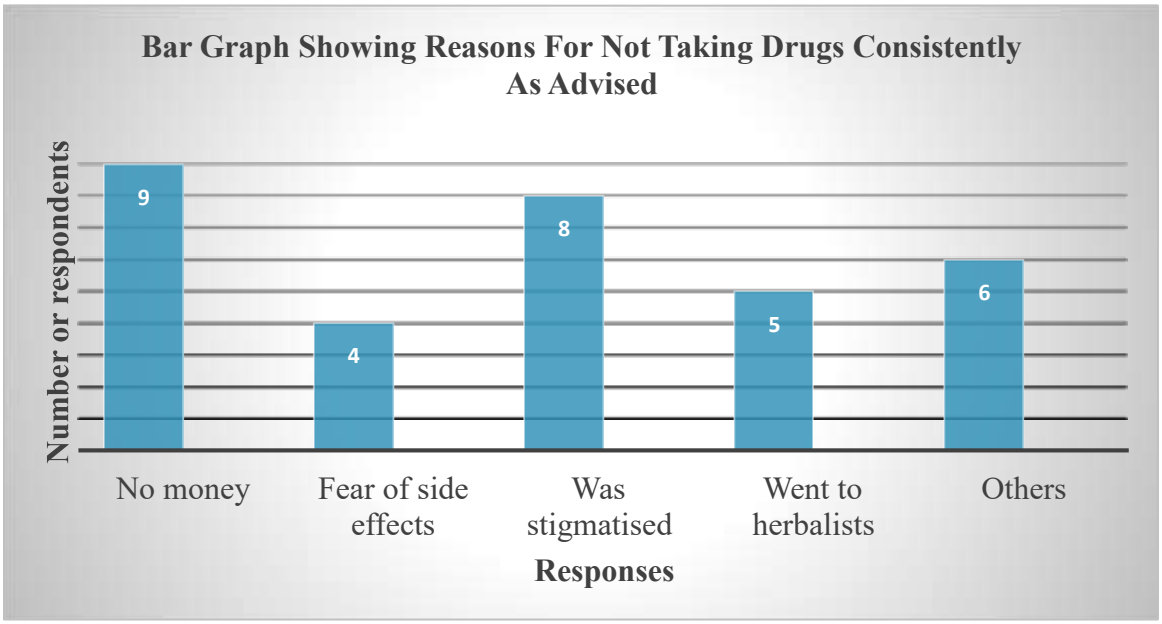


Table 4: Showing community related factors contributing to non-adherence to anti TB drugs among TB patients (N=32).

Variable	Category	Frequency, (f)	Percentage (%)
Use of herbs	Never	28	88
	Daily	02	06
	Only with side effects	02	06
Social support	Yes	29	91
	No	03	09
	None	02	06
Person who escorted respondent	Relative	28	88
	Friends	02	06
	Health worker	00	00
Time started treatment for TB after diagnosis	Immediately	28	88
	After a month	03	09
	More than a month	01	03

Figure 7: Reasons for not taking the drugs consistently as advised (N=32).



Community related factors contributing to non-adherence to anti TB drugs among TB patients.

Findings in table 4, majority of the respondents 28(88%) reported never having used herbs during treatment, the greatest number of respondents received social support from their families and communities 29(91%), with up to 28(88%) having been escorted by at least a family relative for treatment despite 03(9%) and 1(3%) having started treatment after a month and more than a month respectively.

Findings in Figure 7, of those who did not initiate treatment immediately and consistently,8(25%) reported having been stigmatized for the condition, 4(13%) feared side effects that come with the drugs, while 5(16%) went to herbalists first before starting treatment.

Discussion

Socio-demographic data contributing to non-adherence of anti-TB drugs among TB patients

From the study findings, most of the respondents 19(59%) were males compared to their female counterparts 13(41%) enrolled in the study, this was so probably because men have poor health-seeking behaviors and go for health care services when their health condition has worsened. Men are also prone to the risk factors associated with the acquisition of TB because of their lifestyles like drinking alcohol, and smoking, which increase tendencies of negligence towards taking drugs compared to their female counterparts. This finding was coherent with one of the studies conducted in West Nile Uganda among 223 TB patients that also indicated that the male gender 143 (64.1%) was more associated with developing multi-drug resistant TB as a result of non-adherence compared to the female gender 80(35.9%) (Nshizirungu L et al, 2020). It was also similar to another study conducted in Kenya which also showed that non-adherence and development of resistant TB disease were more common in males than females (Lucia Kipkoech Kefer et al, 2015).

18(56%) of respondents were in the age group of 30-45 years of age, and few of less than 18 years

03(10%), consistent with the fact that many didn't have comorbidities like diabetes and hypertension which worsen the outcomes of the TB. These results were in line with those in India which showed that generally elder patients (age > 45) were found more likely to have a 2.584 risk of ADRs compared with younger patients (age 18–45) (Sendekie AK et al, 2023)

While the majority of respondents were peasants 22(69%) earning less than 300,000 Ugx monthly 17(53%), this showed that they had no formal education hence the level of understanding of information about TB varied negatively while their counterparts with high education 3(10%) would be able to understand the disease better than patients with less education, so there is more awareness to be obedient in following treatment.

Individual factors contributing to non-adherence to anti-TB drugs among TB patients

In this study, the majority of the respondents reported having a good basic knowledge of tuberculosis in terms of its transmission 29(91%) and whether it is curable or not of which many concurred with its ability to cure 26(81%). This finding was however not coherent with one conducted in Eritrea where the respondents lacked general knowledge regarding TB Most of the patients had no or an ambiguous idea as to what caused the disease, the mode of transmission, or the length of treatment duration (Gebreweld, F.H et al, 2018).

Alcohol, smoking, and drug abuse were collinear factors in the probe for non-adherence to the anti-TB drugs therefore in this study 11(34%) of the respondents reported having been smoking while 14(445) reported to be using alcohol even while taking the TB drugs. Taking alcohol was linked to patients claiming to have forgotten to take the drug which eventually led to non-adherence. Findings were similar to those conducted by (Davy Mendez. T et al, 2019) which also indicated that patients who were discovered to have had treatment failure following their first treatment attempts were either using alcohol or using drugs of abuse.

Health facility-related factors contributing to non-adherence to anti-TB drugs among TB patients

Achievement of a good treatment outcome and adherence plan from treatment that are long course, especially in the case of pulmonary Tuberculosis that necessitates treatment for up to 68 months or longer depends on the ultimate connection between the patients and the caregivers

Failure to give TB drug treatment advice leaves patients with no information on the risk of stoppage of the drugs before the scheduled 6 months as well as bad attitude of the health workers was associated with a possible cause for non-adherence. Inadequate treatment advice was linked to perceptions where patients stopped taking their anti-TB drugs either when their TB symptoms disappeared or when they felt well and therefore Patients who felt well assumed that they were cured of the disease. In this study, 9% of respondents had not been advised on how to take the drugs which could have cause contributed to the non-adherence. These findings were similar to those in Southern Ethiopia that indicated that quite several participants 50% (11) of out the total respondents twenty-two (22) reported that had stopped taking the drugs because they thought they had recovered and

were greatly linked to inadequate information given to TB patients (Cherinet G. Boru et al, 2017)

Patients who received more pills per day 10(31%) complained of more side effects compared to those who received one or two pills per day 21(66%) taken fewer intervals a day 23(75%). These results are consistent with India showed that as a result of other comorbidities and complications in addition to their initial medical conditions those who received a higher number of medications had a 2.456 risk of developing side effects of the drug ADRs compared with those who had no comorbidities and complications and those who received a lower number of medications, respectively (Sendekie AK et al, 2023).

Community-related factors contributing to non-adherence to anti-TB drugs among TB patients

Whilst the African tradition believes much in the use of herbal medication for the treatment of many medical ailments, therefore the use of traditional healing systems before starting any medications which many believe traditional healing system is effective, takes a shorter treatment period, is supportive, keeps the patient away from bad spirits that wasn't the case with the findings of this study where majority of the respondents 28(88%) reported never having used any herbs during treatment for TB. This was associated with the fact that pre-treatment health education was given to the patients by the health workers as well as the "Directly Observed Therapy" that was introduced to monitor patients' initial treatment course over weeks. These findings were not in line with those conducted in Ethiopia where more than half of the clients in this study resorted to traditional healing system during or after their TB medication, for their bodily discomfort as well as to mask the side effects arising from anti-TB drugs with the use of herbal agents (Cherinet G B et al, 2017)

Family support as well as community and social acceptance contributes greatly to the better outcomes of any diseases that lean on social rejection such as tuberculosis should make the recipient in need of support feel loved, appreciated, and peaceful as well as be monitored for their health. In this study, most, patients reported receiving care and support from the community (91%) as well as relatives shown by the fact majority were escorted by their relatives (88%) for treatment as opposed to self-effort (6%). This finding was coherent with one the research in Indonesia conducted to assess factors affecting adherence to anti-TB agents showed that those who received good family support (96%) had good adherence compared to those who did have it given to them 4% (Maria Tuntun et al,2022)

From the research findings, of those who did not initiate treatment immediately and consistently, 8(25%) reported having been stigmatized for the condition, 4(13%) feared side effects that come with the drugs, while 5(16%) went to herbalists first before starting treatment. Stigma lowers patients' esteem to cope with the long duration of the TB treatment course as a result of being seen as social rejects. From this study, those who reported having been stigmatized were more of the urban setting as opposed to those of rural setting who were supported through the treatment course.

Conclusion

TB treatment default is a complex public health problem that threatens TB control efforts leading to drug-resistant strains that are cumbersome to treat. This study therefore showed that there is adequate general knowledge on TB however loss of employment, stigma and lack of social support, discrimination, poverty, having a comorbidity, medication side effects, and long treatment period posed as barriers to treatment adherence. The long distance to reach health facilities, poor communication, and negative attitude of health care providers towards their patients were found to lead to poor treatment adherence while good education levels were associated with good adherence as patients understood outcomes and their effects on health.

For better treatment adherence, comprehensive health education at treatment sites, patients' family members, and the community at large and strengthening of social support structures need to be addressed.

Limitations of the study

Because most patients were from all over the country as well as refugees with different languages, and others educated, the researcher faced challenges of interpretation, financial constraints, and Limited time for collecting data.

Recommendations

Preventing the need for retreatment in the first place is the best strategy given the patient, community, and national health consequences of poor initial TB treatment outcomes and non-adherence. So, strategies that warrant identification and maximization of treatment success, for example, massive health education to increase awareness and inform masses on the benefits of completing treatment as prescribed, the government and other health partners in the fight against TB should create adherence incentives to patients to encourage them to take and complete the drugs within the scheduled time.

The health workers should also encourage follow-up and involve treatment partners and communities to support those taking the drugs.

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List of abbreviations

ADR : Adverse Drug Reactions

HIV: Human immunodeficiency virus

MOH: Ministry of Health

TB: Tuberculosis

WHO: World Health Organization**.**

DOT: Direct Observation of Treatment

TSR: Treatment Success Rates

Source of funding

No Source of funding

Conflict of interest

No Conflict of interest

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