Factors Affecting Treatment Outcomes Of Drug Resistance Tuberculosis Among Patients On Therapy At Lira Regional Referral Hospital In Lira District, Northern Uganda

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Abstract: Drug-resistance tuberculosis (DR-TB) remains a big challenge with Multi-drug resistance tuberculosis (MDR-TB) and extensive drug-resistance tuberculosis (XDR-TB) being the worst forms. The burden DR-TB in Africa is very high and the World Health Organization estimated that about 36000 to 44000 cases occurred in the Africa region but the actual cases could be more than the estimates due to lack of diagnostic equipment's, technical skills and knowledge in detection of DR-TB. This study presents findings in Lira regional referral hospital which is one of the hospitals serving Northern part of Uganda. The study investigated factors associated with treatment outcomes of Drug-resistance tuberculosis (DR-TB) among patients on therapy at Lira regional referral hospital in Northern Uganda. The study explored a descriptive cross-sectional design with quantitative data collection method to gather data. Data was cleaned, analyzed using spss version 20 and factors affecting treatment outcome was measured using chi-square test at 95% Confident interval, factors with P-value greater than 0.05 were considered significantly associated with treatment outcomes. The study found out than male 38 (97.2%) were more than female 10 (20.2%), Catholics 26(54.2%) and Protestants 20 (41.7%) dominated the study population. In individual factors affecting treatment outcomes were Alcohol consumption, Smoking (p-value 0.033), Lack of family support (p-value 0.034), stigma and discrimination (p-value 0.041). Health system factors include distance to the health facility (p-value 0.001), shortages of drugs (p-value 0.048) drug refills (p-value 0.000) and monitoring of patients and adherence supports (p-value 0.005) were significantly associated with management and treatment outcomes of DR-TB. In conclusion, despite of efforts made by the government to control and prevent TB, Lira regional referral hospital still lack effective diagnostic equipment's to easy identification of incidence cases.

Keywords: Drug resistance tuberculosis, Mono-resistance, poly-resistance, Rifampicin resistance, Adherence and treatment outcome.

1. Introduction

Worldwide, Drug-resistant Tuberculosis (DR-TB) remains a big challenge with multi-drug resistant TB (MDR-TB) and extensively drug-resistant TB (XDR-TB) being the worst forms. DR-TB is said to occur when TB organisms can continue to grow in the presence of one or more anti-

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TB drugs [6]. In most cases, TB is treatable and curable; however, people with TB can die if they do not get proper treatment. Sometimes drug-resistant TB occurs when bacteria become resistant to the drugs used to treat TB and it implies that the drug can no longer kill the TB bacteria. Globally, 1.4 million deaths recorded from TB in 2019 (including 208 000 people with HIV, TB is one of the top 10 causes of death due to the resistance to the drugs, and the leading cause from a single infectious agent. WHO estimated that 10 million people fell ill with tuberculosis (TB) worldwide in 2019, 5.6 million men, 3.2 million women and 1.2 million children [6, 16]. Multi-drug resistance tuberculosis remains a public health crisis and a health security threat to the world especially in low and middle-income countries and about 206 030 people with multidrug- or rifampicin-resistant TB (MDR/RR-TB) were detected and notified in 2019 worldwide [16], 10% increase from 186 883 in 2018.

In Africa an estimates of   about 36 000 to 44 000 multi-drug resistant (MDR-TB) cases occurred in 2016 and 15% developed resistance to rifampicin (the most effective first-line medicine) and needed MDR-TB treatment and about 240,000 deaths reported in the Africa and Asia regions in 2017[16,17]. Due to resoue limmited setting, the true burden of DR-TB is unknown but the meta analysis review shows that prevalence of drug resistance tuberculosis among new cases was 12.6%, MDR-TB 1.5% [2, 7] and to make the matter worse the treatment of patients with DR-TB is either inadequate or lacking. Uganda is one of the "30 high burden TB/ Human immunodeficiency virus (HIV)" countries that collectively account for 90% of the global TB burden [8]. While the World Health Organization (WHO) had removed Uganda off the list of TB high burden countries (HBC) in 2020 [16]. A recent Uganda population-based TB prevalence survey suggests that incidence and prevalence rates in the country are far higher than previously believed [15]. However, several factors such as the burden of human immunodeficiency virus (HIV) infection, low socioeconomic status, and limited diagnostic and treatment facilities highly exacerbate the effect of MDR-TB in the developing world, including Uganda. Furthermore, longer treatment regimen (about two years) and expensive and toxic drugs pose challenges in the programmatic management of MDR-TB in these countries [16], behavioral and occupational factors like contact history with TB patient, contact with an MDR-TB patient, poor drug adherence, previous TB treatment failure, alcohol consumption, and being farmer were found as major factors for the development MDR-TB in Uganda [3]. The facts remain that hospitals and health facilities lack diagnostic equipment's to screen DR-TB or MD-TB. The study investigated factors associated with treatment outcomes of DR-TB among patients on therapy at Lira regional referral hospital in Northern Uganda.

2. Methodology

2.1. Study design, study site, study population and sample size

The study employed a descriptive cross-sectional design using quantitative data collection technique with used of closed ended questionnaires. It was conducted in Lira regional referral hospital in Northern Uganda among 50 (fifty) DR-TB patients on therapy.

2.2. Study procedure and sampling techniques

All participants were sampling using stratified sampling techniques so that all patients with different characteristics were allowed to participate in the study. Each participant consented before data collection and the data collected using researcher administered closed ended questionnaires.

2.3. Eligibility criteria

All DR-TB patients active on treatment at LRRH participated in the study and those with mental health problems or severely ill were excluded from the study.

2.4. Study Variables

The dependent variable was '' Drug resistance tuberculosis treatment outcome' and independent variables included individual factors and health system factors.

2.5. Ethical Considerations

According to the study, ethical consideration was assured through seeking for consents from respondents, confidentiality and privacy.

2.6. Quality Control (Validity and Reliability)

According to this study, the researcher developed a check list to ensure that the information collected was relevant to the study. The researcher developed questions which were straightforward, free of jargon, and must mean the same thing to all who read it so that it gathers relevant information from the respondents. The reliability and validity was ensured by implementing verification strategies integral and self-correcting during the conduct of inquiry itself and proper editing of the data collected from the field by the researcher.

3. Data Management

3.1. Data collection tools and methods

Data from the field was collected using the closed ended questionnaire for data collection from the respondents. The questionnaire was prepared in English and administered to the respondents by the researchers or research assistants in whom the questionnaires were read and translated in local langue (Luo) and allowed the respondents to answer.

3.2. Data entry, cleaning and analysis

Data was cleaned by the researcher and entered using SPSS-Version 20.The data was presented informs percentage, means, frequency and rang in graphs, tables and pie-charts for un-variate and chi-square test performed at 98% Confident interval in order to find the associations.

3.3. Data protection

Data protection was ensured through coding of questionnaires, putting data in lock cabin and putting password in computers.

4. Results

4.1. Socio-demographic characteristics of the respondents

The study found that, those aged (31-35 years) and (40-45 years) were equally represented in the study, male respondents 38(79.2%) tripled the number of female respondents 10(16.7%). In addition to that, majority of the respondents were married 36(75%), Civil servants were poorly represented in the study. Lastly, the highest study participants were Catholics 26(54.2%).

4.2. Health system factors affecting DR-TB treatment outcomes

The researchers found out that, 34(70.8%) had knowledge about DR-TB, majority of them reported the treatment takes 6 months 15(31.4%), most of them were new on DR-TB treatments within the range of 0-5

Months 26(54.2%). Additionally, 40(83.3%) reported that they were far from the DOT sites and the distance of above 10 Km was reported by many respondents 18(37.5%), attitude was found to be good among health workers as reported by all respondents 48(100%), running out of stock for TB drugs was cited by 17(35.4%).

Lastly, treatment side effects like reduce vision 18(37.5%) and Itching 11(22.9%) on the body were reported by many respondents and Adherence counselling supports was reported by 30(62.5%) of the total respondents.

4.3. Association between Health system factors and DR-TB treatment outcomes

The researcher found out that, distance to the health facility (p-value 0.001), shortages of drugs (p-value 0.048), drugs refills (p-value 0.00), regular monitoring of DR-TB patients and Adherence supports (p-value 0.005) were significantly associated with treatment outcome of DR-TB patients at 95% CWE (P<0.05).

Table 1. Association between health system factors and DR-TB treatment outcome.

Variable	DR-TB Treatment Outcome		X^2	df	p-value
	Poor	Good			
Distance to the DOT sites					
0-2 km	6(17.6%)	0(0.0%)	16.733	3	0.001
3-5 km	8(23.5%)	3(21.4%)			
5-10 km	13(38.2%)	0(0.0%)			
>10km	7(20.6%)	11(78.6%)			
Have you ever run out of DR-TB drug					
Yes	15(44.1%)	2(14.3%)	3.858	1	0.048
No	19(55.9%)	12(85.7%)			
If yes, was refills					
Yes	21(95.5%)	4(40%)	12.371	1	0.000
No	1(4.5%)	6(60%)			
Have you Regularly monitored for side effects					
Yes	34(100%)	9(75%)	9.093	1	0.003
No	0(0.0%)	3(25%)			
Do you get adherence supports					
Yes	17(50%)	13(92.3%)	7.771	1	0.005
No	17(50%)	1(7.1%)			

4.4. Individual factors associated with treatment outcomes of DR-TB patients

According to the study, we found that, majority were smokers 29(60.4%), those who take Alcohol were 23 (47.9%), and most of them had tested for HIV and 29 (60.4%) were HIV positive. In addition to that, all HIV positive respondents reported that they were on ART, The highest participants 36(75%) reported comorbidities infections among them.

4.5. Association between the individual factors and treatment side effects of patients with DR-TB

According to this study, smoking (p-value 0.033, at 95%CI), Comorbidity (p-value 0.003 at 95% CI), family supports (p-value 0.034 at 95% CI) and discrimination were found to be significantly associated with drugs resistance tuberculosis treatment.

Table 2. Association between individual factors and drug resistance tuberculosis treatment

Variable	DR-TB Treatment side effects		X^2	df	p-value
	Yes	**No**			
Do you smoke cigarette					
Yes	27(62.8%)	0(0.0%)	4.561	1	0.033
No	16(37.2%)	3(100%)			
Do you have comorbidity					
Yes	34(79.1%)	0(0.0%)	9.093	1	0.003
No	9(20.9%)	3(100%)			
What kind of family supports					
Get foe me medicine	15(40.5%)	0(0.0%)	6.736	2	0.034
Remind me to take medication	12(32.4%)	0(0.0%)			
Counselling on Adherence	10(27.0%)	3(0.0%)			
Are TB clients discriminated					
Yes	26(65.5%)	0(0.0%)	4.172	1	0.041
No	17(39.5%)	3(100%)			

5. Discussion of Results

5.1. Health system factors associated with DR-TB treatment Outcome

According to this study, the researchers found that most of the DR-TB patients 34(70.8%) knew about Drug resistance tuberculosis and most of them reported that the treatment period for DR-TB takes only 6 months. These findings did not support the standard treatment duration or regime for DR-TB patients according to the World Health Organization in which their guidelines indicated that the DR-TB treatment regime ranges from 9 months above. Another studies conducted presents a similar finding which shows that DR-TB patients were knowledgeable about the treatment regime for DR-TB [7, 15]. This difference in knowledge about the recommended treatment duration for DR-TB clients from WHO guideline could be due to a low level of understanding about DR-TB among DR-TB patients, small duration is taken on treatment by DR-TB patients 26(54.2%), limited knowledge about treatment among DR-TB patients and insufficient health education to the Patients by the Health workers. The distance to the DOT was found to be the factor affecting the treatment outcome among DR-TB patients. The majority of the DR-TB patients reported long distances of above 10 Km 18(37.5%) to the DR-TB treatment facility or the Hospital. There was a significant association between the distance to DOT and the treatment outcomes

among the DR-TB patients (p-value 0.001, at 95% CI). Interestingly, these findings were similar to results from the study conducted in Uganda which reflected that distance to the health facility was one of the factors associated with poor treatment outcomes [14].The distance to the health facility or DOT providers affects the follow-up of the DR-TB patients, associate with inadequate counseling, loss of patients, lack of consistent communications, difficulties in the monitoring of the treatment progress, and side effects. The above problems always result in poor treatment outcomes and even sometimes the clients drop out of treatments. Unfriendly and unhelpful DOT providers promotes treatment interruption due to the lack of consistent communication on the part of some DOT providers on the progress of treatment as per results of regular sputum and blood monitoring tests done. This promoted LFU at crucial junctures when patients could have been retained in care with proper counseling and support [14, 17]. The results from the study show that some DR-TB patients reported stock out for the DR-TB drugs 17(35.4%). Running stock out for DR-TB was associated with missing drugs among some DR-TB patients (p-value 0.048, at 95% CI). This was the result of a shortage of drugs from the Hospital and even DOT. Treatment side effects such as itching 11(22.9%), Anemia 6 (12.5%), reduce Vision 18 (37.5%), Joint paint 13(27.1%) were reported by the respondents during data collection. The researcher assumed that poor treatment outcomes among DR-TB could be the result of side effects which make some of the DR-TB patients to dropped out of treatments or skip the drugs on some days. This was similar to the findings from another study conducted in Uganda in which some of the factors such as shortages of drugs, lack of diagnostic equipment, and costs of transport to the health facility, financial burdens, and treatment failure were some of the factors found to be associated with poor treatment outcomes [5, 13]. In addition to that, the highest participant reported that side effects due to medication were not properly treated and managed by the health workers hence making them drop out of treatment when side effects become severe.

5.2. Individual factors associated with treatment outcome of DR-TB patients at LRRH

In this study, the researchers found out that majority of the DR-TB patients reported Cigarette smoking 29(60.4%) and drinking Alcohol 23(47.9%). There was a strong significant association between the side effects and Cigarette smoking (p-value 0.033, at 95% CI). This study was similar to the findings from another study conducted in low and middle-income countries which indicated that drug toxicity was associated with alcohol consumption and tobacco smoking and continued that pill burdens to the patients, drug toxicities, and side effects which in the long run make these patients abandon their treatment and Mycobacterium becomes resistant to the drugs prescribed [12]. Comorbidities was high as reported by 36(75%), HIV positive 20(60.4%), TB 26(78.8%), and MR-TB 7(12.5%). There was positive and significant correlation between comorbidities and treatment outcomes of DR-TB (p-value 0.003, at 95% CI). The study findings from Samuel and Teron supports the above findings on treatment outcomes and comorbidities [8, 12].This is due to drugs interactions, synergies which in turn brings about issues of pill burdens to the patients, drug toxicities, and side effects which in the long run make these patients abandon their prescribed drugs. In regard to family supports 42(93.3%) reported that their families offer to them support concerning DR-TB treatments. Out of those who mentioned family supports, 17(40.5%) reported receiving medicine from hospitals, 12(28.6%) repowered reminding them about the time of taking medicine, and 13(31%) cited Adherence counseling from their family members. Chi-square performed found positive and significant association between family supports and treatment outcomes (p-value 0.034 at 95% CI). A study conducted in Vietnam revealed that Family support, including financial assistance, collecting medication, and emotional support, appeared to be a

strong influence on patient adherence to treatment [7, 9].In their studies, husbands and other males' support was considered important for female patients. Providers in one study noted that patients also could support each other through their treatment course. On the other hand, in some cases, patients on treatment became increasingly demoralized and more likely to become non-adherent as family support weakened [7].The sigma and discriminations among the community member were found to be associated with the treatment outcomes (p-value 0.041 at 95% CI). In conclusion, people with DR-TB were stigmatized tend to neglect treatments due to depression and stress.

6. Conclusion

This research work was designed and conducted in Lira regional referral hospital on DR-TB patients on therapy and the study found out that male were more affected by DR-TB compared to female. Health system factors such as distance to the health facility, shortages of drugs, Adherence supports, drug refills and regular monitoring of DR-TB were found to be positively and significantly associated with treatment outcome of DR-TB. In conclusion, individual factors or behaviors such as Alcohol consumption, smoking, and lack of family supports, comorbidity, stigma and discrimination from individual level up to community level were found to be associated with treatment outcomes.

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