RESEARCH ARTICLE

BARRIERS AFFECTING MEDICATION ADHERENCE AMONG TUBERCULOSIS PATIENTS IN GAZAN REGION 2022

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ARTICLE INFO	ABSTRACT
	Introduction: Tuberculosis (TB) It is a chronic disease that spreads from person to person through the air and is brought on by the bacteria Mycobacterium tuberculosis medication Adherence is a key factor associated with the effectiveness of all pharmacological therapies but is particularly critical for medications prescribed for chronic conditions in this study we aim to assess the barriers of tuberculosis medication adherence. ***Methods:*** Observational cross-sectional cross- sectional community based, carried out in Jazan Region in Saudi Arabia in period between June 2021 till October 2021 included (228) all new diagnosed tuberculosis patients in 2021 was conducted to assess the tuberculosis medication adherence level and its barriers using standardized general medication adherence scale. ***Results:*** 228 tuberculosis patients were enrolled more than 50% of participants aged between 19 t0 34 years and the least age group was less than 19 years, male was found to be more than female 70.2%, majority of the participants was married 58%, regards to education near to 60% of participant was low il educated from intermediate level and below, (11%) of TB patients were had other medical condition hypertension 8.8%diabetes 5.6%, dyslipidemia 1.3% (comorbidity) among registered TB patients 2021, all of patients obtained the medicine from government we found there is a high medication adherence among 86% of participants educational levels, marital status and monthly income (Pvalue .006,.003 and .001) logistics regression showed that is, association with education level and adherence (Pvalue0.002), and also the results shows that secondary education is 3.717 times more likely to adherence than non-adherence. The marital status is positively significant associated with adherence, the p-value for married is 0.006. Also there is positive significant association between monthly income and adherence. the p-value for monthly income with adherence is 0.034 which indicate that there is association with monthly income and adherence, study recommend more effort to be spent not married for low level education and income.

INTRODUCTION

Tuberculosis (TB) It is a chronic disease that spreads from person to person through the air and is brought on by the bacteria Mycobacterium tuberculosis. TB primarily affects the lungs but it can also affect other regions of the body, such as brain, intestines, kidneys, or the spine. The location of the TB germs in the body affects the TB symptoms. Pulmonary TB can manifest as symptoms including a persistent cough, chest pain, hemoptysis, weakness or weariness, weight loss, fever, and night sweats (Zaman K 2010). Globally, an estimated 10.0 million (range, 8.9–11.0 million) (WHO2010) 5 people fell ill with TB in 2019, a number that has been declining very slowly in recent years.

As one of the top 10 global causes of death and the most common infectious disease, surpassing HIV/AIDS in 2018, tuberculosis (TB) is an infectious disease that is one of the main causes of death. One-fourth of the world's population either has the disease or is at risk of getting it (Nezenega ZS2020). According to the WHO, the Kingdom of Saudi Arabia (KSA) has a low to middle incidence of TB. Although the incidence rate of TB has decreased here from 18 in 100,000 in the early 2000's, to around 12 in 100,000 of inhabitants in 2018, still it is high. Although TB can be cured with first-line antibiotics treatment of 6 months regimen, non-adherence is the main challenge for TB control and prevention programs. The patient needs to take >90% of TB medication to facilitate TB cure, and a patient who takes at least 95% is said to be 'high adherence'.

Treatment default is defined by the World Health Organization as a patient who interrupts treatment for 2 or more month(WHO 2003) , therefore Anti-TB medication resistance might develop as a result of improper use or administration. Examples include situations when individuals don't finish their entire course of therapy, doctors prescribe the incorrect medication, dosage, or duration of time to take it, the drug supply isn't always available, or the drugs are prescribed incorrectly (CDC2020). In order to investigate factors influencing treatment medication in mixed methodology study conducted in Ethiopia synthesized thematically present multiple factors that have been identified as influencing non-adherence to TB medication were, forgetfulness, inadequate knowledge about TB and its treatment regimen, psychological distress (poor mental health condition), perceived barriers, long waiting time, drug side-effects, TB-HIV co-infection, being on the continuation phase of treatment, healthcare inaccessibility, and travelling costs.(Nezenega ZS 2020). The Ministry of Health in Saudi Arabia launched the National TB Control and Prevention program (NTCPP) more than 30 years ago (MOH). In 1999, the DOTS program, The concept behind these mobile teams is that a team member brings anti-TB medications to the patient's door and supervises their administration to the patient. WHO's recommended TB treatments regimen, was accepted by the NTCPP. (Al-Hajoj S2015),(Al-Bishri 2014). We aimed of our study to explore barriers and facilitator to tuberculosis medication adherence in among tuberculosis patients in Gazan region.

General objective: To determine barriers of medication adherence among Tuberculosis patients in Gazan region 2022

METHODOLOGY

This is observational cross-sectional cross- sectional community based, carried out in Jazan Region in Saudi Arabia in period between June 2021 till October 2021 included all new diagnosed tuberculosis patients in 2021.

Study setting: Study conducted in Jazan area which located in southwestern Saudi Arabia. covers an area of 40,000 square kilometers, including some 5,000 villages and cities. Attached to it are 100 islands, including the important island of Farasan. Jizan is the third most important seaport on the Red Sea. It runs along the Red Sea coast for almost 200 miles (300 km).The weather in Jazan is hot in the summer and mild in the winter. The average temperature throughout the year is 25-23 Celsius. The province can be windy during the summer months with winds reaching an average 25 km/h. The average rainfall is 45-100mm per year www.the-saudi.net › Saudi Arabia.

Study population: Patients diagnosed pulmonary tuberculosis and registered in national TB register in 2021

Inclusion criteria: Study include all newly diagnosed pulmonary TB patient taking the tuberculosis treatment for one month

Exclusion criteria: All relapsed or drug resistant diagnosed patient were excluded

Sampling technique: Total enumeration technique study will include all registered pulmonary tuberculosis patients in period from January to December 2021.

Assessment Tools and data collection: Researcher used collected data using tools was validate adapted, interviewing questionnaire GMAS developed by (Atta Abbas Naqvi etal 2020) including the (sociodemographic, patients medication adherence status).

Statistical analysis: Socio-demographic variables of the participants estimated using descriptive statistics, including frequency counts and percentages for categorical variables. The mean and standard deviation (S.D.) used for normally distributed continuous variables, while median and interquartile range (IQR) for not normally distributed variables. Spearman's rho helped to explore the association between the medication adherence and the ordinal predictor variable (Likert scales).

The chi-square test helped in assessing the significant relationship between categorical variables. P value < 0.05 was considered statistically significant. The Statistical Package for the Social Sciences (SPSS) (version 25) was used to analyze the data.

Ethical consideration: Preceding to the beginning of the study, the ethical approval was obtained from the Research Ethics Committee. All participants informed about the purpose and details of the study. Participants was informed that they have the right to enroll or not in the study or to not to complete the study without any concerns, and the data collected will be unnamed to protect their confidentiality. Then signed informed consent will be asked from all participants.

RESULTS

(Table 1) characteristics of study participants of medication adherence among registered Tuberculosis Patients in Gazan Region Jizan 2022 (N=228).

Characteristics		Frequency	Percent
Age	18 – 34 years	141	**61.8**
	35- 40 years	26	11.4
	41 years and above	61	26.8
	Total	228	100
Gender	Male	160	**70.2**
	female	68	29.8
	Total	228	100
Marital Status	Married	133	**58.3**
	Single	95	41.7
	Total	228	100
Education	Illiterate	54	**23.7**
	Primary	30	**13.2**
	Intermediate	28	**12.3**
	Secondary	62	27.2
	University	54	23.7
	Total	228	100
Occupation	Self employed	17	**7.5**
	household	29	**12.7**
	Unemployed/jobless	128	**56.1**
	Employed by government	28	12.3
	Employed by private	26	11.4
	Total	228	100
Monthly Income	Lack of money	98	**43.4**
	Less than 5000 SR	95	**42.1**
	Between 5000-10000 SR	30	13.6
	More than 10000 SR	2	0.9
	Total	228	100

The above tables revealed, more than 50% of participants aged between 19 t0 34 years and the least age group was less than 19 years, male was found to be more than female 70.2%, majority of the participants was married 58%, regards to education near to 60% of participant was low ileducated from intermediate level and below. The table shows about (11%) of TB patients were had other medical condition hypertension 8.8%diabetes 5.6%, dyslipidemia 1.3% (comorbidity) among registered TB patients 2021, all of patients obtained the medicine from government The GMAS is an 11-item self-reporting adherence measure.

Table 2. Distribution of (other medical condition) comorbidity and medication

		Frequency	Percent
Other medical conditions	Yes	25	11.0
	No	203	89.0
	Total	228	100%
	Disease	Frequency	Percent
Type of disease	Hypertension	20	8.8
	Diabetes Mellitus	12	5.6
	Dyslipidemia	3	1.3
	Thyroid disorder	1	0.44
	NO of drugs	Frequency	Percent
number of at TB drugs	One	36	15.8%
	Two	1	.4%
	Three	1	.4%
	Four	190	83.3%
	Total	228	100%

Table 3. The percentage overall assessment of barriers affecting medication adherence among TB patients according to GAMS

	Low 16-11	Partial 26-17	Good 27-27	High 30-33	Total
Frequency	3	21	8	196	228
Percent	1.3	9.2	3.5	86.0	100

Each item has 4 outcomes and awards an adherence score. The total score that could be achieved is 33. Sum of all items yields a final score that is interpreted in various levels of adherence; high (30–33), good (27–29), partial (17–26), low (11–16), and poor (≤10) (Naqvi *et al* , 2018). The above table shows the medication adherence level among TB patients, we found there is a high medication adherence among 86% of participants.

our study adopted the general medication adherence scale (GMAS) it contain eleven question with four multiple choice answers score from (zero to four) total score was 33 and answer scaled as high (30–33), good (27–29), partial (17–26), low (11–16), and poor (≤10) (Naqvi *et al*, 2018).(86.8%) of participants had a high medication adherence rate (33-30), seventy percent of them were male and the younger adult age group (18 to 34years) represent more than sixty percent of study group. The study revealed majority (82%) of the patients had low monthly income (less than 5000SR) and low education, about sixty percent were from intermediate and below education level. As we aimed to study the barriers of Tuberculosis medication adherence we analyzed the association between the demographic characteristics of tuberculosis patients, it's clear that sex, age, and occupation of patients has no statistical association with medication adherence (P value.468),

Table 4. The association between demographic characteristics and the overall assessment of adherence among TB patients

Age group	Adherence level				Total	Pvalue
	low	Partial	Good	High		
18- 34	1.4%) 2	(6.4%)9	(2.8%) 4	(90.8%) 126	(100.%)141	
35 - 40	(0.0%) 0	(3.8%) 1	(0.0%)0	(96.2%) 25	(100.%)26	.183
41 and more	1.6%) 1	18.0%) 11	6.6%) 4	73.8%) 45	100%) 61	
Sex						
Male	0.6%) 1	10.0%) 16	3.1%) 5	86.2%) 138	160	
Female	2.9%) 2	7.4%) 5	4.4%) 3	85.3%) 58	68	.468
Education level						
Illiterate	(5.6%) 3	(20.4%)11	(3.7%) 2	(70.4%)38	(100%)54	.006
Primary	(0.0%)0	(10%)3	(0.0%)0	(90%) 27	(100%)30	
Intermediate	(0.0%)0	(10.7%)3	0.0%)0	89.3%) 25	100%) 28	
Secondary	(0.0%) 0	(3.2%) 2	(3.2%) 2	(93.5%) 58	(100. %) 62	
University	(0.0%) 0	(3.7%) 2	(7.4%) 4	(88.9%) 48	(100%) 54	
Total	(1.3%) 3	(9.2%) 21	(3.5%) 8	(86%) 196	(100%) 228	
Marital status						.468
Married	(2.3%) 3	13.6%) 18	5.3%) 7	78.8%) 104	(100%) 132	.003
Single	(0.0%) 0	(3.1%) 3	(1.0%) 1	(95.8%) 92	(100%) 96	
occupation						Pvalue
Self employed	(5.9%) 1	(17.6%) 3	(0.0%) 0	(76.5%) 13	17	.055
Household	(3.4%) 1	(20.7%) 6	(0.0%) 0	(75.9%) 22	(100%) 29	
Unemployed/jobless	(0.8%) 1	(6.2%) 8	3.1%) 4	(89.8%) 115	(100%)128	
Employed by government	(0.0%) 0	10.7%) 3	(7.1%) 2	(82.1%) 23	(100%) 28	
Employed by private	(0.0%) 0	(3.8%) 1	(7.7%) 2	(88.5%) 23	(100%) 26	
Monthly income						Pvalue
No income	(3.0%) 3	(5.1%) 5	(2.0%) 2	(89.9%) 89	(100%)99	.001
Less than 5000	(0.0%)0	12.5%) 12	1.0%) 1	86.5%) 83	(100%) 96	
5000- 10000	(0.0%)0	(9.7%) 3	16.1%) 5	74.2%) 23	(100%) 31	
More than 10000	0.0%) 0	(50.0%) 1	(0.0%)0	(50.0%) 1	(100%) 2	

The above table showed there statistical significance with TB medication adherence and educational levels ,marital status and monthly income (Pvalue .006,.003 and .001). (Table 5)The association between number of drugs and the overall assessment of adherence among TB patients. As shown by the table above there is about 14% of TB patients who were taken one type of medication had partial to good level of adherence, and the TB patients who were taken four types of drug had a high level of adherence with score (33to30) with statistical significance (P.value 0.000). There are about (12%) of TB patients have a comorbidity with TB and It found to be statistically significant barriers of TB medication adherence (Pvalue.039). The Saudi National TB Control and Prevention program (NTCPP) was initiated more than 30 years ago under the aegis of the Ministry of Health (MOH). The NTCPP adopted the WHO standard TB treatment strategy, i.e. the DOTSprogram, in 1999. The literature shows that even after three decades of the NTCPP and DOTS programs, TB treatment coverage is only around 87% of patients, and the treatment success rate is only 62% (Al-Hajoj S,2015), These figures are far lower than the WHO targets of 85% treatment success rates these finding is a challenges facing MOH to strengthen the national effort in detecting, treating and following the TB till cured. This is cross sectional study community based conducted in Jazanwhich achieved one hundred percent response rate as result of good communication and arrangement of national tuberculosis program all newly diagnosed pulmonary TB patient taking the tuberculosis, started in (March to August 2022), 228 patients enrolled,

(P value.183) and (P value .055) consecutively these finding is similar to Kassahun Dessie Gashu *et al.* 202) which conducted in Ethiopia. Gashu *et al.* 2021). While educational level and (Pvalue.006) marital status (P value .003) and monthly income (P vale .001) were found to be statistically significance

Table 5. The association between number of drugs and the overall assessment of adherence among TB patients

Number of drugs	The overall assessment of adherence among TB patients			P.value
	30 - 33	27 - 29	17 - 26	
one	(86.1%) 31	(11.1%) 4	(2.8%) 1	.000
	13.9%	100.0%	100.0%	
Two	1	0	0	
	100.0%	0.0%	0.0%	
	0.4%	0.0%	0.0%	
Three	1	0	0	
	100.0%	0.0%	0.0%	
	0.4%	0.0%	0.0%	
Four	190	0	0	
	100.0%	0.0%	0.0%	
	85.2%	0.0%	0.0%	

Table 6. The association between other health' problems and the overall assessment of adherence among TB patients

Other health' problems	The overall assessment of adherence among TB patients			P.value
	30 - 33	27 - 29	17 - 26	
Yes	23	2	0	**.039**
	10.3%	50.0%	0.0%	
No	200	2	1	
	98.5%	1.0%	0.5%	
	89.7%	50.0%	100.0%	

Conclusion and recommendation

As overall TB medication adherence study found more than 80% of TB patients has a high level of adherence according to (GMAS) educational levels, marital status and monthly income (P value .006, .003 and .001) consecutively has statically significance. Logistic regression was done to assess the statistical significance of factors affecting the TB medication adherence we found that there is association with education level and adherence (Pvalue0.002), and also the results shows that secondary education is 3.717 times more likely to adherence than non-adherence. The marital status is positively significant associated with adherence, the p-value for married one is 0.006. Also there is positive significant association between monthly income and adherence. the p-value for monthly income with adherence is 0.034 which indicate that there is association with monthly income and adherence,

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