Relationship between Health-Related Quality of Life and Medication Adherence among Patients with Pulmonary Tuberculosis

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Abstract

Background: TB is still a significant global public health and economic issue. One of the most crucial factors in the success of TB treatment is medication compliance and health-related quality of life (HRQOL). **Aim:** assess the relationship between health-related quality of life and medication adherence among patients with pulmonary tuberculosis. **Design & Setting:** A descriptive cross-sectional study design utilized to conduct the current study in Ismailia fever hospital, Ismailia, Egypt**. Sample:** A purposive sample of 52 patients diagnosed with pulmonary tuberculosis. **Tools:** three tools were used to carry out this study. **Tool I:** A structured self- administrated questionnaire included two parts which involved assessment of the demographic data and patients' medical and family history. **Tool II:** Health Related Quality of life for patients with chronic illness. **Tool III:** Morisky Medication Adherence Scale. **Results:** According to the current study (57.7%) of the studied patients have high level of drug adherence compared to 11.5% of them had low level of drug adherence. The majority of the studied patients (88.5%) had high level of HRQOL, whereas 11.5% had low level of HRQOL. There was statistically significant positive correlation between medication adherence and total HRQOL. **Conclusion:** The studied patients had high level of medication adherence. Also, the majority of studied patients had high level of HRQOL. So, the current study showed that there was statistically significant positive correlation between medication adherence and total HRQOL and its domains. **Recommendations:** Designing and implementing an educational program about methods for improving medication adherence and HRQOL for pulmonary tuberculosis patients.

Key words: Health-Related Quality of Life, Medication Adherence, Pulmonary Tuberculosis.

1.Introduction

Tuberculosis (TB) is a communicable disease that is a major cause of sick wellbeing which caused by bacillus *Mycobacterium tuberculosis*, which is spread when individual who are ill with TB expel bacteria into the air; for example, by coughing. It typically influences the lungs (pulmonary TB) but can more over influences other sites (extra pulmonary TB). Almost a quarter of the world's population is affected with M. tuberculosis and thus at hazard of creating TB infection **(Harries, Brigden, & Nunn, 2019).**

Increased information and awareness about the disease is vital along with early detection,

diagnosis, and treatment to control TB. In spite of the fact that much attention has been given to clinical results of treatment and microbiological cure, patient reported health related quality of life which can have a major impact on the clinical results has been ignored **(Sineke., 2019)**.

Health related quality of life is the affect that perceived health status has on the normal functions of life. Decreased health related quality of life can lead to depression and medication nonadherence which can further lead to declining of the medical condition. Twenty-two countries carry 80% of the world-wide incident cases of tuberculosis (TB) **(Nisar, 2018)**.

According to the definition of the World Health Organization (WHO), the health-related quality of life refers to individuals' understanding about their circumstance in life in terms of culture, the value system in which they live, and their goals, expectations, standards, and needs. Accordingly, it is absolutely an individual-oriented concept that's based on the individual's understanding of distinctive aspects of their lives **(Jafaryparvar, Adib, hanbari Khanghah, & Kazem Nezhad Leyli, 2018).**

Adherence and HRQOL are two outcomes

representing different aspects in time following processes of care. Adherence to tuberculosis medication is very vital for improving the health-related quality of life and preventing complications of the disease. Measure of health outcome as judged by the individual respondents. Adherence is an intermediate outcome or process variable whereas HRQOL is an ultimate outcome **(Yadav., 2021).**

Significance of the study:

Egypt is one of the nations with a moderate incidence of TB. It is seen as a significant public health issue because it has an impact on Egypt's productive population (those between the ages of 15 and 44), which has an impact on the country's economy. In Egypt, there were 26 cases of TB for every 100,000 individuals. If untreated, each infected person can spread the infection to an average of 10 to 15 people annually **(National tuberculosis control program 2021).**

The greatest barrier to effective therapy is non-adherence to anti-TB medications, which leads to disease spread, progression, and mortality. The results of the study will help identify the health domains that pulmonary TB has the greatest effects on in terms of

HRQOL and the health status of individuals with pulmonary TB. The study of these concepts will allow identifying which health features of TB have an influence on adherence and which health domains are affected by non-adherence. Adherence behavior will also be studied from a patient perspective.

Aim of the study: The current study aims to assess the relationship between health-related quality of life and medication adherence among patients with pulmonary tuberculosis.

1. Subjects and Methods

2.1. Study design: A descriptive cross-sectional study design was utilized in this study.

2.3. The sample of the study: Purposive sample of 52 adult patients with pulmonary TB, consist of 34 male and 18 female. Sample size was calculated using this formula:

$$n = \left[\frac{Z_{\alpha/2} + Z_{\beta}}{\frac{1}{2} \log \frac{1+r}{1-r}} \right]^2 + 3$$

n= Sample Size (52 Patients).

$Z_{\alpha/2}$=1.96**,**

Z_{β}= 0.84(Dawson&Trapp,2004).

r = Correlation (.718)**.**

Study setting: The current study was carried out at out-patient clinics at Ismailia fever Hospital in Ismailia city, Egypt**.**

Research Question:

Is there a relationship between health-related quality of life and medication adherence among patients with pulmonary tuberculosis?

Research Hypothesis:

There is a relationship between health-related quality of life and medication adherence among patients with pulmonary tuberculosis.

Tools of data collection:

Tool (1): A structured self-administrated questionnaire:

Part (1): Socio demographic data
It was divided into two parts as part I covered socio demographic data such as age, level of education, occupation.

Part (2): Medical and family histories
the medical and family histories of the patients, including the length of the current illness and its impact on patients' ability to work.

Part (3): Health Related Quality of life for patients with chronic illness:

It was developed by **(King & Hinds, 2011)** and adopted from **(Omar ,Bakr, Sobeh, & Shehab, 2020)** in Arabic form, includes (thirty-nine questions). it was used to assess health related quality of life in following domains:

- Physical domain (fourteen questions).

- Psychological domain (fifteen questions).
- Social domain (ten questions).

Scoring system:

Health Related Quality of life: Items was rated on a scale from 0 to 10 for responses "absent" to "always present", respectively for positive items, whereas for negative items (items 14, 16, 17, 18, 19, 20, 21, 29, 33, 34, and 39), they were scored in the opposite order. The item scores were added up for each domain of HRQOL, and the total was divided by the number of items, yielding a mean score for each domain. Based on the 60% cut threshold, these scores were translated into a percent score. If the patient's percent score is equal to or higher than 60%, they are considered to have a high quality of

life; if it is lower, they have a bad quality of life.

Tool (2): Morisky Medication Adherence Scale (MMAS-8):

It was developed by Morisky (2008) to assess medication adherence behaviors in patients with pulmonary tuberculosis and adopted from **(Omar ., 2020)** in Arabic form. MMAS is highly sensitive in terms of identifying low adherences and is considered simple regarding detecting and monitoring adherence. The scale ranges from (zero) to (eight).

Coding Instructions for the Morisky Medication Adherence Scale (8-Item):

It was observed that for item number 5, the response direction of the code was positive, and that for item number 8, the code is standardized (0–4), creating a scale from low to high adherence. The overall scale ranged of zero to eight.

Adherence Level:

- Low adherence (< 6)
- Medium adherence (6 < 8)
- High adherence (= 8)

Reliability of the Tool:

The Cronbach's alpha coefficient test was

statistically used to assess the reliability of the patient profile sheet questionnaire. The tools' reliability for the King & Hinds (2011) and Omar. (2020) Arabic translation of the King & Hinds (2011) health-related quality of life for chronic illness patients' questionnaire was = 0.794. Tools' reliability for Morisky Medication Adherence Scale that was in English form and adopted from **(Omar ., 2020)** in Arabic form was = 0.838.

Field work:

Two days a week were used to collect the data. The six-month period from the start of June 2021 to the end of December 2021 covers the data collection. To ensure confidentiality and privacy, face-to-face interview technique was carried out in a private room within the center for data collecting process. The researcher started interviewing patients for data. The researcher visited the outpatient chest clinic twice a week from 9:00 a.m. to 1:00 p.m. Prior to data collection, written consent was obtained from each patient who agreed to take part after illustrating the objective of the study prior to data collection.

The interviewing process, which lasted for roughly 45 minutes, was initiated by the researcher. The data gathering techniques were used to interview about two to three patients each time. After filling out the tool, the researcher reviewed every point within the tool in front of the patient to make sure that no points are left out.

Administrative design:

Before beginning any step of the study, a formal letter from the dean of the nursing faculty was sent to the administrator of each study location listed above, requesting his/her participation and approval to conduct the study in out patients' clinics and after illustrating the aim of the study.

Ethical considerations:

before the beginning of the study, the research approval will be obtained from Research Ethical Committee of Nursing Faculty at Suez Canal University. To conduct the study, official approval was obtained from the director of the Ismailia fever hospital. After explaining the aim of the study written consent was obtained from each patient. The patients who were being studied were given the assurance that the data would be kept private, utilized only for the research. The study's subjects were made aware that their participation was completely optional and that they had the right to

withdraw at any time.

Statistical design:

Using the appropriate statistical technique and the statistical Package for Social Sciences (SPSS), data will be gathered, tabulated, and evaluated. To examine the relationship between two category variables, the chi-square test was applied. The correlation between two continuous variables was examined using Pearson's correlation test. To determine if the means of two continuous variables differed, an independent T-test was employed, and the data was then presented in the most acceptable way.

3. Results

Table (1): Reveals that half of studied patients (50%) were in age group from 30 to less than 40 years old, 65.4 % were male, 55.8% were married, 73.1% of them had basic education, and more than half of them 55.8% resided in rural areas. Also, 48.1% had father role in family, 69.2 % had not enough income and more than three quarter of them 92.3% were working. In relation to housing condition and number of family members of the studied patients more than three quarter 76.9 % of them were living with more than 4 family members at home with Mean ±SD (5.13±.85), 60.0% of them had

two rooms in their houses with mean±SD (2.43±.56), the majority of them 94.6% were living in poor ventilated house.

Figure (1): shows that more than half of the studied patients 57.7% have high level of drug adherence compared to 11.5% of them had low level of drug adherence.

Figure (2): Shows that most of the studied patients 88.5% had high health related quality of life, while 11.5% had low health related quality of life.

Table (2): clarifies that mean score of health-related quality of life among the studied patient, regard to the total health related quality of life, the mean score was 149.29 with 38.6 SD. In relation to the domains of health-related quality of life, psychological health got the highest mean score with mean± SD 75.76±8.43 followed by social health with mean±SD 42.84±8.47 and physical health with mean±SD 30.69±26.13.

Table (3): Clarifies that there was statistically significant positive correlation between adherence and physical health with r= .712 and P value **<.001*.** Also, there was statistically significant positive correlation between adherence and psychological health

with r= .950 and P value **<.001***. Moreover, there was statistically significant positive correlation between adherence and emotional health with r= .934 and P value **<.001*.**

Furthermore, there was statistically significant positive correlation between total adherence and total health related quality of life with r=.944 and p value<.001*

4. Discussion

Mycobacterium tuberculosis is the causative agent of the infectious disease known as tuberculosis (TB). It was deemed a global public health emergency because it is the greatest cause of infectious disease-related death worldwide. According to reports, only 64% of the projected 10 million TB infections are found and treated annually. **(Fan at al., 2021)**. Identification of risk factors is effective for policy-makers to put in place appropriate strategies to prevent the disease and reduce the global burden of the infection. Depending on the community's level of health education and awareness, the disease can be totally prevented and cured through prevention and control. **(Yousif, Maki, Khalil Babikir& Abuaisha, 2020).**

For sociodemographic characteristics among the studied patients the present study,

the finding showed that half of studied patients were in age group from thirty to less than forty years old, the high percent of them were male, more than half of them were married, had secondary education and resided in rural areas.

These findings are in line with a study by **Yadav at al., (2021)** published in 2021, titled "Health Related Quality of Life and Associated Factors with Medication Adherence Among Tuberculosis Patients," which showed that more than three-quarters of the participants in the study were male, between the ages of 35 and 45, and had a secondary education.

In relation to housing condition and number of family members of the studied patients more than three quarter of them were living with more than four family members at home, more than half of them had two rooms in their houses, the majority of them were living in poor ventilated house.

These results are in agreement with **Omar, (2020)** at their study entitled "health related health related quality of life and its association with medication adherence for patients with pulmonary tuberculosis" who reported that more than three-quarters of the

studied patients were employed, and the majority of them did not have enough income.

For assessing total level of medication adherence among the studied patients, the current findings of the present study demonstrated that more than half of the studied patients have high level of drug adherence compared to low percent of them had low level of drug adherence.

In agreement with this result of a study conducted by **Kastien-Hilka, Rosenkranz, Schwenkglenks, Bennett& Sinanovic, 2017)** and entitled "Association between health-related quality of life and medication adherence in pulmonary tuberculosis" in South Africa which concluded that more than three quarter of patients reported to be high in total adherence to medication. This result in difference with **Du at al., (2020)** who concluded that tuberculosis patients' total level of medication adherence was not very high and it was influenced by diverse and complex factors involving sociodemographic characteristics, treatment factors, knowledge about TB, mental health, and behavioral characteristics.

From the researcher point of view, this may be due the health care setting provides effective instruction to TB patients and the importance of its medication adherence, in addition to the negative health outcome of non-adherence. That's may help the patients to follow their treatment schedule.

For level of total health related quality of life of the studied patient, the present study represented that, most of the studied patients 88.5% had high health related quality of life, while 11.5% of them had low health related quality of life.

These results in congruence with this **Yadav at al., (2021)** which demonstrated that the majority of tuberculosis patients adhering to medication had good total heath related quality of life. Also, **Kastien-Hilka at al., (2018)** concluded that total HRQOL improved over 6-month TB treatment adherence. On the contrast **Malik at al., (2018)** at the study titled " Health related quality of life among TB patients: question mark on performance of TB DOTS in Pakistan" which represented that the disease had a negative impact on total HRQOL of TB patients across all domains.

From the researcher point of view, this finding may be due to that the studied patients reported high level of medication adherence as it appears at the current results, that's make them cope with their disease and improve their health-related quality of life.

For mean score of total HRQOL of the studied patient, the present study represented that, the mean score of total health related health related quality of life was 149.29 with 38.6 SD. In relation to the domains of health-related quality of life, psychological health got the highest mean score followed by physical health and social health. From the researcher point of view, this finding may be due to that the studied patients reported high level of medication adherence as it appears at the current results, that's make them cope with their disease and improve their HRQOL.

These results in congruence with this Yadav et al., (2021) which demonstrated that the majority of tuberculosis patients adhering to medication had good total HRQOL. Also, Kastien-Hilka et al., (2018) concluded that total HRQOL improved over 6-month TB treatment adherence. On the contrast Malik et al., (2018) at the study titled " Health related health related quality

of life among TB patients: question mark on performance of TB DOTS in Pakistan" which represented that the disease had a negative impact on total HRQOL of TB patients across all domains.

For the correlation between total HRQOL scores and total level of medication adherence among the studied patients, the current study stated that there was statistically significant positive correlation between adherence and total HRQOL and its domains. The finding is in the line with **Kastien-Hilka., (2018),** which discussed that a positive relationship exists between adherence and HRQOL in TB. Additionally, **Yadav at al., (2021)** demonstrated that a statistically significant relationship between medication adherence and total health related quality of life was found.

In disagreement with this result, Hepburn-Smith., (2016) at the study titled "Establishment of an external ventricular drain best practice guideline: the quest for a comprehensive, universal standard for external ventricular drain care" which reported that there were no statistically significant differences in mean scores for HRQOL and total medication adherence.

5. Conclusion

According to the results of the study, the current study demonstrated that there was a significant positive correlation between medication adherence and total HRQOL and its domains among patients with pulmonary TB.

6. Recommendations

Based on the finding of the current study, Designing and implementing an educational program about importance and ways to increase health related quality of life for patients with pulmonary tuberculosis.

Table (1): Percentage distribution of the studied patients according to their socio-demographic characteristics (n=52).

Items	N	%
Age (Years)*		
20:<30	10	19.2
30:<40	26	50.0
40:<50	13	25.0
≥50	3	5.8
Gender		
Male	34	65.4
Female	18	34.6
Marital status		
Married	29	55.8
Not Married	23	44.2
Education		
Illiterate	3	5.8
Read and write	7	13.4
Basic education	38	73.1
Higher education	4	7.7
Residence		
Urban	23	44.2
Rural	29	55.8
Role in family		
Father	25	48.1
Mother	13	25.0
Brother	14	26.9
Income		
Enough	16	30.8
Not Enough	36	69.2
Job		
Working	48	92.3

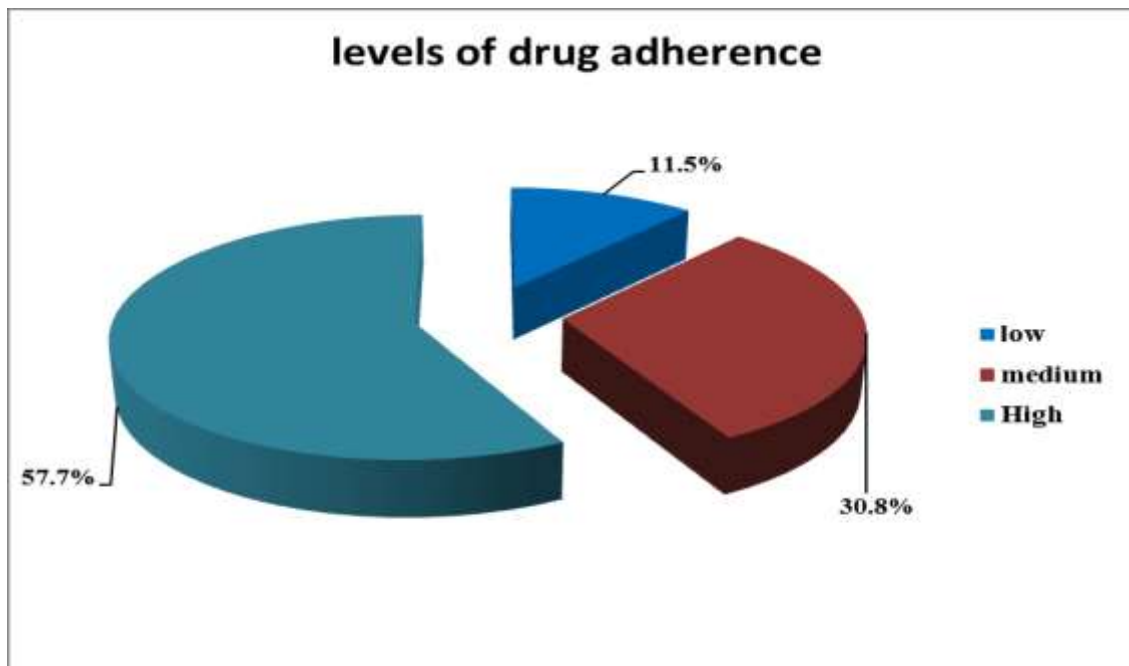|		
Not Working	4	7.7
Rooms		
2	36	69.2
3	14	26.9
4	2	3.9
Family members resides at home		
4	14	26.9
5	20	38.5
6	6	26.9
7	4	7.7

Figure (1): Distribution of patients according to total medication adherence level (n=52)
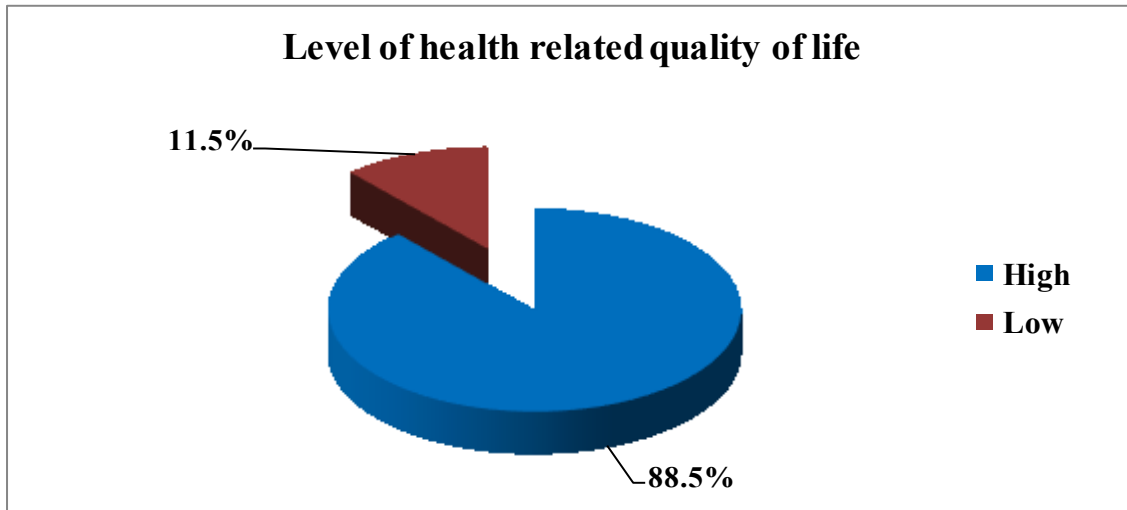
Figure (2): levels of quality of life of the studied patients (n=52).

Table (2): Mean score of total health related quality of life of patients with pulmonary tuberculosis adherent to medication

Items	Mean± SD
▪ Physical health related- health related quality of life	30.69±26.13
▪ Psychological health related- health related quality of life	75.76±8.43
▪ Social health related- health related quality of life	42.84±8.47
▪ Total health related health related quality of life	149.29±38.6

Table (3): Correlation between total patient adherence to anti-tuberculosis medication and their health-related quality of life domains (n=52).

HRQOL domains	Physical		Psychological		Social		Total HRQOL	
	r	P value	R	P value	r	P value	r	P value
Adherence to medication	.712	<.001*	.950	<.001*	.934	<.001*	.944	<.001*

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