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Research Article

Assessment of Medication Adherence, Quality of Life And Risk Factors Among Patients With Tuberculosis In a South Indian Tertiary Care Hospital: A Cross-Sectional Study

Ravindrababu Pingili

Department of University, Punjab, India.Pharmacology, Lovely Professional

ABSTRACT

Background: The main objective of the current study was to assess the level of medication adherence, quality of life, risk factors for better treatment outcomes and to improve patient quality of life by giving TB education.

Methods: A prospective observational study was conducted on 278 patients (139 tubercular patients and 139 health volunteers). A data collection form of various socio-demographic factors, lifestyle factors, and co-morbid conditions for tuberculosis were collected. The quality of life (QOL) was assessed by interviewing the subjects using WHO- QOL BREF questionnaire. Morisky – 8 item medication Adherence Questionnaire was used for assessing adherence.

Results: In a total of 139 TB patients, high adherence (60.06%), medium adherence (20.86%) and low adherence (10.07%) are reported. WHOQOL-BREF mean domain scores were physical health (54.10±12.33), psychological health (51.73±16.24), social health (62.04±15.35) and environmental health (57.14±16.90) respectively. In present study male (67.63%) are higher than females (32.37%). Risk factors observed in study were statistically significant and discussed in present study.

Conclusions: This study showed that the MMAS-8 had good reliability and validity for measuring adherence levels in rural TB patients. There was a high level of adherence to anti-TB treatment was seen in study area. WHO-QOL BREF questionnaire had good reliability and validity for measuring quality of life and Improved quality of life observed in patients with high adherence to anti tubercular drugs. Risk factors such as age, education, locality, food habits, income, smoking and alcoholism are independently associated with Tuberculosis.

Keywords: Tuberculosis, Quality of life, Adherence, Risk factors

INTRODUCTION

Tuberculosis (TB) is one of the top 10 causes of death worldwide. Globally in 2016 there were an estimated 10.4 million incident cases of TB (range, 8.8 million to 12.2 million), equivalent to 140 cases per 1,00,000 population. Over 95% of TB deaths occur in low- and middle-income countries. Seven countries account for 64% of the total, with India leading the count, India accounts for about a quarter of the global TB burden. The World Health Organization (WHO) TB statistics for India for 2016 gives an estimated incidence figure of 2.79 million cases of TB for India. In that incidence of TB 87,000.1,2

TB is an airborne bacterial infection caused by Mycobacterium tuberculosis, which affects any part of the body and most commonly the lungs. Mycobacterium tuberculosis is exposed to the air as droplet nuclei from coughing, sneezing, shouting or singing of individuals with pulmonary or laryngeal TB.3 The two types of clinical manifestation of tuberculosis (TB) are pulmonary TB (PTB) and extra pulmonary TB (EPTB). EPTB refers to TB involving organs other than the lungs (e.g., pleura, lymph nodes, abdomen, genitourinary tract, skin, joints and bones, or meninges).4

TB treatment "adherence" was defined as the degree of compliance in taking the drug doses specified in each phase of treatment.5 Those patients who took the recommended doses were considered adherents. Tuberculosis treatment involves a 6–9 month medication regimen with combinations of drugs, which may cause side effects and non-adherence. Poor adherence to TB medication can be particularly problematic because it can result in prolonged treatment, higher costs, an increase in new cases, and the development of multidrug resistance.6

The WHO defines "Quality of Life" as individual's perception of

Correspondence to: Ravindrababu Pingili, Department of Pharmacology, Lovely Professional University, Punjab, India; E-Mail: pravindrababu@gmail.com

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their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. It is a broad ranging concept affected in a complex way by the person's physical health, psychological state, level of independence, social relationships, personal beliefs and their relationship to salient features of their environment.7 The effect on patient quality of life (QOL) is rarely quantified. Specifically, the effect of TB on a patient's global QOL (physical, mental, or social impairment) has not been studied adequately, particularly in developed countries. Evaluation of the TB disease effect on a patient's QOL requires selecting a proper QOL measure to assess TB patients.8 The main objective of the current study was to assess the level of medication adherence, quality of life, risk factors for better treatment outcomes and to improve patient quality of life by giving TB education.

METHODS

For this purpose, a prospective observational study was carried out at outpatients and inpatinents department of Dr. Pinnamaneni Siddhartha Institute of Medical Sciences and Research Foundation, Gannavaram, Andhra Pradesh, South India from 01-11-2017 to 30-04-2018. The study was initiated after approval by the Institutes Ethical Review Committee, KVSR Siddhartha College of Pharmaceutical Sciences (SCOPS), Vijayawada, India. KVSR SCOPS was recognized by All India Council of Technical Education (AICTE) and Pharmacy Council of India (PCI), New Delhi, Govt. of India. The protocol approval number was KVSRSCOPS/IEC/ PG/238/2017.

Selection of participants

Patients of either sex diagnosed with Tuberculosis of any duration and some subjects (without tuberculosis) were included in the study. The total patients (n=278) were divided into control (n=139) and tubercular group (n=139) were enrolled in the study.

Inclusion criteria

Patients have been on anti-TB medications for at least four weeks with age group of 18-70 years and are willing to participate in the study. People without any medications or disease or disorder (control).

Exclusion criteria

Patients with age less than 18 years, pregnant women and patients who are not willing to participate in the study.

Data collection

The information regarding demographics (age, sex), socioeconomic and lifestyle characteristics (smoking, alcohol consumption) were collected by interviewing the participant.

Statistical analysis

In the descriptive statistical analysis, categorical variables were expressed as numbers and percentages. For categorical variables, the tests of significance analysis we applied chi-square test. For all analysis, P<0.05 was regarded as statistically significant. Odds ratio with 95% confidence intervals was calculated using univariate regression analysis. Data was analyzed using statistical tool graph pad prism software (version 5.0).

RESULTS

A total of 278 patients were involved in the study 139 patients were with tuberculosis and 139 patients were healthy volunteers. Socio-demographic, food, life style characteristics and disease related variables in tuberculosis patients were presented in Tables 1, 2, 3 and 5. Adherence in tuberculosis patients was assessed using MMAS-8 questionnaire. A total 139 cases high adherence (60.06%), medium adherence and (20.86%) and low adherence (10.07%) was reported . Gender and adherence was not statistically significant. In comparison between Adherence and Gender in tuberculosis patients, males showed more adherences (90.4%) than females (88.89%). The mean and standard deviation were compared. In present study, the patients using category I (71.22%) of DOTS regimen showed more adherence than category II (17.26%) shown in .

Quality of life in cases (n=139) and controls (n=139) was assessed using WHOQOL- BREF questionnaire. In present study, the mean WHOQOL-BREF physical domain, psychological domain, social domain and environmental domain score were 54.10±12.33, 51.73±16.24, 62.04±15.35, and 57.14±16.90 respectively. Scores indicating positive functional outcome. When comparing quality of life level between the two groups, the groups of healthy volunteers had higher scores than the group of patients with tuberculosis in the four domains of the questionnaire . The incidence of tuberculosis was higher in males (67.63%) compared to females (32.37%) among them, age group of 46-59 (26.62%, p=0.0332) and >60 (14.39%, p<0.0001), and body weight 50-70 (40.29%, p<0.0001) and >70(10.17%, p<0.0001). Most of them are married (85.61, p<0.0001), uneducated (58.99%, p<0.0001) and living in rural area (73.38%, p< 0.0001). Incidence of tuberculosis was more in daily wage worker (33.81%. p<0.0001), had mixed food habits (96.40%, p=0.0046). People with no physical activities (89.93%), past smokers (26.62%, p<0.0001) and past alcoholics had more incidence (33.81%, p<0.0001).

Variables	
Gender	
Female	45 (32.37)
Male	94 (67.63)
Age (years)	
18-31	33 (23.74)
32-45	49 (35.25)
46-59	37 (26.62)
60	20 (14.39)
Body weight (kg)	
<50	68 (48.92)
50-70	56 (40.29)
>70	15 (10.17)
Education	
Educated	57 (41.01)
Uneducated	82 (58.99)
Marital status	
Unmarried	20 (14.39)
Married	119 (85.61)
Locality	

Urban	37 (26.62)
Rural	102 (73.38)
Occupation	
Unemployed	36 (25.90)
Daily wage worker	47 (33.81)
Government employee	3 (2.16)
Private employee	26 (18.71)
House wife	27 (19.42)
Monthly income	
No income	65 (46.76)
Below 7000	24 (17.27)
7000-14000	36 (25.90)
Above14000	14 (10.07)
Food habits	
Vegetarian	5 (3.60)
Mixed	134 (96.40)
Physical activity	
No	125 (89.93)
Yes	10 (7.19)
Occasional	4 (2.88)
Habit of smoking	
No	85 (61.15)
Yes	18 (12.95)
Past smoker	37 (26.62)
Habit of drinking alcohol	
No	73 (52.52)
Yes	19 (13.67)
Past alcoholic	47 (33.81)
Habit of taking junk foods	
No	42 (30.22)
Daily	23 (16.55)
Once weekly	13 (9.35)
Weekly twice	9 (6.47)
Occasionally	52 (37.41)
Situation at working places	
No stress	112 (80.58)
Stress	27 (19.42)
Co-morbidities	
No co-morbidities	23 (16.55)
T1DM	3 (2.15)
T2DM	38 (27.35)
Gastric problems	20 (14.39)
Hypertension	25 (17.99)
HIV	11 (7.91)
Liver disorders	6 (4.32)
Other pulmonary disorders	13 (9.35)

Table 1: Socio-demographic, food and lifestyle characteristics of patients with tuberculosis (n=139).

Univariate regression analysis was performed to determine the odds ratios for the modifiable and non-modifiable risk factors for tuberculosis . The present study shows more risk in age groups of 46- 59(OR, 2.088; 95% CI, 1.089-4.004, p=0.0332) and >60 (OR, 10.91; 95% CI, 3.007-39.58, p<0.0001), people with un education (OR, 10.32; 95% CI, 5.611-19.00, p<0.0001), living in rural areas (OR, 5.573; 95% CI, 3.326-9.339, p<0.0001), mostly Daily wage worker (OR, 5.353; 95% CI, 2.366-12.11, p<0.0001), people having monthly income Below 7000 (OR, 3.534; 95% CI, 1.424-8.768, p=0.0050), and 7000-14000 (OR, 3.373; 95% CI, 1.583-7.190, P=0.0011), people with mixed food habits (OR, 4.243; 95% CI, 1.537-11.72, p=0.0046), past smokers (OR, 18.86; 95% CI, 5.635-63.14, p<0.0001), and daily smokers (OR, 4.59; 95% CI, 1.750-12.03, p=0.0010) daily alcoholics (OR, 2.646; 95% CI, 1.214-5.766, p=0.0173) and past alcoholics (OR, 15.71; 95% CI, 5.975-41.31, p<0.0001) based on the results our present study revealed more risk for above group of people.

DISCUSSION

The present study's results suggested that subjects who are aged (>46 years), uneducated, living in rural areas, nature of work (daily waged worker), food habits (mixed diet), past smokers and past alcoholics are the major risk factors for the development of tuberculosis. The incidence of tuberculosis was higher in males (67.63%) compared to females (32.37%) and was statistically not significant (p=0.171).The present study results revealed that there is no significance difference and risk between gender and tuberculosis. In our present study among the age groups of 18-31 (23.74%), 32-45 (35.25%), 46-59(26.62%) and >60 (14.39%),the age group of >60 are highly at risk (OR, 10.91; CI, 3.007- 39.58; p<0.0001) when compared to age group of 46-59 (OR, 2.088; CI, 1.089-4.004; p<0.0332) and there is a significant association between age and tuberculosis. Study conducted by Mohrana et al showed that 91.4% cases belonged to economically productive age group 15-59 years.9 Therefore, further studies are needed to evaluate the exact impact of education on risk for tuberculosis.

People with <50 kg (48.92%) were compared with 50-70 kg (40.29%) and weight of >70 kg (10.17%). The study results were statistically significant (p<0.0001). The present study reveals that there was no association between body weight and tuberculosis. The incidence of tuberculosis was higher in married people (85.61%) when compared to unmarried people (14.39%) and statistically significant (p<0.0001). According to the results of the study, there was no significant association between marital status and tuberculosis. The incidence of tuberculosis was higher in people with mixed food habits (96.4%) compared to vegetarians (3.6%) and is statistically significant (p=0.0046). People who take mixed diet are at risk (OR, 4.243; 95% CI, 1.537-11.72; p=0.0046) for tuberculosis when compared to vegetarians. Therefore, further studies are needed to evaluate the exact impact of education on risk for tuberculosis.

The incidence of tuberculosis was higher in people with no physi-

cal activity (89.93%) when compared to people with daily physical activity (7.19%) and occasional physical activity (2.88%). The results were statistically significant in those with physical activity (p=0.0001) and occasional physical activity (p=0.0008). The results revealed that there was no significant association between physical activity and tuberculosis. Study results revealed that there was significant association between smoking and tuberculosis. People with past smokers are at high risk (OR, 18.86; 95% CI, 5.635-63.14;m p<0.0001) when compared to daily smokers (OR, 4.59; 95% CI, 1.750-12.03; p=0.0010).In one study (2015) conducted nested case-control study by Smith et al among members of Kaiser Permanente Northern California (KPNC) in a total of 2380 cases between 1996 and 2010.10 Results Increased PTB risk was observed among ever smokers (OR=1.35; 95% CI 1.19 to 1.53), as well as current (OR=1.26; 95% CI 1.08 to 1.48) and past (OR=1.43; 95% CI 1.23 to 1.67) smokers, compared with never-smokers and concluded that smoking increases risk of PTB.

People with past alcohol are at risk (OR, 15.71; 95% CI, 5.975-41.31; p<0.0001) for tuberculosis when compared to the people with alcoholic (OR, 2.646; 95% CI, 1.214- 5.766; p=0.0173). The incidence of tuberculosis was higher in people who occasionally take junk food (37.41%) when compared to those who take daily (16.55%), once weekly (9.35%), weekly twice (6.47%) and don't take junk food (30.22%). The results revealed that there were not statistically significant and no risk between habit of junk food and tuberculosis. The incidence of tuberculosis was higher in patients those without stress (80.58%) than those with stress (19.42%) at working places. The results obtained are not statistically significant and there is no risk between stress at working places and tuberculosis.

Our present study revealed WHOQOL-BREF mean domain scores were physical health (54.10±12.33), psychological health (51.73±16.24), social health (62.04±15.35) and environmental health (57.14±16.90) respectively. Among them, physical domain (p=0.0121) and psychological domain (p=0.0565) shown significantly lower scores. Similar prospective study was carried out by Chung et al in 270 patients (140 TB patients and 130 healthy referents) using WHOQOL- BREF questionnaire among pulmonary tuberculosis patients in Taiwan resulting Physical health 12.7±2.79 (p<0.01), environmental 12.71±2.51 (p<0.05), psychological 12.41±3.05 (p<0.01), social 13.28±2.52. Another cross sectional study11 was conducted by Sule et al in 154 tuberculosis patients showed that the highest score in the QOL rating was (12.54 3.03) in the physical health domain while the lowest score was in the environment domain (11.10±1.82) then followed closely by psychological domain with the score of (11.44±2.63).12 Our final scores therefore appear to be largely similar to those found in healthy Indian adults, which indirectly suggests that anti-tuberculosis treatment improved patient status to near- pre morbid level in most cases.

Adherence

In present study by using MMAS-8, showed that high adherence and medium adherence (80.92%) was more when compared to low adherence (10.07%). In a cross- sectional survey conducted by Xu et al in 358 TB patients used C-MMAS-8 showed high and medium adherence (65.36 %) and low adherence (34.64%) thus concluded that more than one-third of the participants had low medication adherence.5 Gube et al cross-sectional study design was conducted among TB patients in Arba Minch governmental health institutions in Ethopia.13 The overall non-adherence using MMAS-8 was 67 (24.7%) (CI=20.0– 30.4).

CONCLUSION

This study showed that the MMAS-8 had good reliability and validity for measuring adherence levels in rural TB patients. There was a high level of adherence to anti-TB treatment was seen in study area. WHO-QOL BREF questionnaire had good reliability and validity for measuring quality of life and Improved quality of life observed in patients with high adherence to anti tubercular drugs. Risk factors such as age, education, locality, food habits, income, smoking and alcoholism are independently associated with Tuberculosis.

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