



A cross sectional study on assessment of nutritional status of patients with tuberculosis and associated factors in a tertiary care Hospital, Hyderabad, Telangana, India

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Abstract

Introduction: TB predisposes the patient to malnutrition and malnutrition increases the risk of developing active TB by 6 to 10 folds.

Objectives: To study the socio demographic profile of the study population, to study the determinants of malnutrition among patients of Tuberculosis.

Methods: A cross sectional study was conducted in the Government TB and Chest Hospital, Hyderabad from January to March 2023 (3 months). Ethical clearance was obtained from the institution ethics committee. The study population includes newly diagnosed active pulmonary TB patients aged more than 18 years, receiving TB treatment under DOTS and willing to participate in the study. Using the formula $4pq/l^2$, sample size of 110 was arrived. A pilot tested semi-structured questionnaire was used to collect data.

Results: Most common age group was 38-47 years found in 54.5% of study subjects. Females constituted 64.5% of the study subjects. Subjects belonging to lower class were 44.55%, and 69% of the study subjects belonged to urban areas and 96.3% of the study subjects were married. Majority (86.3%) of the subjects never consumed alcohol, and (70.9%) were current smokers. Statistically significant relationship was found between younger age, female gender, rural residence, cigarette smoking, presence of diabetes and malnutrition. ($p < 0.05$).

Conclusion: Various determinants of nutritional status have emerged in our study. These include younger age groups, female gender, rural residence, cigarette smoking and presence of diabetes.

Keywords: Tuberculosis, malnutrition, nutritional status

Introduction

Underweight is a malnutrition stage in which the body mass index (BMI) of the adult scores less than 18.5 KG/M² cuts-points ^[1]. Tuberculosis (TB) is an infectious disease caused by mycobacterium Tuberculosis species. It is one of the oldest diseases known

to mankind ^[2]. According to the World Health Organization (WHO), Tuberculosis attacks 10 million people and kills 1.3 million people every year ^[3]. In India, Tuberculosis is the Leading cause of death among all communicable diseases and the fifth leading cause of death among all diseases ^[2]. Estimated incidence rate of Tuberculosis in India was 193 cases/lakh population in 2019 and estimated Tuberculosis cases in India was 26.4 lakh ^[3]. The National Tuberculosis Elimination Program (NTEP) is the Public Health initiative of the Government of India that organizes its anti-Tuberculosis efforts. It was formed as a result of consolidation of a series of rapid and progressive advancements in RNTCP from 2016 onward, and with Government of India's commitment to achieve the END TB targets by year 2025, 5 years ahead of the sustainable development goal target for Tuberculosis ^[2]. It functions as a flagship component of the National Health Mission (NHM) and provides technical and managerial leadership to anti-tuberculosis activities in the country ^[2].

Malnutrition plays a significant role in the occurrence as well as worsening of tuberculosis ^[4, 5]. One-quarter of TB in the world was as a result of malnutrition and improving the nutritional status of the individual decreases the risk of TB ^[6]. TB predisposes the patient to malnutrition and malnutrition increases the risk of developing active TB by 6 to 10 folds ^[7, 8, 9]. The treatment outcomes of TB patients can be improved by studying their nutritional status ^[10]. Even with the availability of powerful anti-tuberculous drugs, India still has a long road ahead to reach the “End TB by 2025” goal. Taking stalk of this situation, promising programmatic guidance for nutritional support in TB patients have been formulated by the Central TB division of India ^[2]. The present research aims to study the determinants of malnutrition among patients of Tuberculosis.

Materials and Methods

The present study is a cross sectional study done in the Government TB and Chest Hospital from January to March 2023 (3 months). Ethical clearance was obtained from the institution ethics committee to conduct the study. Permission was also obtained from the superintendent of the Government TB and Chest Hospital, Hyderabad. The study population includes newly diagnosed active pulmonary TB patients aged more than 18 years who are receiving TB treatment under DOTS. Patients unwilling to participate in the study, critically ill patients as well as adolescents less than 18 years were excluded from the study. The prevalence of malnutrition among the study population was taken to be 50% and using the formula $4pq/l^2$, a sample size of 110 was arrived. A semi-structured questionnaire was used to collect data on socio-demographic characteristics and nutritional parameters like height, weight, BMI, HB%, calcium and other micronutrients. Simple random sampling technique was used and data was collected until sample size was met. Pilot study was performed on 10% of the sample size i.e. 11 patients to pre-test the interview schedule, assess feasibility of the study, content validity and length of each interview. Necessary modifications were made and a modified interview schedule was prepared. The participants were approached during the OPD hours and interviews were conducted with the help of medical officers and staff nurses of the Government TB and Chest Hospital. Prior verbal informed consent was obtained from the study subjects. The data obtained was entered in excel sheet and analyzed using Epi Info 7.

Results

A total of 110 study subjects were included in this study.

Table 1: Distribution of study subjects based on socio economic profile characteristics

Variable	Frequency (n)	Percentage (%)
Age		
18- 27	09	8.1%
28-37	05	4.5%
38-47	60	54.5%
48-57	31	28.1%
>58	05	4.5%
Gender		
Male	39	35.4%
Female	71	64.5%
Socio-economic status (Modified BG Prasad)		
Upper class	19	17.2%
Upper lower	42	38.1%
Lower	49	44.5%
Residence		
Urban	76	69%
Rural	34	30.9%
Marital status		
Married	106	96.3%
Unmarried	04	3.6%
Alcohol consumption		
Former	07	6.3%
Current	18	16.3%
Never	95	86.3%
Cigarette consumption		
Former	18	16.3%
Current	78	70.9%
Never	14	12.7%

As shown in Table 1, the most common age group was 38-47 years, contributing to 54.5% of study subjects followed by 48-57 years age group in 28.1% of study subjects. Females constituted 64.5% of the study subjects and males were 35.4%. Among socio economic classes, subjects belonging to lower class were 44.55% and upper lower class were 38.1%. 69% of the study subjects belonged to urban areas and 30.9% belonged to rural areas. Married people constituted 96.3% of the study subjects. Among personal habits and addictions, majority of the subjects (86.3%) never consumed alcohol, followed by 16.3% who were current alcoholics. Majority of the subjects (70.9%) were current smokers, followed by 16.3% who were former smokers.

Table 2: Distribution of study subjects based on spectrum of clinical presentation

Clinical feature	Number (%)
Cough	72 (65.45)

Chest pain	51 (46.36)
Fatigue	70 (63.67)
Others	12 (10.9)

It was seen from Table 2 that the most common presenting symptom was cough seen in 65.45% of study subjects. This was followed by chest pain in 46.36% of study subjects. Multiple symptoms were found in many study subjects.

Table 3: Association between underweight and socio-demographic profile of study subjects

Variable	Under weight	Normal weight	Odds ratio (95% CI)	P-value
Age (in years)				
<30	03	04	1	
31-45	25	30	0.9 (0.18-4.4)	0.89
>45	43	05	0.09(0.015-0.5)	0.006*
Gender				
Male	31	08	3 (1.2-7.4)	0.017*
Female	40	31		
Socio-economic status				
Upper class	33	21	0.74 (0.3-1.6)	0.46
Lower	38	18		
Residence				
Urban	42	34	0.21 (0.07-0.6)	0.0039*
Rural	29	05		
Marital status				
Married	68	38	0.59 (0.059-5.9)	0.63
Unmarried	03	01		
Alcohol consumption				
Former/Never	59	33	0.89 (0.3-2.6)	0.83
Current	12	06		
Cigarette consumption				
Former/Never	02	30	0.0087 (0.0018-0.042)	<0.001*
Current	69	09		

(* = p value <0.05)

It was observed from Table 3 that a total of 71 (64.54%) study subjects were underweight and 39 (35.45%) were normal weight according to BMI calculation. Significant association was found between age over 45 years and good nutrition. Age over 45 years was found to have a protective relationship against malnutrition. This relationship was statistically significant ($p < 0.05$). Male gender was 3 times more protective against underweight compared to females. This relationship was statistically significant ($p < 0.05$). Residence in urban areas was found to be protective against malnutrition compared to rural areas. Former smokers and non-smokers were protected against malnutrition compared to current smokers. These relationships were statistically highly significantly ($p < 0.001$). Socio economic status, marital status, alcohol consumption did not show any statistically significant relationship with nutritional status ($p > 0.05$).

Table 4: Association between underweight and clinical profile of study subjects

Variable	Underweight	Normal weight	Odds ratio	P-value
Type of TB				
Pulmonary	55	28	1.35 (0.5-3.3)	0.5
Extra pulmonary	16	11		
HIV Status				
Positive	10	02	3 (0.63-14.6)	0.167
Negative	61	37		
Diabetes				
Positive	55	11	8.75 (3.58-21.35)	<0.001*
Negative	16	28		
Functional status of the patient				
Ambulatory	69	38	0.9(0.08-10.34)	0.94
Bed ridden	2	1		

(* = p value <0.05)

It was seen from Table 4 that patients with diabetes were 8.75 times more at risk of being underweight compared to non-diabetics. This relationship was statistically highly significant. ($p < 0.001$). Type of tuberculosis, HIV status and functional status of the patient did not show any statistically significant relationship with nutritional status. ($p > 0.05$)

Discussion

A total of 110 study subjects were included in this study. Most common age group was 38-47 years found in 54.5% of study subjects. Females constituted 64.5% of the study subjects. Among socio economic classes, subjects belonging to lower class were 44.55%, 69% of the study subjects belonged to urban areas, married people constituted 96.3% of the study subjects. Among personal habits and addictions, majority of the subjects (86.3%) never consumed alcohol, and majority of the subjects (70.9%) were current smokers. These findings were in agreement with those of study done by EA Dodor *et al.* [11] in 570 newly diagnosed pulmonary tuberculosis patients in Ghana. The mean age of the population was 39 years. But contrary to our study, study population in the study done by EV Dador *et al.* [11] had a majority of male population of 65%. Study done by Anurag Bhargava *et al.* [12] in Chhattisgarh state among 1695 also found the mean age to be 38 years. In their study, men constituted a majority of the study population (40%) and rural population constituted a majority (94%). Most common presenting symptom in our study was cough found in 65.45% of the study subjects. This finding was in agreement with study done by Bhattacharya P [13] among 654 TB patients where cough was found in 54.34%. In the present study, a total of 71 (64.54 %) study subjects were underweight and 39 (35.45%) were normal weight according to BMI calculation.

Prevalence of undernutrition in our study was 64.54%. This was higher than the prevalence of undernutrition found in studies done by Kidist Endalkachew *et al.* [14] where it was found to be 42.2% and Adane Tesfaye Anbese *et al.* [15] where it was found to be 29%. In the present study, younger age groups, female gender, rural residence, cigarette smoking and presence of diabetes were significantly associated with underweight among TB patients. In Korea, a 3-year longitudinal study involving 800 000 civil servants showed that the risk ratio of tuberculosis in diabetic patients versus non-diabetic controls was 3.47 (95% CI 2.98-4.03) [16]. In a case control study done by Roya Alavi-Naini *et al.* [17] multivariate logistic regression revealed cigarette

smokers were 3.1 (95% CI: 1.4-10.3) times more frequent in TB patients compared with controls.

Conclusion

Various determinants of nutritional status have emerged in our study. These include younger age groups, female gender, rural residence, cigarette smoking and presence of diabetes.

Recommendations

Various targeted information, education and communication (IEC) campaigns should be conducted in the vulnerable populations to improve their nutritional status and thereby strengthen the National Tuberculosis Elimination Program (NLEP). Food security should be ensured in this population and delivery of food grains should be regularly monitored.

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