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ORIGINAL ARTICLE

A cross sectional study of dietary practices and nutritional status of tuberculosis patients

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ABSTRACT

Introduction: Tuberculosis (TB) is caused by Mycobacterium tuberculosis which often affect the lungs, although it can spread to other organs in the body. TB is the second deadliest disease worldwide caused by a single infectious agent **Objective:** evaluate the nutritional status of active TB patients in a tertiary care medical college hospital in Chennai. **Methods:** This was a descriptive cross-sectional study conducted from August 2022-September 2022 among active Tuberculosis patients in a tertiary care medical college hospital in Chennai who had tested positive by sputum microscopy and are under treatment. Sample size was calculated to be 105. Participants were selected by simple random sampling. Sampling was done by simple random sampling of the study population. Data on clinical and demographic characteristics and dietary intake was collected using questionnaire. **Results:** Mean age of the participants was 34, 04 years. The energy intake of most (62, 9 %) of the participants was found to be less than the RDA levels for Tuberculosis patients. Inadequate calorie consumption was found to be significantly associated with the presence of complications of tuberculosis after adjusting for age and gender with an odds ratio of 3, 24 (95 % CI, 1, 45-6, 74). **Conclusion:** Inadequate calorie intake was significantly associated with presence of complications of tuberculosis. Proper nutritional counseling along with nutritional support should be given to severely malnourished TB patients, and nutritional assessment of TB patients should be done periodically.

Key words: dietary practices, nutrition, tuberculosis patients.

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INTRODUCTION

Tuberculosis (TB) is caused by Mycobacterium tuberculosis which often affect the lungs, although it can spread to other organs in the body. TB is the second deadliest disease worldwide caused by a single infectious agent [(1)]. Globally, in 2014, 9, 6 million people were estimated to have fallen ill with TB; among them, 3, 2 million were women, 5, 4 million were men, and 1 million were children. Of the 9, 6 million TB cases, in 2014, 12 % of them were HIV positive. Now, TB ranks along with HIV as a leading cause of death worldwide [(2)]. However, TB is completely curable through a short course of chemotherapy (DOTS), which has been recognized as a highly cost-efficient and effective strategy [(3)].

TB spreads from person to person through the air [(4)]. There are two kinds of TB infections: latent and active. In latent TB, the bacteria remain inactive and do not show any typical signs and symptoms of TB. While they are not contagious, they can become active at any time. In active TB, the bacteria show signs and symptoms of TB and are contagious to others [(1)].

Symptoms of active pulmonary TB are coughing, chest pain, fever, night sweats, weight loss, fatigue, and sometimes, the coughing up of blood [(5)]. Active TB, like other infectious diseases, requires high energy consumption i.e., 20–30 % extra energy of recommended daily allowance (RDA). Undernutrition increases the risk of progression from TB infection to an active TB disease. Food insecurity and poor nutritional status in the population are important contributors to the global burden of the TB disease [(6)].

Both malnutrition and TB are of considerable magnitude in most of the underdeveloped regions of the world. Nutritional status is significantly lower in patients having active TB than others [(7)]. Therefore, the present study was conducted with an objective to evaluate the nutritional status of patients with active tuberculosis in a tertiary care medical teaching hospital in Chennai.

METHODS

This was a descriptive cross-sectional study conducted from August 2022-September 2022 among Tuberculosis positive patients in a tertiary care medical college hospital in Chennai. Patients who had tested positive for Tuberculosis, by sputum microscopy and are enrolled for treatment in the tertiary care institution in the past 2 months were included in the study. Sample size was calculated to based on a previous study finding where 87, 4 % [(8)] of TB patients had daily calorie intake less than the recommended level.

Assuming an absolute error of 7 % and at 5 % level of significance, sample size was calculated to be 105. Sample population was selected from the Tuberculosis treatment register by simple random sampling of the study population.

Approval was obtained from the Institutional Ethics Committee. Informed consent was obtained from the participants. Clinical and demographic details like age, sex, tuberculosis treatment status, presence of complications (loss of weight, worsening of respiratory symptoms, pneumonia, anorexia, conversion to extra pulmonary tb and development of bronchiectasis) etc. were collected using a questionnaire. Data on dietary intake was collected using a food frequency questionnaire.

Calorie intake of the person was assessed using 24 hour recall method. The required dietary allowance for a patient suffering from TB is 2500 calories [(1)], below which the calorie intake was considered inadequate.

Data was checked for completeness and consistency and entered in IBM SPSS software version 2. Descriptive statistics like percentages and mean were used. The data was analysed based on various factors such as gender, age, occupation, type of TB, co-morbidity status, category of treatment and dietary intake. Inferential analysis was done using chisquare test. Bivariate analysis was done using Binary logistic regression. Multivariate analysis was done to fine adjusted odds ratio using multiple logistic regression. P value of less than 0, 05 was taken as statistically significant.

RESULTS

Data was collected from 105 study participants. Table 1 shows that majority (45, 7 %) of the participants were in the age group of 31 - 40 years of age with mean age being 34, 04 years. About 70, 5 % of the participants were males.

Table 1. Demographic characteristics distribution of the participants

Variable	Categories	No	%
Age group	20 to 30	26	24, 8
	31 to 40	48	45, 7
	41 to 50	19	18, 1
	51 to 60	12	11, 4
Gender	Male	74	70, 5
	Female	31	29, 5

All patients were on treatment with antitubercular regimen. A little less than two-third (64, 8 %) of the participants had atleast one complication (Table 2).

Table 2. Dietary assessment of the participants

Variables	Categories	No	%
Frequency of food intake in a day	> 3 times	36	34.3
	≤ 4 times	69	65.7
Meals not prepared at home	> 2 days in a week	31	29.5
	≤ 2 days in a week	74	70.5
Pulses	Yes	87	82.9
	No	18	17.1
Meat	Yes	23	21.9
	No	82	78.1
Egg	Yes	12	11.4
	No	93	88.6
Intake of Calories	Adequate	39	37.1
	Inadequate	66	62.9
Complications of Tuberculosis	Present	37	35.2
	Absent	68	64.8

Table 4 shows the details about dietary intake of the participants. The frequency of food intake was more than 3 times a day in only one third (34, 3 %) of the participants. About 29, 5 % of the participants take outside food not prepared at home more than 2 days in a week. Majority (82, 9 %) of the participants took pulses in their diet but only few participants took meat and egg in their diet which was found to be 21, 9 % and 11, 4 % respectively. The energy intake of most (62, 9 %) of the participants was found to be less than the RDA levels for Tuberculosis patients.

Inadequate calorie consumption was found to be significantly associated with the presence of complications of tuberculosis with an odds ratio of 1, 78 (95 % CI, 0, 78-4, 04). This association was also found to be significant after adjusting for age and gender with an odds ratio of 3, 24 (95 % CI, 1, 45-6, 74).

Table 4. Association of calorie intake with complication of TB

		Complications of Tuberculosis		P value	Odds ratio (95 % CI)
		Present	Absent		
Calorie intake	Adequate	19	49	0, 01	Ref
	Inadequate	20	17		3, 03 (1, 32-7, 00)
Calorie intake*	Adequate			0, 01	Ref
	Inadequate				3, 24 (1, 45-6, 74)

*Analysis done using multiple logistic regression adjusting for age and gender.

DISCUSSION

This study revealed that most patients on treatment for TB (62, 9 %) did not consume adequate amount of calories as per Recommended Dietary Allowance.

The required dietary allowance for a patient suffering from TB is 2500 calories [(1)]. This percentage is lesser than that found in previous studies. Jovita L et al [(9)] found that 81, 5

% of TB patients had inadequate intake of calories in a study in India. In a study done in China [8], 87, 4 % of male TB patients and 59, 9 % of female patients consumed inadequate amount of calories.

Other studies [10,11,12] also reported higher proportion of TB patients having inadequate calorie intake. However, a direct comparison of the prevalence of inadequate calorie among studies may be inappropriate, because of the differences in survey methods and inclusion criteria of study subjects. The discrepancy in the prevalence rates reported among studies may be due to differences in socioeconomic and demographic factors, lifestyle, the severity of the disease, and the time when the studies were carried out.

Majority of the participants took meals less than or equal to three times a day. In a study in China [8] majority of adult TB patients consumed a low frequency, 1 to 2 meals per day, and low daily food frequency was associated with increased odds of undernutrition. This finding was consistent with previous studies from Nepal [13], and Kenya [14], which revealed that adult TB patients did not consume adequate dietary intakes. A potential reason for poor food frequency per day is likely due to the loss of appetite caused by the disease [14,15], which is associated with consumption and weight loss [16].

Most of the patients consumed plant protein in the form of pulses. Proteins in the diet can be of animal or plant origin. Proteins of animal origin like milk, eggs, and meat have relatively higher proportion of essential amino acids and are therefore considered as of higher biological value, hence since majority of the patients only took plant based protein diet, proper nutrition education and awareness is still needed among TB patients.

TB being an infectious disease, patients need additional energy to sustain body function due to an increased basal metabolic rate (BMR), which contributes to weight loss. [17] Energy consumption in TB patients may also be adversely affected due to reduced appetite and gastrointestinal disorders. [18]

Inadequate calorie intake was significantly associated with presence of complications of tuberculosis. This data implicates that patients with adequate nutritional status show better recovery from the disease than patients with an improper caloric intake. Thus a caloric intake of more than 2 500 calories is required for better prognosis and recovery of patients.

Some limitation is inherent in the methods used such as not performing serial food recall surveys, measurement intake accuracy and recall bias. Study could have included weight and BMI which was an indicator for prognosis of the disease for long term monitoring of patients, since this was a descriptive crosssectional study and not a

prospective study, data collection was done during a point in time and changes in BMI cannot be assessed.

CONCLUSION

Proper nutritional counseling along with nutritional support should be given to severely malnourished TB patients, and nutritional assessment of TB patients should be done periodically. Most of the patients undergoing treatment were from lower socio economic status, and data shows that these patients have low nutrition intake and have calorie deficit from normal RDA. Hence a monthly or bimonthly nutrition allowance can be beneficial for these groups.

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