

Nutritional Status of Patients with Pulmonary Tuberculosis receiving Anti-Tuberculosis Treatment at BP Koirala Institute of Health Sciences, Nepal

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Abstract: Tuberculosis (TB) is a major global health problem. Poor nutritional status is associated with risk of TB and unfavorable outcome. The objectives of this study were to assess nutritional status of pulmonary tuberculosis patient receiving Anti-tuberculosis treatment and to find out the association between nutritional status and selected socio-demographic variables. A Descriptive cross-sectional study was conducted to assess the nutritional status of pulmonary tuberculosis patient. Total 84 pulmonary tuberculosis patients were selected by convenient sampling technique. Study was conducted at Directly Observed Treatment Short course (DOTS) clinics under BP Koirala Institute of Health sciences (BPKIHS) Nepal. Subjective Global Assessment (SGA) tool was used for data collection. Descriptive (frequency, percentage, mean, standard deviation) and inferential statistics (Chi-square) were used to analyze data. The study demonstrated that the mean age of respondents was 40.52 ± 16.78 years. 50.0% of the respondents were well-nourished, 39.3% were mildly/moderately malnourished whereas 10.7% were severely malnourished. Nutritional status is not statistically significant with socio-demographic variables but there is highly significant association ($p < 0.0001$) of nutritional status with BMI, loss of body fat, loss of muscle mass and present health status of respondents. On the basis of result, it can be concluded that half of the respondents were malnourished. The age, gender, marital status, religion, educational status, type of family and family income are not associated with nutritional status. From this study, it can be inferred that there is need of nutritional counseling and supplementation, which may improve TB treatment outcomes.

Key words: Anti-tuberculosis Treatment; Nutritional status; Pulmonary Tuberculosis

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I. Introduction

Tuberculosis (TB) is a major global health problem. In 2015, there were an estimated 10.4 million new TB cases worldwide.¹ TB ranks as sixth leading cause of death in Nepal. In Nepal, about 45 percent of the total population is infected with TB, of which 60 percent are adult. Every year, 45,000 people develop active TB, out of them 20,500 have infectious pulmonary disease. Treatment by Directly Observed Treatment Short course (DOTS) has reduced the number of deaths; however, 5,000- 7,000 people are still dying per year by TB.²

Tuberculosis can lead to malnutrition and malnutrition may predispose to tuberculosis.³ It has been found that malnourished tuberculosis patients have delayed recovery and higher mortality rates than well-nourished patients.⁴ Despite the high burden of malnutrition, assessment of nutrition intake is often neglected in clinical practice and national TB programs.⁵ Thus, the objectives of the study were to assess nutritional status of pulmonary tuberculosis patient receiving Anti-tuberculosis treatment and to find out the association between nutritional status and selected socio-demographic variables.

II. Material and Methods

A Descriptive cross-sectional study was conducted at DOTS clinics under BP Koirala Institute of Health sciences (BPKIHS) Dharan, Nepal. Total 84 pulmonary tuberculosis patients were selected by using non-probability, convenient sampling technique from 16th April to 15th May 2017. Total 84 Pulmonary tuberculosis patients age 18 years and above and receiving anti-tuberculosis treatment for at least 4 weeks were included in the study. The sample size was calculated based on the findings from the previous study.⁶

$$\text{Sample size} = 4pq/L^2$$

Where,

$$p = \text{prevalence} = 55.8\% \text{ (Indupalli et al., 2013)}$$

$$q = 1 - p = (100 - 55.8) = 44.2\%$$

$$L = \text{allowable error (20\% of } p) = 11.16$$

$$L^2 = 124.54$$

$$\text{Sample size} = 4pq/L^2$$

$$= \frac{4 \times 55.8 \times 44.2}{124.54}$$

$$= 79.2150$$

$$= 80$$

Considering the 5% sample mortality = 5% of 80 = 4

Therefore, Total sample for this study was 84.

Ethical clearance was obtained from Institutional Review Committee (IRC) of BPKIHS, Nepal. Participants were requested to involve voluntarily and informed written consent was taken from each respondent. Privacy and confidentiality of the subjects was maintained throughout the study. During data collection, measuring tape and calibrated weighing machine was used to measure height and weight of the participants. Interview questionnaire was used to collect the information, which was divided into 4 parts: Part I consists of questions related to socio-demographic characteristics such as age, gender, marital status, educational status etc., Part II consists of questions related to general information of respondents which includes previous history of tuberculosis, dietary pattern, exercise, sleep, smoking habit, alcohol consumption habit etc., Part III consists of anthropometric measurements which includes height, weight and BMI and Part IV consists of Subjective Global Assessment (SGA) tool, which is a structured approach to taking history on the categories of weight change, changes in food intake, gastrointestinal symptoms, functional impairment and is combined with a physical examination looking for evidence of loss of subcutaneous fat, muscle wasting, edema and ascites.

Data were analyzed by using SPSS version 20. Descriptive statistics like percentage, mean and standard deviation were used to describe socio-demographic variables and anthropometric measurements. Chi square test was used to find out the association between nutritional status and selected socio-demographic variables. The confidence interval was taken at 95% and the probability significance was set at $p < 0.05$.

III. Results

Total 84 pulmonary tuberculosis patients were included in the study. In this study, 33.3% of the respondents were in the age group of <30 years followed by 25% in the age group of 30-40 years (mean age 40.52 ± 16.78 years). Among the respondents, 53.6% of the respondents were male. Majority (70.2%) of the respondents were married. The result showed that, nearly half of the respondents (46.4%) were unemployed. More than half (54.8%) of the family were nuclear and most of the respondents had no any past history of TB (81.0%) and no family history (71.4%) of TB. Table 1 depicts socio-demographic characteristics of the respondents. Table 2 shows the nutritional status of the respondents based on Subjective Global Assessment criteria. The result revealed that 42 (50.0%) of the respondents were well-nourished, 33 (39.3%) were mildly/moderately malnourished and 9 (10.7%) were severely malnourished. In this study, nutritional status is not statistically significant with age, gender, marital status, religion, educational status, type of family and family income but, there is statistically significant association ($p < 0.0001$) of nutritional status with BMI, loss of body fat, loss of muscle mass and present health status of the respondents at 0.05 level of significance. The details are depicted in Table 3 and 4.

Table1: Socio-demographic characteristics of the Respondents

n=84

Variables	Frequency	Percentage
Age (in years)		
<30	28	33.3
30-40	21	25.0
40-50	10	11.9
50-60	12	14.3
≥60	13	15.5
Gender		
Male	45	53.6
Female	39	46.4
Marital status		
Married	59	70.2
Unmarried	19	22.6
Divorced	2	2.4
Widow/Widower	4	4.8
Ethnicity		
Dalit(Terai/Hill)	11	13.0
Janajati(Terai/Hill)	53	63.1
Madhesi	4	4.8
Muslim	1	1.2
Brahmin/Chhetri	15	17.9
Educational Status		
Illiterate	7	8.3
Can read and write	21	25.0
Primary level	14	16.7
Secondary level	29	34.5
Higher secondary level	10	11.9
Bachelor and above	3	3.6

Table 2: Nutritional status of the Respondents based on Subjective Global Assessment criteria

n=84

Nutritional Status	Frequency	Percentage
Well-nourished	42	50.0
Mildly/moderately malnourished	33	39.3
Severely malnourished	9	10.7

Table3: Association of Nutritional status with Socio-demographic variables

n=84

Variables	Nutritional Status		χ^2 value	p-value
	Well-nourished n(%)	Malnourished n(%)		
Age*				
<50	33(55.9)	26(44.1)	2.791	0.095
≥50	9(36.0)	16(64.0)		
Gender*				
Male	20(44.4)	25(55.6)	1.197	0.274
Female	22(56.4)	17(43.6)		
Marital status*				
Unmarried	12(63.2)	7(36.8)	1.700	0.192
Married	30(46.2)	35(53.8)		
Religion*				
Hindu	33(47.1)	37(52.9)	1.371	0.242
Others	9(64.3)	5(35.7)		
Educational status†				
Illiterate	4(57.1)	3(42.9)	-	1.000
Literate	38(49.4)	39(50.6)		
Type of family*				
Nuclear	26(56.5)	20(43.5)	1.730	0.188
Joint	16(42.1)	22(57.9)		
Family income*				
<25000	26(47.3)	29(52.7)	0.474	0.491
≥25000	16(55.2)	13(44.8)		

* Pearson Chi-Square

†Fisher's Exact Test

Table 4: Association of Nutritional status with body built and present health status of the Respondents n=84

Variables	Nutritional status		χ^2 value	p-value
	Well-nourished n(%)	Malnourished n(%)		
BMI*				
<18.50	14(31.1)	31(68.9)	13.832	<0.0001
≥18.50	28(71.8)	11(28.2)		
Loss of body fat[†]				
No	34(91.9)	3(8.1)	43.473	<0.0001
Yes	8(17.0)	39(83.0)		
Loss of muscle mass[†]				
No	34(91.9)	3(8.1)	43.473	<0.0001
Yes	8(17.0)	39(83.0)		
Present health status[†]				
Better	38(63.3)	22(36.7)	13.125	<0.0001
Same or decline	4(16.7)	20(83.3)		

* Pearson Chi-Square

[†] Continuity Correction

IV. Discussion

In this study out of 84 pulmonary tuberculosis patients, 33.3% of the respondents were in the age group of <30 years followed by 25.0% in the age group of 30-40 years and 11.9% in the age group of 40-50 years (mean age 40.52 ± 16.784 years). Among the respondents 53.6% of the respondents were male. Similar study conducted in India has also found that majority 88 (86.3%) of cases were in economically productive age group i.e. 15 to 64 years with male predominance, which is similar to this study.⁶

Present study revealed that 8.3% of the respondents were illiterate and among the literates 34.5% studied up to secondary level and only 3.6% had education up to Bachelor and above. This finding was consistent with the study conducted in Tertiary care hospital, India. It was found that 20% of patients were illiterate, 17% had education up to primary level, 52% up to secondary school and only 11% of patients were graduates.⁷ In the present study, more than half (54.8%) of the family were nuclear and nearly half of the respondents (46.4%) were unemployed because most of them left the job after illness due to social stigma, poor health status, lack of energy etc. Most of the respondents had no any past history of TB (81.0%) and no family history (71.4%) of TB. According to respondents, most of them (71.4%) had better health status at present compared to past, this may be due to the effect of Anti-tuberculosis treatment.

In this study, Body Mass Index (BMI) of the respondent showed that less than half of the respondents (42.9%) were in normal range, likewise 27.4% were in mild thinness category, 15.5% were in moderate thinness category and 10.7% were in severe thinness category. But 3.6% were in pre-obese category. Several other studies conducted in India have also found the similar findings, where more than 50% had BMI less than 18.5 kg/m².^{5,7}

Malnutrition in the patients with tuberculosis has been documented in many studies^{6,8,9,10} and once again reflected in this study. In the present study, nutritional status was assessed on the basis of Subjective Global Assessment criteria. The result revealed that 50.0% of the respondents were well-nourished, 39.3% were mildly/moderately malnourished whereas 10.7% were severely malnourished. Similar studies conducted in different countries like India, Ghana, Ethiopia and Brazil have found the similar results. A study found that, 51% were malnourished; 24%, 12% and 15% respectively had mild, moderate and severe malnutrition.⁸ Another study also observed that, majority 55.8% of cases were undernourished.⁶ A similar study found the prevalence of undernutrition was 39.7 % (23.6 % mild, 8.6 % moderate and 7.2 % severe undernutrition), more than one third of adult TB patients were undernourished.¹⁰ A cross-sectional study demonstrated that prevalence of nutritional deficiency was high among the patients with pulmonary tuberculosis. 50% and 25%, respectively, presented nutritional deficiency at the beginning and at the end of treatment.⁹

Similarly, in the present study nutritional status was not statistically significant with age, gender, marital status, religion, educational status, type of family, family income. Similar study conducted in India has also found no any significant association between nutritional status and per capita income, marital status and category of cases, which was consistent with the findings of this study. But, there was significant association between nutritional status and literacy status where prevalence of under nutrition was high i.e. 68% among illiterates and primary literates.⁶ However, finding of this study contrast with study conducted in Ghana. There was significant association of nutritional status with marital status, income per month, educational level, believe in avoiding certain food types and immediate family size.⁸

Likewise, there was highly significant association (p=<0.0001) of nutritional status with BMI, loss of body fat, loss of muscle mass and present health status of the respondents in the present study. A study conducted in India also found the similar finding that both the anthropometric indicators (Mid upper arm

circumference & BMI) of chronic energy deficiency were found to be statistically significant ($p < 0.001$) between TB patients at different stages of treatment as compared with healthy controls.¹¹

In spite of the findings, the study had limitation also. In the present study, pattern of food intake among the respondents were assessed by interview method and direct observation could not be done; hence there may be recall bias. Likewise, this study has some important implications. The findings of this study may give insight to health personnel to conduct nutrition related counseling and educational programs to the tuberculosis patients. It also helps to plan various nutrition related programs. This study can also be used as a baseline reference for the further studies in the similar field.

V. Conclusion

On the basis of result, it can be concluded that half of the respondents were malnourished and among them few were severely malnourished. The age, gender, marital status, religion, educational status, type of family and family income are not associated with nutritional status. From this study, it can be inferred that there is need of nutritional counseling and supplementation, which may improve TB treatment outcomes.

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