

Original Research Article

Assessment of nutritional status in TB patients

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Abstract

Tuberculosis (TB) is one of the oldest diseases known to human beings and one of the leading cause of worldwide deaths caused by Mycobacterium tuberculosis. Present study deals with the nutritional status assessment of 30 TB patients. It was done by collecting data on anthropometric measurements, biochemical reports, clinical signs and dietary intake. Results showed that 33.33% males and 13.3 percent females were at risk of malnutrition as they received SGA rating B while 26% of the patients were malnourished including 7 males and 1 female. These patients showed lesser weight and BMI, with symptoms of weight loss, recurrent infections and fever.

Keywords

Multidrug-resistant TB, Revised national TB control program, TB control program in India, Treatment of TB, Tuberculosis

Introduction

Tuberculosis (TB), which occurs by bacteria Mycobacterium tuberculosis complex, is a huge peril disease against humans and as per WHO is one of the leading causes of mortality after HIV/AIDS. Lower socioeconomic strata are highly affected by this disease in developing countries like India. It mainly affects the lungs, but can spread to other organs also ^[1].

Etiology

It is caused by the bacteria called Mycobacterium Tuberculosis that can spread by breathing in infected air. Other risk factors include HIV infection, corticosteroids, immuno-suppressants. Homeless people, crowded dwellings, smoking, low body weight are some other associated risk factors.

Signs and symptoms include clubbing of the fingers or toes in advance stage, swollen or tender lymph nodes in the neck or other areas, pleural effusion, unusual breath sounds ^[2].

Objective

- To study the nutritional status of TB patient

Research Methodology

A prospective observational study was planned and conducted on 30 patients admitted at Mahatma Gandhi Medical College and Hospital. Sample selection was done using purposive random sampling technique. Following criteria were taken for patient selection ^[3]

Inclusion criteria

- Patient should be in the age group of 40 - 80 years of age
- Both male & female were included
- Patient should be willing to participate in the study
- Patient should not have any other serious medical complication

Exclusion criteria

- Patient < 40 years and > 80 years of age
- Patient unwilling to participate or cooperate

- Patient having any other serious medical complication

Data collection was done as per following format -

Phase 1 Collection of demographic details

In this phase data collection was done for patient's name, age, sex, educational status (Illiterate/ primary education/ metric/ graduate/ higher education), working status (working/ not working), activity pattern (sedentary/ moderate/ heavy), economic status (LIG/ MIG/ HIG), marital status (Unmarried/ married) [4].

Phase 2 Assessment of nutritional status

2.1 Anthropometric measurements: In this part, patients height, weight, Mid upper arm muscle circumference (MUAC) and triceps skinfold thickness (TSFT) were measured using standard methods. Body mass index (BMI) was calculated by following formula [5]

$$\text{Weight (Kg) / Height (M}^2\text{)}$$

2.2 Biochemical reports: Reports for complete blood count, hemoglobin and total proteins were noted.

2.3 Clinical signs and symptoms: These were observed for presence of any of the following -

Fever, cough, shortness of breath, weight loss, occurrence of infections

2.4 Diet intake: Patient's home diet recall was recorded by interview of patient or attendant for 3 consecutive days and then it was converted to nutrient intake. Then 3 day's average nutrient intake was compared to the requirements of the patients.

Phase 3 Interpretation of data as rating of Nutritional status/ Nutritional diagnosis

In this phase, on the basis of data collected, patients were rated as malnourished/ at risk of malnutrition/ healthy.

Results & Discussion

Results & Discussion part has been divided into following sub headings:

1. General information of the patients

Patients no.	Age / Gender	Education status	Working status	Types of activity	Economic status	Marital Status
1	59/Male	Metric	Working	Moderate	HIG	Yes
2	51/Male	primary	working	Heavy	LIG	Yes
3	71/Female	metric	working	sedentary	MIG	Yes
4	68/Female	metric	working	sedentary	MIG	Yes
5	59/Male	illiterate	working	Moderate	HIG	Yes
6	57/Male	graduate	working	sedentary	HIG	Yes
7	60/Male	illiterate	working	Moderate	HIG	Yes
8	65/Female	metric	working	sedentary	MIG	Yes
9	80/Male	metric	working	Heavy	LIG	Yes
10	59/Female	graduate	working	sedentary	MIG	Yes
11	65/Male	graduate	working	Moderate	HIG	Yes
12	64/Male	graduate	working	Heavy	LIG	Yes
13	79/Male	primary	working	Moderate	LIG	Yes
14	65/Male	metric	working	sedentary	MIG	Yea
15	56/Female	metric	working	sedentary	LIG	Yes
16	57/Male	illiterate	working	Heavy	LIG	Yes
17	53/Male	metric	working	Heavy	HIG	Yes
18	56/Female	graduate	working	sedentary	MIG	Yes
19	73/Male	primary	working	Heavy	MIG	Yes
20	70/Male	graduate	working	Moderate	HIG	Yes
21	43/Female	metric	working	sedentary	LIG	Yes
22	57/Male	metric	working	Moderate	MIG	Yes
23	62/Male	primary	working	Heavy	MIG	Yes
24	49/Male	metric	working	Moderate	MIG	Yes
25	43/Male	illiterate	working	sedentary	HIG	Yes
26	49/Male	primary	working	Moderate	MIG	Yes
27	59/Female	illiterate	working	sedentary	MIG	Yes
28	60/Male	metric	working	Heavy	LIG	Yes
29	64/Female	metric	working	sedentary	LIG	Yes
30	40/ Male	graduate	working	Sedentary	MIG	Yes

Table 1: Demographic details of TB patients

Table 1 showing that 70% patients were male while 30% were female. Twenty three percent of patients were graduates while 16.6% of patients were illiterate and primary educated. Seventy four percent of patients were from either middle income group or lower income group. All patients were married. It is showing that lower income group and less educated male patients are more affected by TB.

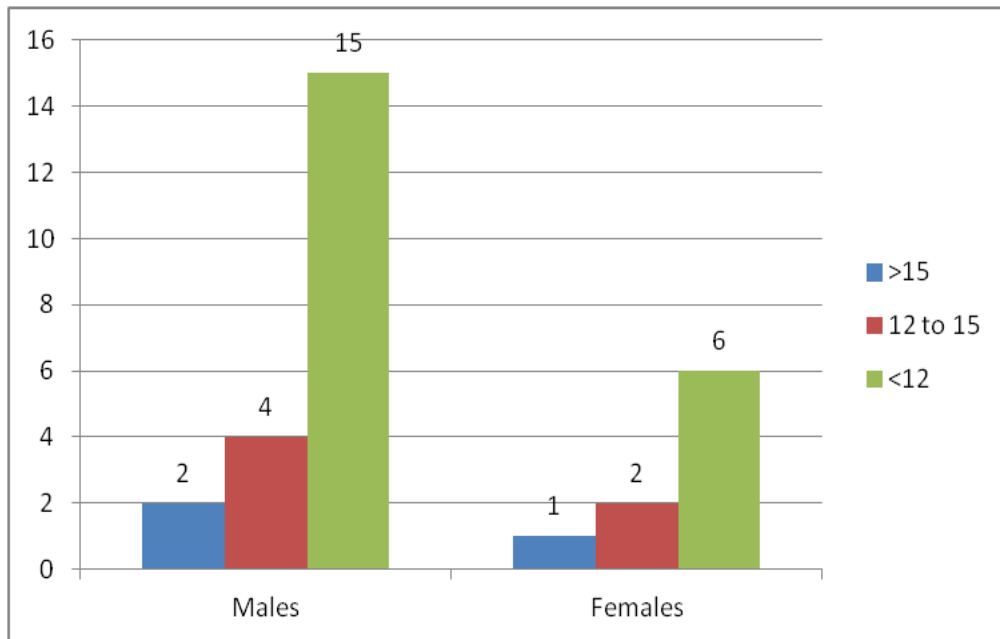
2. Assessment of Nutritional status**2.1 Anthropometric measurements**

Table 2 is showing that the majority of the male patients had a height between the range of 170 - 180 cm, while mean weight of males was 65 kg. Mean BMI of males was 20.22 kg/m². Mean height of females was 160 cm, while mean weight was 55 kg. Mean BMI in females was observed as 21 kg/m². Mid upper arm circumference data revealed the majority of male and female patients had MUAC in the range of 21 - 25 mm. Similarly TSFT was also found towards the lower side in 71% males and 55% females. It is showing the trend towards malnutrition in the majority of the patients. It may be attributed to loss of appetite and reduced food intake.

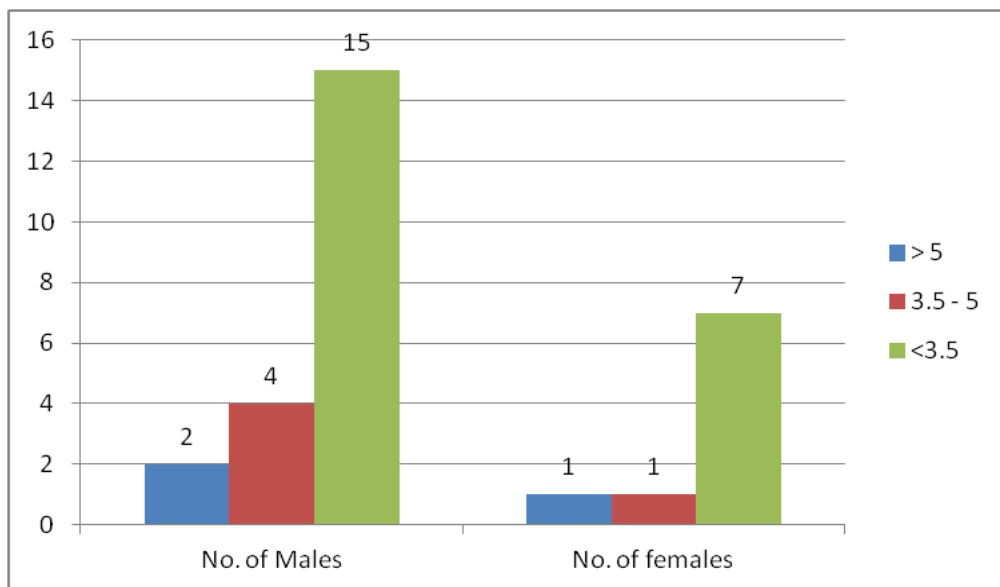
Anthropometry	Measurements	No. of males	%	No. of females	%
Height (cm)	150-160	3	14.28	4	44.44
	160-170	10	47.62	5	55.55
	170-180	12	57.14	0	0
Weight (kg)	50-60	4	19.04	5	55.55
	61-70	11	52.38	2	22.22
	71-80	8	38.09	2	22.22
BMI (kg/m ²)	18-23	14	66.66	5	55.55
	24-29	7	33.33	4	44.44
MUAC (mm)	21-25	16	76.19	5	55.55
	26-30	6	28.57	4	44.44
TSFT (mm)	10 - 20 mm	7	33.33	4	44.44
	<10 mm	15	71.42	5	55.55

2.2 Biochemical reports

Patient's hemoglobin and total protein values were observed and it was found that the mean Hb level of males was 12 g/dl while for females; it was 11 g/dl. Similarly mean total protein content of 70% males was 3.0 g with albumen level of 2.5 g/ dl. Similar trend was observed in females also as shown in graph 1 & 2 below -



Graph 1: Hemoglobin (g/dl) in male and female TB patients



Graph 2: Total protein content in male & female TB patients

2.3 Clinical signs and symptoms

Patients no	SOB	Cough	Fever	H/o Wt loss	Recurrent infections
1	Yes	No	Yes	Yes	Yes
2	Yes	Yes	Yes	No	No
3	No	Yes	Yes	Yes	Yes
4	Yes	No	Yes	No	No
5	Yes	No	Yes	Yes	Yes
6	Yes	No	Yes	No	Yes
7	Yes	No	Yes	Yes	Yes
8	Yes	Yes	Yes	Yes	No
9	Yes	No	Yes	Yes	Yes
10	Yes	No	Yes	Yes	No
11	Yes	Yes	No	Yes	Yes
12	Yes	Yes	Yes	Yes	No
13	No	Yes	Yes	No	No
14	Yes	Yes	No	Yes	Yes
15	Yes	No	Yes	No	No
16	Yes	No	Yes	Yes	No
17	Yes	Yes	Yes	Yes	Yes
18	No	Yes	Yes	No	No
19	Yes	No	No	Yes	Yes
20	No	Yes	No	Yes	Yes
21	Yes	Yes	No	Yes	Yes
22	No	Yes	Yes	Yes	No
23	Yes	No	Yes	No	Yes
24	Yes	No	Yes	Yes	No
25	Yes	Yes	No	Yes	Yes
26	Yes	No	Yes	No	No
27	No	Yes	Yes	Yes	Yes
28	No	Yes	No	No	Yes
29	Yes	No	Yes	No	No
30	Yes	Yes	Yes	Yes	Yes

Table 3: Clinical signs and symptoms of TB patients

Table 3 is revealing that 76.67% patients showed complaints of shortness of breath and fever while the problem of cough was seen in 53.33% patients. Sixty six percent patients showed a history of weight loss while recurrent infections and low immunity was observed in 17 out of 30 patients. These are quite alarming symptoms as these are responsible for loss of appetite and poor food intake [6].

2.4 Nutrient intake as per home diet recall

Nutrient	Range	No. of males	Percentage	No. of females	Percentage
Energy (Kcal)	>75%	18	85.71	5	55.55
	<75%	3	14.28	4	44.44
Protein (g)	>75%	0	0	0	0
	50 - 75	15	71.42	4	44.44
	<50%	6	28.57	5	55.55
Carbohydrate (g)	>75%	4	19.04	6	66.66
	50 - 75	12	57.14	3	33.33
	<50%	5	23.8	0	0
Fat (g)	>75%	18	85.71	4	44.44
	50 - 75	3	14.28	3	33.33
	<50%	0	0	2	22.22

Table 4: Nutrient intake as per home diet recall

Above table 4 is showing the percentage of nutrient intake in relation to their requirements. It was noted that 85% of patients showed energy intake above 75% of their requirements. Only 14.28% of the patients consumed less than 75% calorie intake. Protein intake was found somewhat at a lower side as 71% males and 55.55 percent females consumed protein in the range of 50-75% and < 50% of the requirements respectively. It shows that the majority of the patients fulfilled their energy requirements either through carbohydrate or fat.

Phase 3 Nutritional diagnosis

The study found that 33.33% males and 13.3 percent females were at risk of malnutrition as they received SGA rating B while 26% of the patients were malnourished including 7 males and 1 female as shown in table 5.

Parameters	Total male patients (21)	%	Total females (9)	%
SGA RATING A	3	10	4	13.3
SGA RATING B	11	33.33	4	13.3
SGA RATING C	7	23.3	1	3.3

Table 5: Nutritional diagnosis of admitted TB patients

Conclusion

Results showed that out of 30, 21 were male while 9 were females. Only 23% of patients were graduates and 74% of patients were from either middle or lower income group. All patients were married. Biochemical profile depicted that the mean Hb level of males was 12 g/dl while for females; it was 11 g/dl. Similarly, mean total protein content of 70% males was 3.0 g with albumen level of 2.5 g/ dl. Majority of the patients showed symptoms of cough, sob, fever, recurrent infection and history of weight loss. Protein intake was found much lesser than the requirements although energy intake was good which was due to higher carbohydrate and fat intake. Final nutritional diagnosis was that 33.33% males and 13.3 percent females were at risk of malnutrition as they received SGA rating B while 26% of the patients were malnourished.

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