

Assessment of Nutritional Status and Associated Factors Among Adult TB Patients on Directly Observed Treatment of Short Course in Health Facilities at Adama Town, East Shewa Zone, Ethiopia

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Abstract

The aim of this study was to assess nutritional status and associated factors among adult tuberculosis patients on DOTS in health facilities at Adama town, East Shewa Zone, Ethiopia. A facility based cross-sectional descriptive study design and systematic random sampling techniques were conducted from Feb to April 2015 in the selected Public Health facilities. A total of 292 TB by systematic random sampling technique from all adult TB clients were included in the area. The data was collected by trained health experts (nurses). Measuring of height and weight and structured questioners based interview was conducted for data collection after proper consent and ethical clearance. In this study the nutritional status of patients attending TB on DOTS in Adama was about 53% malnourished. Out of malnourished 95 (63.33%) is mild, 25 (16.66 %) is moderate and 30 (20%) is severe malnourished. Gender, educational status, household income and HIV/AIDS status patients were found to be significant contributors for the nutritional status of TB patients. Females are more vulnerable to malnutrition than males. The proportion of malnutrition status of patient is higher in those patients unable to write and to read and those patients with TB/HIV co-infected. The study also showed that average monthly family income were found to be significantly associated with nutritional status of TB patients.

Keywords: Adult, Nutritional status, TB, Associated Factors, DOTS

1. INTRODUCTION

Tuberculosis is one of the top ten causes of illness, death, and disability throughout the world and it is also the leading cause of death from a curable infectious disease. Due to the rise in poverty, population growth and HIV/AIDS the burden is becoming increasing from time to time(1).According to the WHO Global TB Report 2013, Ethiopia ranked seventh in the world and third in Africa for TB burden (2).Patients with poor nutrition are at increased risk for TB as well as malnutrition and tuberculosis directly related problems in most of the underdeveloped countries including Ethiopia; the existing of poor nutritional status especially for TB patients increase the risk as indicated by poor clinical outcome, including death and enhance transmission of TB in the community. So, it is important to assess the nutritional status of TB patients and associated factors.

Justification of the Study

Malnutrition and tuberculosis are directly related problems in considerable magnitude for most of the underdeveloped countries. Nutrition problem is one of risk factor for different types of diseases. So assessing the nutritional status of TB patients is enables to intervene for treatment and responds timely as well as to address and identify the possible influencing factors.

At present, even if there are large population size in Adama town, there is no sufficient studies conducted in the area.

Significance of the Study

The findings of this study could be used for Ministry of health and other implementing partners to plan intervention strategies and co-ordinate care and support activities for TB patients. It may also open

room for researchers to investigate more on the topics and/or could be used as a reference for further studies. The information generated in this research is also inform policy makers in designing intervention program.

Objectives

General Objective: The objective of this study was to assess nutritional status and associated factors among adult tuberculosis patients on DOTS in health facilities in Adama town, East Shewa Zone, Oromia 2015.

Specific Objectives

- To determine nutritional status of adult tuberculosis patients on DOTS in Adama, East Shewa, Ethiopia.
- To identify factors associated with nutritional status of Adult TB patients on DOTS Services in Adama Town, East Shewa Zone, Ethiopia.

2. Materials and Methodology

2.1. Description of Study area

The study was conducted in Adama Referral hospital and five Adama health centers of TB clients. This is located in East Shewa Zone at a distance of about 99 kms away from capital city, Addis Ababa. The population of Adama town is 155,321 according to the National Population and House hold Censuses 2007 with five health centers and one hospital serving the population of the town and its surrounding. Among these 78,997 were Male and 76,324 were Female.

2.2. Study Design and Period

Facility based cross-sectional descriptive study using qualitative method has been used to assess adult TB patients nutritional status and associated factors among TB patients on DOTS at Adama referral Hospital and Adama health centers. The study has been conducted between February to April, 2015.

2.3. Source Population

All adult tuberculosis patients who are on follow up on DOTS in Adama Referral hospital and Adama health centers TB clinic.

2.4. Study Population

The study population was adult tuberculosis patients selected by the systematic sampling methods from source population during the study period.

2.5. Inclusion Criteria

The inclusion criteria of the study was those who are on DOTS only for the first two months of treatments were included in the study.

2.6. Exclusion Criteria

Patients who were extreme ill, MDR-TB and unable to communicate, pregnant woman were excluded from the study.

2.7. Sample Size Determination

The sample size of the study was calculated using formula for estimation of single proportion. The proportion (77.9%) is adopted from research done in Yirgalem Hospital by Tesfaye Medebo, 2000.

The required sample size for the study is determined using

$$n = \frac{(z \alpha/2)^2 * p (1-p)}{d^2}$$

Whereas:

n= sample size

p = prevalence of TB individual with malnutrition, as the proportion is known from previous studies, it taken as 0.779 (77%).

d= maximum allowable error (Margin of error) =0.05

z= value of standard normal distribution (Z-statistic) at 95% confidence level (z=1.96)

By applying the above formula the optimum sample size (n) = 265 subjects were needed. The final sample size with 10% non-response rate was 292 patients.

2.8. Sampling Procedure

The sampling technique was systematic random sampling by considering the proportion to their Adult tuberculosis patient's population on DOTS.

2.9. Study Variables

Dependent Variable: -Nutritional status (BMI) of TB patients on DOTS.

Independent Variables: -Socio demographic, Sex, Age and Marital status, HH income, Educational status, Religion, Occupation, Family size, types of TB, HIV status.

2.10. Data Collection Procedures

The structured questionnaires which was prepared in English first translated in to Afan Oromo and then translated back to English to check for consistency by doing preliminary test as all the respondents can hear and speak Afan Oromo and pre-tested in Bishoftu health center on 5% of the sample with the data collectors and then modified accordingly. Weighing scale and measuring scale for height was checked to make measurements more reliable. Data on socio-demographic and nutritional history was collected using a structured and pre tested questionnaires.

2.11. Nutritional status (Body Mass Index) Measurement

2.11.1 Measurement of Weight

Measurement of body weight was conducted using a standard beam balance that is used in the medical setup recorded to the nearest 0.1kg.

2.11.2. Measurement of Height

Similarly height measurement were carried out while the subject removed and the measurement was recorded to the nearest 0.5cm.

2.12. Body Mass Index Calculation

BMI was calculated using the formula: $BMI = \text{weight in kgs} / (\text{Height in mts})^2$. Then classification was made using the standard BMI chart. Data collection was made by six nurses and taring was given to all data collectors on the questionnaires and ways of collecting data by the principal investigator

2.13. Data quality Assurance

The quality of data was measured through careful design, translation and pretesting of questionnaires, proper training of data collectors and proper handling of data. The data was monitored frequently during collection and collected questionnaires were examined for completeness and consistency during interview and at the end of each day.

2.14. Data processing and Statistical Analysis

Data was checked, coded and entered to SPSSversion 20 statically packages for window. Data entry was conducted by the principal investigator. A descriptive analysis of the socio economic status of the respondents was made to see the respondents' characteristics and determine the nutritional status of patients.

In this study binary logistic regression model was applied for each explanatory variables (gender, monthly family income, types of TB, HIV/ADIS status, religion, educational status and residence) were analyzed and have an association with dependent variable. Again all the variables which were found to have an association with the dependent variable were entered into in multiple logistic regressions to control the potential confounding factors.

2.15. Ethical Considerations

Ethical clearance was obtained from Debremarkos University and Oromia Ministry of Health Bureau Ethical Review Committee. And official letter was written to Adama Referral Hospital and Adama health centers. The participants were informed that they had the full right to participate or not to participate in the study as well as to with draw any time during interview. Confidentiality was assured through recording without a name and coding of questionnaires. Consent was obtained from all individuals respondents.

3. Result and Discussion

3.1. Result

3.1.1. Socio-Demographic Characteristics

A total of 285 adult TB patients on DOTS were involved in the study with response rate of 98% and (44%) of the participants were males and (56%) were females. Eighty five (29.8%) were in the age group of 18-24 years while the majority, (64.5%) were between 25-54 years and sixteen (5.7%) were 55 and above years.

Concerning the occupational status of the respondents; (27%), (20.4%) and (20%) were housewives, government employee and daily laborer respectively. Regarding the educational status; most of them were attend elementary school (39.6%) and secondary school (34.4%). (14%) of the respondents could

not read and write, whereas (12%) of the respondents were attend college and university. Regarding marital status more than half of the respondents were married (51.6%), while (43.5%) were single and (2.8%), (2.1%) were divorced and widowed respectively. Regarding monthly income of the respondents; majority of them (60.6%) got <1000 ETB and few of them (39.4%) got >= 1000 ETB.

3.1.2. Nutritional Status of Adult TB Patients

The nutritional status of 285 respondents indicated in the below figures 1 and 2. The nutritional status of respondents revealed that more than half of the respondents 150 (53%) were malnourished and 135 (47%) were normal. Out of malnourished 95 (63.33%) is mild, 25 (16.67%) is moderate and 30(20%) is severe malnourished. Based on WHO, 2004 International classification of adult nutritional status (mild, moderate, severe, normal and obesity) current result revels that none of the respondents were obese i.e. BMI > 25. On the sever rate amongst TB patients was 10.5%, a relatively high.

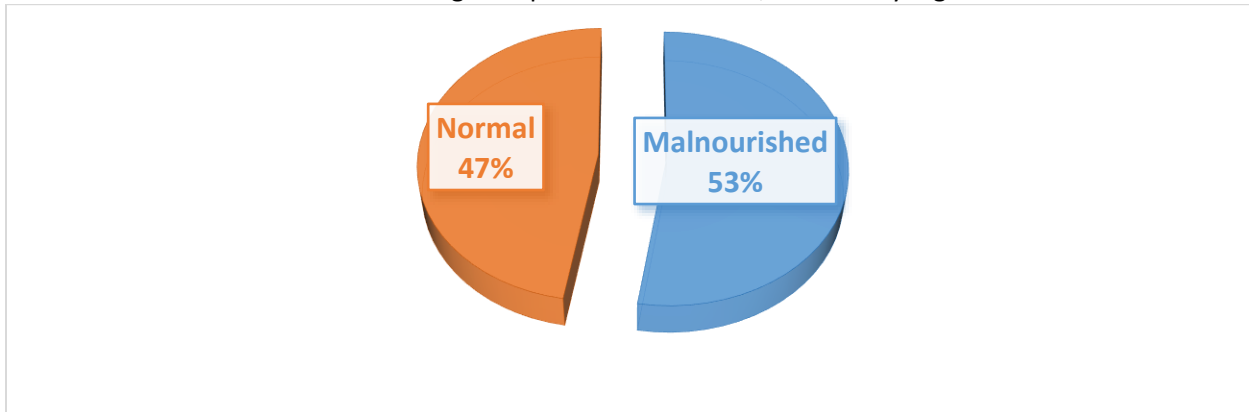


Figure 1. Nutritional status among adult TB patients attending DOTS in Public health faculties, Adama, Oromia, 2015

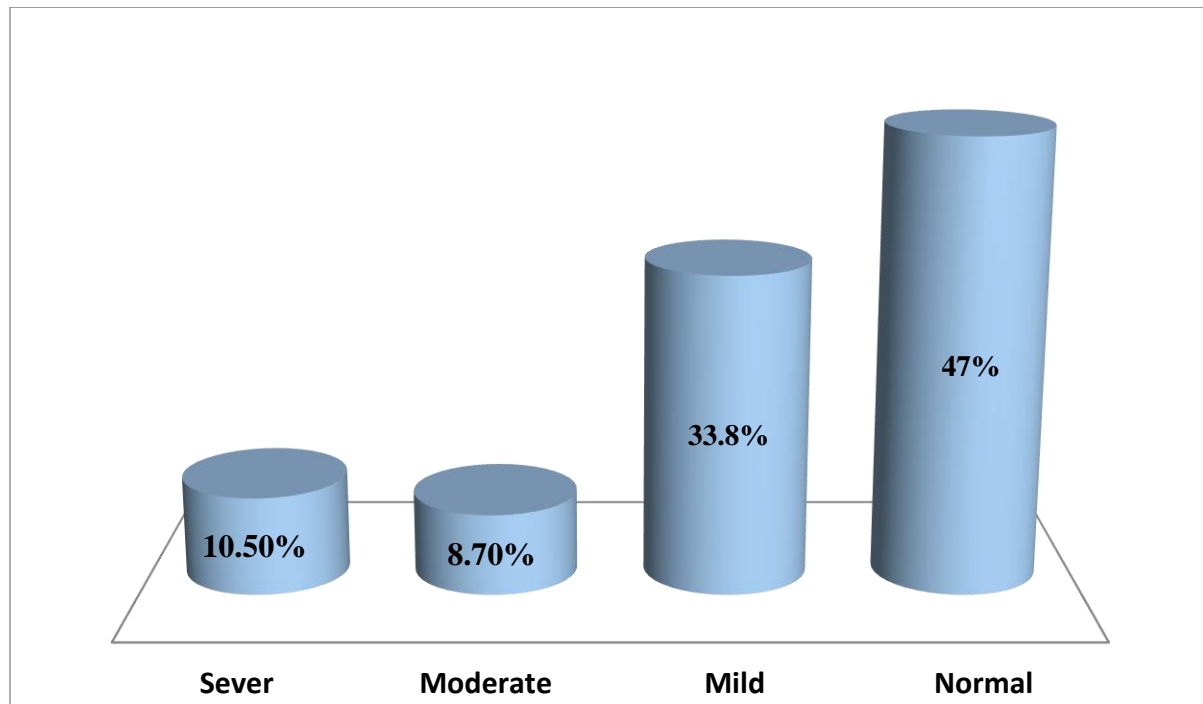


Figure 2. Nutritional status among adult TB patients attending DOTS categorized by BMI in public health facilities, Adama, Oromia, 2015

3.1.3. Nutritional status of adult TB patients by Gender

As per Figure3, the malnutrition levels between male and female TB patients are different. Severe rate of 13.8% and 4.8% in females and males, respectively. The results indicate that there are more male (64.8%) that are normal nutritional status than female (36.9%) TBpatients.

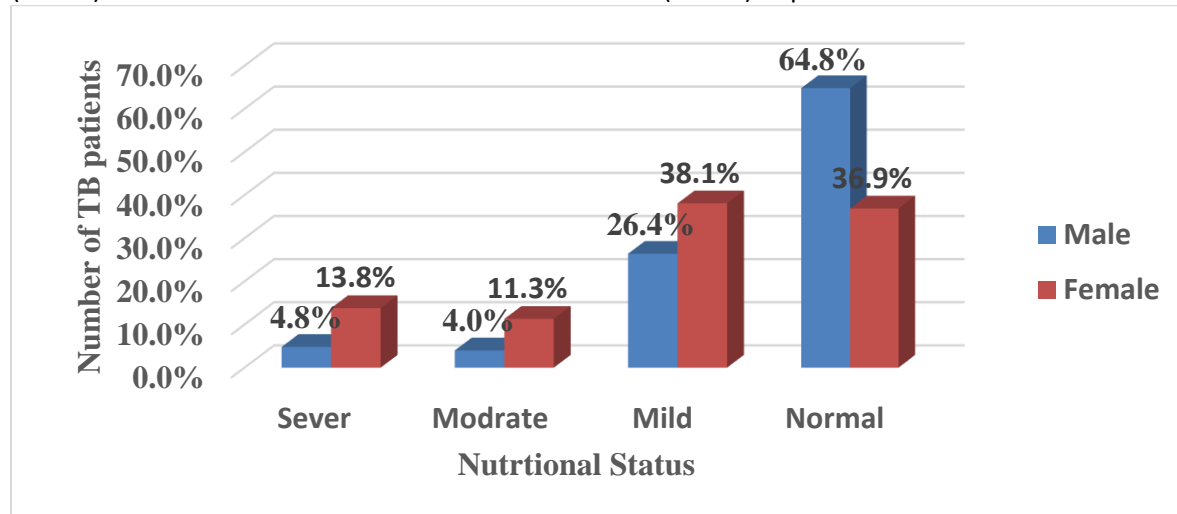


Figure 3. Nutritional status among adult TB patients by gender attending DOTS in public health facilities, Adama, Oromia, 2015

Behavioral and Clinical Characteristics of Tuberculosis Patients

Table 1. Behavioral and clinical characteristics and nutritional status of patients attending DOTS in health facilities Adama town, Oromia, 2015

Is the patient malnourished?	No = N (%)	Yes= N (%)	Total = N (%)
HIV/ADIS Status			
TB/HIV Negative	122 (58.7)	86 (41.3)	208(73)
TB/HIV Co-infected	8 (11.3)	63 (88.7)	71(25)
Unknown status	5 (83.3)	1 (16.7)	6(2)
History of Smoking Cigarette			
Never smoking	106 (52)	98 (48)	204 (71.57)
Quitted smoking	26 (38.2)	42 (61.7)	68(23.85)
Current smoker	4 (30.7)	9(69.3)	13(4.56)
Type of TB			
Pulmonary smear positive	53 (45.7)	63 (54.3)	116(40.7)
Pulmonary smear negative	39 (44.3)	49 (55.7)	88(30.8)
Extra Pulmonary ETB	43 (53.1)	38 (46.9)	81(28.5)

3.1.4. Nutritional status and Types of TB

Table 2. Cross tabulation of nutritional status and TB type of patients attending DOTS in public health facilities, Adama, Oromia, 2015

Type of TB	Is the patient malnourished?		Total= N (%)
	No= N (%)	Yes=N (%)	
Pulmonary smear positive	53 (45.70)	63(54.30)	116 (100)
Pulmonary smear negative	39 (44.30)	49 (55.70)	88 (100)
Extra Pulmonary ETB	43 (53.10)	38 (46.90)	81(100)
Total	135 (47.40)	150 (52.60)	285(100)

3.1.5. Factors Associated with Nutritional status of TB

The result was found that gender, HIV status and monthly family income were found to be significantly associated with nutritional status of patients. Respondents who are female patients had six times more likely to have malnourished than male (AOR [95%CI] = 6.423 [2.81- 14.68]). It was also found that patients who had an average monthly income between 1000 and 3000 birr are 64% less risk to have malnourished than patients with income less one thousands birr (AOR [95%CI] = 0.36 [(0.16-0.80)]. Patients who had an average monthly income greater than 3000 birr are 90% less risk to have malnourished than patients with income less one thousands birr (AOR [95%CI] = 0.10 [(0.02-0.59)]. Patients who had TB/HIV co-infected were found to be 9.8 times more likely to have malnourished than patients TB/HIV negative AOR [95%CI] = 9.8[(2.80-11.80)].

Table 3. Result of multivariate analysis of Nutritional status on each explanatory variables, among patients attending DOTS in public health facilities, Adama, Oromia, 2015

Variable	Is the patient malnourished?		Adjusted Odds Ratio (AOR)	95% C.I.	
	No	Yes		Lower	Upper
Gender					
Male	81 (64.8)	44 (35.2)	1		
Female	54 (33.8)	106 (66.2)	6.423	2.81	14.682
Monthly HH income					
<1000	31(27.7)	81 (72.3)	1		

1000 to 3000	80 (56.3)	62 (43.7)	0.365	0.167	0.801
>3000	24 (77.4)	7 (22.6)	0.108	0.02	0.592
HIV/ADIS status					
TB/HIV Negative	122 (58.7)	86 (41.3)	1		
TB/HIV co-effected	8 (11.3)	63 (88.7)	9.896	2.807	11.886
Unknown	5 (83.3)	1 (16.7)	0.214	0.008	5.896

3.2. Discussion

Malnutrition and TB effects are interrelated and exacerbate one another in various way. The study revealed that proportion nutritional status of adult TB patients attending DOTS in Adama was about 53% malnourished and 47% was normal. Out of malnourished 95 (63.33%) is severe, 25 (16.67%) is moderate and 30(20%) is mild malnourished. The current study of prevalence of malnutrition which is measured BMI <18.5 was higher when compared with study conducted in Peru (21%), but lower than studies conducted in Gulbarga city of India (55.8%) (3, 4). The proportion malnourished patient is higher in female (66.2%) than male (35.2%). The difference may be due to, socio culture and awareness creation made regarding to TB. It showed that females were more malnourished than males. It could be females have more responsibility than males and have given priorities to their children and husband. The proportion of malnutrition status of patient is higher in those patients unable to write and to read (87.5%) and followed by started primary education (62%). While the proportion of patient malnourished with secondary education and advanced/colleague were found to be lower, 40.8% and 2%, respectively. This could be due to the fact that literates have a better awareness on importance of continuous intake of drugs and better adhere to medications, and those literates might be in a better socio economic status and able to take balanced and adequate food. Findings of the study was also similar to the study done by who found, that higher level of education was significantly protective against TB (4).

In this study there was higher proportion of TB with HIV- negative (73%), TB/HIV co-infected (25%) and unknown status (2%). Present study showed that the prevalence of HIV among TB patients was lower than previous reports from different health centers at Addis Ababa and Gondar University Hospital, 27.2% (6), 52.1% (7), respectively with equal the study carried out in FelegeHiwot Referral Hospital 25% (8). However, this was higher as compare to studies carried out from different parts of Ethiopia such as Nekemte 11.5% (9), West Arsi 13.6% (10). TB-HIV co-infection in present study (25%) was also lower than in the WHO estimate (39%) in Africa (1).

In this study the proportion of patientsmalnourished is higher those patients with TB/HIV co-infected (88.7%) while the proportion of patient malnourished TBwith HIV negative (41.3%) were found to be lower. This is due to the disease it cause loss of appetite and also have probability of developing other opportunistic infections. It could be due to all drugs (TB and HIV) have also reduced appetites of patients and due to most of them are bedridden and economically they are poor. This is similar with the finding in a study conducted in Ethiopia with active TB (81 HIV-negative and 74 TB/HIV co-infected) and 31 controls, BMI <18.5 was common (65.4% of TB patients, 71.6% of TB/HIV co-infected), and severe malnutrition (BMI<16) was more common in those co-infected (5). It was also found that TB/HIV co-

infected patients were 9.8 times more likely to have malnourished than patients TB/HIV negative AOR [95%CI] = 9.8 [(2.80-11.80)].

4. Conclusions

The study shows the presence of malnutrition and associated factors in Adama hospital and Adama health centers. The proportion nutritional status of adult TB patients attending DOTS in Adama was about 53% malnourished and 47% was normal and it was affected by gender, the average monthly income and HIV status of patients. The proportion malnourished patient is higher in female than male. It was higher in those patients unable to write and to read and followed by started primary education. In this study the proportion of patients malnourished is higher those patients with TB/HIV co-infected while the proportion of patient malnourished TB with HIV negative were found to be lower. The study showed that average monthly family income were found to be significantly associated with nutritional status of patients.

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