



## **IMPACT OF PROTEIN AND VITAMIN C SUPPLEMENTATION IN MALNOURISHED PULMONARY TUBERCULOSIS PATIENTS**

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### **ABSTRACT**

Efficacy of egg and amla supplementation to enhance nutritional status of pulmonary tuberculosis patients has been documented. Majority of studies in relation explored the relation between nutritional status and dietary supplementation in the light of body mass index. Another alternative to assess nutritional status is in the form of mid upper arm circumference. The present study is an effort in this direction to assess the impact of protein and vitamin C supplementation on nutritional status as assessed by mid upper arm circumference in pulmonary tuberculosis patients. The sample comprise of 300 male pulmonary tuberculosis patients divided into two groups with equal number of subjects in each group. The selection of sample was done from primary health centres operational in Raipur district of Chhattisgarh. Supplementation of protein and vitamin C was given to subjects belonging to experimental group in the form of amla and egg for a period of three months. The measurement of mid upper arm values were taken prior to commencement of the study period as well as after the completion of three months study period. For the purpose of classification, 26-29 cm was considered as reference value for Mid Upper Arm Circumference (MUAC). Values below 26 were considered as malnourished. The frequency distribution shows that in the period of three months of study period, malnutrition as assessed by mid upper arm circumference in male pulmonary tuberculosis patient belonging to experimental and control group has decreased but in varying magnitude. Before the commencement of dietary supplementation eggs and amla of certain amount in week for three months, 22% selected male pulmonary tuberculosis patients had normal nutritional status which increased to 32% post dietary supplementation program. Before the commencement of study period, 11.3% selected male pulmonary tuberculosis patients from control group had normal nutritional status which increased to 16.7% after the study period of three months. The results once again show the efficacy of additional dietary supplementation of eggs and amla in improving the nutritional status as assessed by mid upper arm circumference of male pulmonary tuberculosis patients as compared to male pulmonary tuberculosis patients from placebo controls.

**Keywords:** Pulmonary Tuberculosis, protein and vitamin C, supplementation, Amla, Egg



## INTRODUCTION

Khan (1959) defined tuberculosis as great white scourge is a worldwide bacterial infection. Tuberculosis, a communicable disease is second leading cause of death worldwide. The World Health Organisation (WHO) TB statistics for India for 2016 gives an estimated incidence figure of 2.79 million cases of tuberculosis for India. In 2016 out of the total reported patients, almost one fifth of the patients were reported from the private sector. Both malnutrition and tuberculosis are problems of severe magnitude in most of the underdeveloped regions of the world. These two problems are interrelated. Tuberculosis mortality rates in different economic groups in a community tend to vary inversely with their economic levels. Similarly, nutritional status is significantly lower in patients with active tuberculosis compared with healthy controls. To control malnutrition among tuberculosis patients various kinds of dietary supplementation have been

suggested. In context to this eggs and amla is good combination in this regard. Borsheim, 2002 scientifically documented that eggs are a good source of high-quality protein that promote protein synthesis and maintenance of skeletal muscle mass. According USDA (2015) reports one large egg provides 6.3 g protein that is rich in essential amino acids. Vilcheze (2013) reported that Vitamin C reduces ferric to ferrous iron, and the ferrous ions react with oxygen to produce hydroxyl radicals, which are a type of reactive oxygen species.

## REVIEW OF LITERATURE

So many researchers namely Rajeswari et al. (1999), Schwenk and Macallan (2000), Muniyandi et al. (2007), Ezekiel et al (2012), Rudolph et al. (2013), Bhargawa et al. (2013), Frediani et al. (2016) studied various factors related to tuberculosis including prevalence, malnutrition, wasting, indicators of socio-demography etc. But none evaluated the efficacy of egg and amla supplementation for period of three months on nutritional status



as assessed by mid upper arm circumference among tuberculosis patients.

### **OBJECTIVES**

The main objective of the present study is to find out the impact of egg and amla supplementation of certain duration on mid upper arm circumference, as an indicator of malnutrition in tuberculosis patients.

### **MATERIALS AND METHODS**

#### **Sample**

The sample comprise of 300 male tuberculosis patients. The selection of sample was done from primary health centres operational in Raipur district of Chhattisgarh.

#### **Tools**

#### **Mid Upper Arm Circumference:**

Mid-Upper Arm Circumference is the circumference of the left upper arm, measured at the mid -point between the tip of the shoulder and the tip of the elbow. Left upper arm was measured with the flexible non- stretchable tape. The mid- point of the upper arm was recorded. Circumference was recorded to the nearest 0.1

centimeter. Mid-Upper Arm Circumference value, 26-29cm is standard value.

#### **Design**

Pre-post randomized group design was preferred to conduct the study.

### **METHOD AND PROCEDURE**

After selection of 300 male pulmonary tuberculosis patients they were divided into two groups i.e. experimental and control group with equal number of subjects in each group. Mid upper arm circumference was measured twice in both the group i.e. prior and after the completion of study period. On the basis of MUAC range for normal / malnourished nutritional status, frequency distribution was calculated. The results are presented in table 1 and 2.

### **RESULT AND DISCUSSION**

The pre-post frequency distribution of male pulmonary tuberculosis on the basis of nutritional status as determined mid upper arm circumference is shown in table no. 1.



For the purpose of classification, 26-29 cm was considered as reference value for Mid Upper Arm Circumference (MUAC). Values below 26 were considered as malnourished.

The frequency distribution shown in table 1 shows that in the period of three months of study period, malnutrition as assessed by mid upper arm circumference in male pulmonary tuberculosis patient belonging to experimental and control group has decreased but in varying magnitude.

The pre-test distribution shows that 78% male pulmonary tuberculosis patients from experimental group were malnourished but the post test distribution shows 68% male pulmonary tuberculosis patients were malnourished. In other words before the commencement of dietary supplementation eggs and amla of certain amount in week for three months, 22% selected male pulmonary tuberculosis patients had normal nutritional status which increased to 32% post dietary supplementation program.

The pre-test distribution in placebo controls shows that 88.7% male tuberculosis patients were malnourished and the post test distribution shows 83.3% male pulmonary tuberculosis patients from placebo group were malnourished. In other words before the commencement of study period, 11.3% selected male pulmonary tuberculosis patients from control group had normal nutritional status which increased to 16.7% after the study period of three months.

The direct evidence of effect of nutrition on tuberculosis is difficult because of whole complex of coincident environmental factors.

In an India study it was found that pulmonary tuberculosis patients was 11 times more prone to be malnourished with mid upper arm circumference of <24 cm. Hence improvement in serum protein as indicated in a study by Gurwara and Janghel (2016) may also be the reason for improvement in nutritional status of male tuberculosis patients after



supplementation of vitamin C and protein supplementation of three months.

### CONCLUSION

On the basis of results it may be concluded that nutritional

status as assessed by mid upper arm circumference may be enhanced with the help of vitamin C and protein supplementation in the form of eggs and amla for a specific duration.

**Table No. 1: Pre-Post Test Frequency Distribution of Selected Pulmonary Tuberculosis Patients on the Basis of Mid Upper Arm Circumference (MUAC)**

Groups↓	Mid Upper Arm Circumference (MUAC)	Pre Test (N=150)		Post Test (N=150)	
		Frequency	%	Frequency	%
Experimental Group	Normal	33	22.0	48	32.0
	Malnourished	117	78.0	102	68.0
	Total	150	100.0	150	100.0
Control Group	Normal	17	11.3	25	16.7
	Malnourished	133	88.7	125	83.3
	Total	150	100.0	150	100.0

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