A REVIEW ON NUTRITIONAL STATUS OF TB PATIENTS WITH SPECIAL REFERENCE TO REDUCING TUBERCULOSIS IN HUMAN POPULATION

Chiranjit Majumder, **Research Scholar, Nutrition, Seacom Skills University, Santiniketan, India**

Abstract **:** A major infectious disease now a days is tuberculosis. Tuberculosis is an infectious disease that caused by various strains of micro-bacterium, usually Mycobacterium Tuberculosis. In shortly, Mycobacterium Tuberculosis is called as MTB. The major public health problem in India and worldwide is Tuberculosis. Poor nutrition is a problem among TB patients. Approximately 2 million TB cases is found in India and 8.6 million TB cases is stayed worldwide. The relation between malnutrition and tuberculosis is stayed. Malnutrition is generally measured by BMI (Body Mass Index).Malnutrition is mainly two types. One is under-nutrition and another is over nutrition. When BMI is less than 18.5 kg/m^2 (<18.5 kg/m^2), it is called underweight and when BMI is greater than equal to 25 kg/m^2 (>=25 kg/m^2) is known as overweight/obese. Severe underweight is occurred when BMI is less than 16 kg/m^2. It is seen in many studies that underweight peoples are more prone to develop Tuberculosis (TB) and it is also observed in many studies and survey that males are more affected in TB than females. Micronutrient status of tuberculosis patients with malnutrition is very poor. Micronutrient mainly vitamin A and Zinc (Zn) deficiency is observed in patients with pulmonary tuberculosis. Lower concentration of hemoglobin of blood, white blood cell (WBC), serum albumin, vitamin A (serum retinol) and zinc is observed with active tuberculosis compared with health peoples. Active tuberculosis patients has poor micronutrient status compared with healthy peoples. Low hemoglobin concentration, serum retinol and zinc (Zn) is observed with TB patients with malnutrition. It is cleared that TB patients has poor nutritional status. It is seen that maximum number of patients belongs to underweight with BMI less than 18.5kg/m^2. Maximum number of nutrients deficiency occur with malnourished Tuberculosis patients mainly calorie, protein, micronutrients deficiencies like vitamin A,D,$B_{12,}$ zinc (Zn), iron and folic acid. For TB patients, medication with proper diet is needed to overcome the situation. High calorie, high protein and adequate amount of micronutrients diet is required to fulfill the deficiency gap in TB patients. The diet needs to contain liberal amounts of milk, dhal, eggs, fish, meat, green leafy vegetables and fruits. Now, there are treatment (DOTS stands for Directly Observed Treatment, Short-course) and dietary guideline for TB patients. Patients needs to be disciplined to take their medicine properly from primary health care in villages. In together, TB medicine and diet can cure the patients more quickly than medicine alone. And patients should be stayed in tension free condition because tension can decrease appetite.

Keywords – Tuberculosis, Malnutrition, Micronutrient Deficiency, Nutritional Status, Public Health.

I . INTRODUCTION

A major infectious disease now a days is tuberculosis. Tuberculosis is an infectious disease that caused by various strains of micro-bacterium, usually Mycobacterium Tuberculosis. In shortly, Mycobacterium Tuberculosis is called as MTB. The major public health problem in India and worldwide is Tuberculosis(WHO,2017).[1] WHO publish global TB report in every year from 1997. In India, mostly vulnerable groups are tribal groups. Worldwide 8.6 million TB patients is found (Rao et al, 2018).[2] In India, maximum number of patients is found basically in villages with poor economical condition. In respiratory diseases, including Tuberculosis, cough is most common symptom. In TB patients with diabetes mellitus (DM) cough is a dominant symptom. Usually the feature of an infectious disease is fever. Cough, chest pain and fever is the most common symptoms of Tuberculosis patients and TB patients with diabetes mellitus(DM)(Pavlovic et al, 2018).[3] In most of the underdeveloped regions of the world malnutrition is associated with Tuberculosis(Gupta et al.,2009).[4] Malnutrition can cause tuberculosis and vise versa tuberculosis patients can deficient in nutrients that leads to malnutrition. Calories, proteins, fats, vitamins and minerals are important for TB patients specially before the emergence of anti-tuberculosis chemotherapy. The role of diet is very important with treatment of TB with anti-tuberculosis drugs. In developing countries malnutrition is main problem which leads to active TB. Prevalence of HIV (human immunodeficiency virus) is seen in countries which are underdeveloped and malnutrition and tuberculosis can be occurred due to HIV. It is believed that one very important risk factor for tuberculosis is HIV. Both HIV infection with TB affects the patients nutritional status(Gupta et al.,2009).[4]

II . TUBERCULOSIS PREVALENCE IN INDIA AND WORLDWIDE

Today one of the most public health problem in developing countries is Tuberculosis (TB). Poor nutrition is a problem among TB patients. Approximately 2 million TB cases is found in India and 8.6 million TB cases is stayed worldwide (Karoli et al.,2015).[5]

III . TUBERCULOSIS AND MALNUTRITION

The malnutrition and Tuberculosis both are associated with each other. Malnutrition is generally measured by BMI (Body Mass Index).Malnutrition is mainly two types. One is under-nutrition and another is over nutrition. When BMI is less than 18.5 kg/m^2 (<18.5 kg/m^2), it is called underweight and when BMI is greater than equal to 25 kg/m^2 (>=25 kg/m^2) is known as overweight/obese. Severe underweight is occurred when BMI is less than 16 kg/m^2 (< 16 kg/m^2)(Hoyt,K.J., 2017).[6] It is seen in many studies that underweight peoples are more prone to develop Tuberculosis (TB) and it is also observed in many studies and survey that males are more affected in TB than females.

IV . STATUS OF MICRONUTRIENTS IN PULMONARY TUBERCULOSIS PATIENTS

Malnutrition is seen again and again in patients with Tuberculosis that is related mainly with chest, called pulmonary tuberculosis. Micronutrient status of tuberculosis patients with malnutrition is very poor. Micronutrient mainly vitamin A and Zinc (Zn) deficiency is observed in patients with pulmonary tuberculosis. Lower concentration of hemoglobin of blood, white blood cell (WBC), serum albumin, vitamin A (serum retinol) and zinc is observed with active tuberculosis compared with health peoples. Active tuberculosis patients has poor micronutrient status compared with healthy peoples. Low hemoglobin concentration, serum retinol and zinc (Zn) is observed with TB patients with malnutrition (Ahmad et al., 2011).[7]

V . VITAMIN D AND TUBERCULOSIS

In different populations in the world, deficiency of vitamin D is common circumstance. Vitamin D deficiency (VDD) is responsible for immune system disorder with higher incidence and advancement of some infectious diseases. Vitamin D is very essential micronutrient for bone health and for prevention of chronic diseases. The role of vitamin D for our immune system is very crucial. Vitamin D has a role to reduce the tuberculosis prevalence in human population. Vitamin D has a important role on HIV (human
immunodeficiency virus) and has a role to defence against respiratory infections(Dini and Bianchi, 2012).[8] Vitamin D rich diet like sea fish and ultraviolet (UV) ray of sunlight is beneficial to reduce tuberculosis symptoms and prevalence.

VI . VITAMIN B_{12} AND PULMONARY TUBERCULOSIS

Vitamin B_{12} works indirectly against tuberculosis. Vitamin B_{12} increases appetite in TB patients. Vitamin B_{12} with protein supplementation repair and healing body tissue. Vitamin B_{12} improve the underweight in ill children. Vitamin B_{12} improve the growth of ill children(Savvi et al, 2008).[9] Iron and folic acid deficiency also occur in TB patients.

VII . ASSOCIATION BETWEEN VITAMIN A AND TUBERCULOSIS

Deficiency of vitamin A occur in tuberculosis patients. After antituberculosis treatment low serum level of retinol convert to normal level. Vitamin A deficiency occur in TB patients is due to loss of appetite(anorexia),not good intestinal absorption, increased vitamin A loss through urine, reaction of acute phase. Due to vitamin A deficiency in TB patients, immunity power is very low. Supplementation of vitamin A reduces the mortality and morbidity of TB patients. Zinc (Zn) is mainly needed for vitamin A metabolism. Deficiency of zinc (Zn) also affect the defence of host in a different of ways. It is cleared that zinc (Zn) deficiency is responsible for secondary vitamin A deficiency in human population. It is cleared that Vitamin A with zinc supplementation to TB patients is more beneficial rather than vitamin A supplementation alone because zinc (Zn) is needed for metabolism of vitamin A(Mathur,M.L., 2007).[10]

VIII. CONCLUSION

It is cleared that TB patients has poor nutritional status. It is seen that maximum number of patients belongs to underweight with BMI less than 18.5kg/m^2. Maximum number of nutrients deficiency occur with malnourished Tuberculosis patients mainly calorie, protein, micronutrients deficiencies like vitamin A,D,B_{12}, zinc (Zn), iron and folic acid.

IX . RECOMMENDATION

For TB patients, medication with proper diet is needed to overcome the situation. High calorie, high protein and adequate amount of micronutrients diet is required to fulfill the deficiency gap in TB patients. The diet needs to contain liberal amounts of milk, dhal, eggs, fish, meat, green leafy vegetables and fruits. Now, there are treatment (DOTS stands for Directly Observed Treatment, Short-course) and dietary guideline for TB patients. Patients needs to be disciplined to take their medicine properly from primary health care in villages. In together, TB medicine and diet can cure the patients more quickly than medicine alone. And patients should be stayed in tension free condition because tension can decrease appetite.

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