International Journal of Nursing and Medical Investigation

International Peer Reviewed Journal

Research article

A malnourished child with pulmonary tuberculosis recovered: A case study

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Abstract

Introduction: Tuberculosis (TB) and malnutrition are important causes of morbidity and mortality in children in the developing world. In 2015, an estimated 1 million children developed TB and 170,000 died from it. The national TB statistics for India is collected by the government Revised National Tuberculosis Control Programme (RNTCP).Severe malnutrition is a risk factor for Mycobacterium tuberculosis infection. India is the country with the highest burden of tuberculosis (TB).

Case study: We describe our clinical Experience of a Case of 5 year old malnourished child with tuberculosis belong from an economically backward class and illiterate family. He was in DOT treatment after forced visit to the hospital by an Anganwadi worker. A standardized diet was given to him and regular home visit. Health education was given to the family members about diet, importance of DOT treatment and personal hygiene. We have visited every fifteen days for regular care. After 2 months, weight of the child was increased and he has completed his full TB treatment.

Conclusion: The study reveals that the diagnosis of pediatric tuberculosis with association of malnutrition is still a noted problem in the rural India that should be rectified by the modification of the existing government schemes. Health Personnel needs to visit in community field and arrange various health programmers time to time for children and Parent and see to it that the children receive the required supplementary nutrition and vaccinations regularly.

Keywords: Malnutrition, Pulmonary tuberculosis, Nursing Management.

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1.Introduction

Severe malnutrition is a risk factor for pneumonia. India is the country with the highest burden of tuberculosis [1]. In 2015, an estimated 1 million children developed TB and 170,000 died from its [2].A recent methodical review reported that the series of bacterial pathogens that cause pneumonia in children with severe malnutrition is different to those that cause pneumonia in well-nourished children, and that Gram negative bacteria are predominant causes [3]. Mycobacterium tuberculosis is also believed to be an important cause of pneumonia in severely malnourished children, but there are surprisingly limited data available [3, 4, 5].

The national TB statistics for India are collected by the government Revised National Tuberculosis Control Programme (RNTCP). TB is curable disease that can cause severe malnutrition in children, either as a primary or as an associated cause. An important contributor to uncertainties regarding prevalence of TB in severely malnourished young children is related to the challenge in confirming a diagnosis. The data on the occurrence, morbidity and mortality pattern of Nutritional status in infectious diseases like diarrhoea, tuberculosis (TB) and HIV is well established but though it is not been emphasized [6].

In India Revised National Tuberculosis Control Programme (RNTCP) is responsible for collecting the national TB statistics. It was found that TB can lead to

severe malnutrition either as a primary or as an associated cause. The prevalence of TB in severely malnourished young children is related to the challenge in confirming a diagnosis of TB.
Nutritional supplementation may be a useful tool for fast recovery in tuberculosis patients. In addition, healthy nutritional status of population may advocate controlling tuberculosis in underdeveloped areas of world. It is established fact that Fats, vitamins, minerals and proteins rich diet is the Fighting measures of TB. Government runs Food supplementation programmers, such as the Public Distribution System, Integrated Child Development Services and Mid-day Meal Programme which can up lift the value of foods supplied and spot the families who actually need them.

Aim- The aim of our study is to recover the Child from Pulmonary Tuberculosis**.**

Case Report:

Clinico-social diagnosis:

Five year old male child, the only child of parents, residing in a remote tribal village, belonging to an economically backward class and illiterate family, with history of faulty breast-feeding practices was evaluated for poor weight gain since birth.

According to the history given by his mother he developed diarrhea and pneumonia when he was 11 months. He was taken to hospital for treatment of pneumonia and was treated symptomatically. Later, whenever he had cough and cold, home remedies were given to him. There was no history of worm infestation, pica or any other major illnesses in the past.

A systematic review of literature showed that BMI and TB incidence is directly proportionate in different settings with different levels of TB burden [7].

History of clinical diagnosis:

On clinical examination, the child was conscious, cooperative, not irritable, responding to external stimuli and a febrile. Pallor was present and was also suffering from dry cough and cold over a year. After recurrent cold and cough forced the parents to take him to the hospital and was diagnosed as Pulmonary Tuberculosis; as the collected sputum sample was TB positive (3+) by fluorescence microscopy and also the TB culture (LJ Media) was positive. Other hematological tests and Monteux Test were also done. He has been on Direct Observation Therapy (DOT) (Table 1).

Table No 1: Diagnosis

Name of test	Unit	Result value	Reference range
Montoux test	-	Negative	-
Erythema	-	Present	-
Induration	Mm	5x5	Reading after 48/72 hours
Hemoglobin	Gm/dl	12.2	13.5- 18
Total wbc	/cumm	7600	4000-11000
Neutrophils	%	44	40-70
Eosinophil's	%	2	0-6
Monocytes	%	4	1-8
Basophils	%	00	0-1

Nursing management:

First visit:

On first visit, it is observed that he used to reject food at home whenever served. His parents were also relied on the food provided by the Anganwadi. The quantity of meals was reduced to a very little amount. His weight was only 11kg (Table 2) at the age of 5 years as loss of appetite led to absolute weight loss. We explained his parents the importance of healthy diet and the diet plan was given. We suggested his mother to include more proteins, fruits, vegetables, in his diet.

Table No 2:

Second visit:

No of Visits	Height (cm)	Weight (Kgs)	Head Circumference (cm)	Mid arm Circumference (cm)	BMI (kg/m 2)
First Visit	101 cm	11kg.	48cm	11cm	10.8
Second Visit	101 cm	11kg.600gms.	48cm	11cm	11.4
Third Visit	101cm	12kg.100gms	48.2cm	11.3cm	11.9
Fourth Visit	102cm	12kg.800gms	48.5cm	11.5cm	12.3

On our second visit after fifteen days, his dietary intake was improved. Chapattis, rice with dal or khichdi along with the food provided by the Anganwadi was given to him. Vegetables of his choice like lady's finger, cauliflower were given to him. Egg once in a week was prepared and was added in his diet. He always rejected milk whenever it was served to him. His weight increases of 0.6kg (Table 2) within this period of time.

Third visit:

On our next visit after fifteen days, his condition was better. He started taking 2-3 eggs per week and his dietary intake increased by 1 chapatti and used to take bananas. As per our suggestion on our previous visit they used to make the dough for chapattis by mixing

wheat flour and soya bean flour in a ratio 1:1; this increased the protein consumption of the child. And it is also suggested not to stop the child's medicinal treatment. Various vegetables including green leafy vegetables, fruits, milk, eggs etc. were included in his diet. He was taking 2-3 chapattis/day, rice with dal or khichdi in this follow up. His weight increased 0.5kg more than previous weight (Table 2).

Fourth visit:

On our next visit after fifteen days, his physical condition was much better. He was enjoying and taking interest in activities conducted in Anganwadi. His was taking full meal served in Anganwadi. His mother was suggested to visit Government hospital with his treatment documents for Follow up checkup. His weight is increased 700 gms (Table 2).From our side, it is been advised to Anganwadi worker that to strictly monitor the growth and development of the child.

Discussion

Current studies cannot estimate the actual burden of pediatric TB but it has been assumed that 10% of total TB load is found in children. Worldwide, yearly about 1 million cases of pediatric TB are estimated by different data published [8, 9]. The burden of childhood TB in India is collected from regional data of the World Health Organization (WHO) indicate that pulmonary TB positive in children (<14 years old) accounts for 0.6%–3.6% of all reported cases [10].

This case provides a scenario of malnutrition followed by TB in rural area of Madhya Pradesh, India. There are few such data from TB endemic settings in rural areas of India given the strong clinical and epidemiological association between severe malnutrition and TB in children [11].

In terms of population coverage, India's DOTS program is the largest in the world and is reaching fast among the TB patients in India even in rural population [12].
Bacteriological diagnosis of pulmonary TB is a skillful technique which needs skilled personnel and adequate facilities to perform lung puncture. Poor laboratory settings and lack of resources are the constrain for diagnosis of Pulmonary TB in rural areas till date [13].

Previous studies showed that a strong and consistent log-linear relationship existed between BMI and TB incidence [14]. It has been known that malnutrition and TB are complementary to each other. Each could be predisposing to the other and/or be the consequence of each other. However, what is bare fact that there is lack of coordination amongst the Anganwadi Workers (AWWs) and departments of Public Health & Family Welfare as it is concerned about children's malnutrition followed by TB. There is no inherent arrangement for TB investigation for children is provided in the rural anganwadi is that may be the reason for delayed diagnosis of the disease.

In our country as well as in the state of Madhya Pradesh, TB is investigated only in case of Severely Acute Malnourished children and that too for those children who are able to reach the Nutrition Rehabilitation Centers NRCs). The government is not so instrumental to reach out the medical assistance to those children who do not have access to the NRCs. Also, there is no programme in place for identifying TB amongst the school-going children of age 6 to 14 years.

It is established fact that malnutrition and TB are complementary to each other. Each could be predisposing to the other and/or be the consequence of each other. To combat the situation the Anganwadi centers are provided supplementary nutritious food for less than 6 years children who have TB so as to help them recover from the disease. TB is rarely investigated in children and mostly neglected in the developing countries.

The association between nutrition and tuberculosis is inseparable. The WHO End TB Strategy prognosticates a reduction in TB incidence of 75 per cent from current levels, by 2025 [15].

Mortality rates in Tuberculosis vary inversely with the economic levels of different economic groups in a community. In severe Malnutrition can increases the host's susceptibility to infection due to secondary immunodeficiency. The patients with both, protein-energy malnutrition and micronutrients deficiencies increase the risk of tuberculosis. It has been found that the recovery of TB among well-nourished patients is faster than malnourished tuberculosis patients. The adequate and good sources of quality protein such as pulses or dairy products, fat, fat-soluble vitamins A, D and K and micronutrients such as iron, zinc, and folic acid can improve the nutritional status of the patients [16].

In a systematic review reviled that eight of ten studies established provision of food could improve adherence thus adequate nutritional supplement can assist the DOT treatment [17].

A previous study on malnutrition in a rural area was suggested that ICDS needs to design and implement flexible, area-specific and focused activities for AWWs to efficiently enhance their potential for reducing multidimensional problem of malnutrition [18].

In addition, raising nutritional status of population may prove to be an effective measure to control tuberculosis in underdeveloped areas of world. Present pediatric TB patients represent the future reservoir of TB disease. Childhood TB has historically been neglected by the global TB community and the health community and

never consider major public health problem. As children with TB are usually less infectious than adults, they have received little attention from national TB control programmers. Some of the community based health researches advocated that Integrative care approaches that optimize inclusion of TB screening and prevention within existing nutritional rehabilitation, maternal and child health services and other service areas are required for improved case detection [19,20].

However, only little difference was seen in ground practice. The present case study of malnutrition may be a just drop in the ocean of malnourished children; nonetheless we hope that this example will carve a new path for earlier detection of growth faltering and encourage holistic approach in the management of such children. This study is one of the few studies that attempts to focus on clinical, social, nutritional and nursing management aspects of malnutrition.

Anis-ur-Rehman at Ayub medical college, Abbott bad, Pakistan, showed that TB is common problem of poor community, majority of the cases belonged to backward district [21].

Community education efforts and nursing management enlighten the parents and family members on mode of transmission and the care of TB patients, decrease the stigma associated with TB, and encourage people to access healthcare earlier [22].Outbreaks of TB among children in low-endemic countries have been well-described [23].

Community Health Nurses are playing indispensable role for helping health systems achieve their potential, regardless of a country's level of development. In under developed and developing countries, Community Health Nurse can make major refinements in health priority areas, including reducing childhood malnutrition, improving maternal and child health services, and contributing to the control of tuberculosis infections. Community Health Nurse can contribute to minimizing the disease burden by participating in the management of risk factors, in Tuberculosis control, in the management of infection.

Conclusion

It may be concluded that acute malnourished children are more prone to tuberculosis. This study argues strongly in favor of routine screening of malnutrition and identifies the children at higher risk of TB at primary level and that could be possible if anganwadi workers were trained effectively.

This study pointed out a number of running issues that need to be addressed if this collaborative strategy is to identify more TB cases amongst malnourished children in India.

Acknowledgments

We would like to express our sincere thanks to Anganwadi worker, Helper & Parents for their invaluable support and contribution during data collection.

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