A Comparative Study of the Nutritional Status of Adolescents in Residential and Non-Residential Tribal Secondary Schools

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Abstract

Background: Tribal populations lack access to health services and proper educational opportunities due to geographical, social and economic reasons. Among tribal population, malnutrition is prevalent resulting in vicious cycle of morbidities and mortalities. To tackle these issues, various interventions are being done at all levels. Establishment of residential schools along with structured meals and Mid-Day Meal program for non-residential schools are few of many such strategies. This study was undertaken to study the effect of these interventions in a tribal district.

Materials and Methods: It is a record based retrospective cross-sectional study. Health records of class VIII students from a residential and a non-residential (40 each) were analysed for desired variables. Data was compiled using Microsoft Excel 2016 and analysed using SPSS version 22.

Results: More proportion of adolescent tribal students in non-residential schools had history of worm infestation and diarrhoea in the last six months. Similar pattern was observed for signs of deficiencies of Vitamin B and Vitamin C. Significant difference was observed between food consumption and food diversity pattern being followed.

Conclusion: The findings of the study reiterate the need of strengthening of nutrition and hygiene centric school health program for tribal adolescents**.**

Key words: *Tribal, Adolescents, School, Residential, Nutrition, Health.*

Introduction

In India, tribal population is characterised by lack of access to health services and proper education which puts them at risk of social and economic deprivation. Among tribal population, malnutrition is very common and has affected the general health of tribal children as it lowers the ability to resist infections, leads to chronic illness and sometimes leads to brain impairment. [1]

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The establishment of Ashram Schools was envisaged as a direct intervention to tackle the socio-economic and geographic inequalities of the tribal population particularly in sparsely populated areas by providing educational opportunities under the 'Establishment of Ashram Schools in Tribal Sub Plan Areas' by the Ministry of Tribal Affairs; operational since 1990-91 and revised with effect from financial year 2008-09. The Ashram Schools of the State Governments/Union Territories Administrations are mandated to provide all necessary facilities like drinking water, bedding and mattress, good quality food etc. With the notification of RTE Act, Ashram Schools also come under the purview of Ministry of Education ,[2] and have to follow the

prescribed norms of standards. [3]

In Maharashtra, government non-residential schools in rural and tribal areas are run under direct administration of Rural Local Governance. In every school, Mid-Day meal (100 grams of rice for standard I to V and 150 grams of rice for standard VI to VIII) is being given to students to prevent the malnutrition. [1]

To address the issue of poor quality of food being provided and its implications, a Centralised Kitchen Project was initiated in August 2015 on a pilot basis in Palghar and Nasik districts of Maharashtra. Under this, Ashram Schools in Palghar District are being provided the cooked food prepared at a Central Kitchen. Mid-day meal to tribal non-residential schools is also being provided through the same kitchen. [4]

Against this background, to study and compare the nutritional status of tribal adolescents in a tribal residential and non-residential secondary schools, the present study was undertaken in Palghar District of Maharashtra. The objectives were to study the sociodemographic profile of tribal school adolescents, to compare the nutritional status of a tribal residential and non- residential school adolescent students and to evolve recommendations based on study findings.

Materials and Methods:

This is a record based retrospective cross-sectional study based on data from school health records in Palghar district. Health records (February 2017) of class VIII students from randomly selected residential (ashram) and non-residential school (40 each) were obtained by purposive sampling method on a pilot basis. From these records, socio-demographic and nutritional status related data (Anthropometry, history of co-morbidities influencing nutrition, signs of vitamin and micronutrient deficiency, diet history). Ethical committee approval was taken **.**Collected data was compiled using Microsoft Excel 2016. Data was analysed using SPSS Version 22 for Descriptive Statistics values (frequencies, mean, standard deviation). Chi square test/Fisher exact test were used for comparison between categorical variables of two groups. For mean and standard deviation comparison, Open Epi was used.

Results: The background characteristics like mother's education, father's education and number of family members were comparable in both the groups. Most parents were illiterate and very few made it to higher secondary level. However, the difference in parents' occupation was observed ($p<0.05$). Most parents were illiterate and involved in farming and other labour work to earn their livelihood.

Table 1: Anthropometric Parameters of School Children

Variable	Value		'p' value
	Residential School	Non-residential School	
Mean Age (SD)	14.18 (0.448)	13.70 (0.516)	0.000
Female students 'n' (%)	12 (30)	21 (52.5)	0.040
Mean Height in cm (SD)	151.38 (7.941)	148.70 (6.094)	0.094
Mean Weight in kg (SD)	34.90 (6.496)	35.78 (6.407)	0.543
Mean BMI kg/m2(SD)	15.113 (1.753)	16.188 (2.825)	0.044
Underweight 'n' (%)	29 (72.5)	20 (50)	0.069
Healthy weight 'n' (%)	11 (27.5)	18 (45)	
Overweight 'n' (%)	0 (0.0)	2 (5)	

Significant difference in the mean age of adolescent students of residential (Ashram) and non-residential schools. The percentage of girl students studying in ashram schools is found to be less (30%) compared to boys. (Table 1)

The difference in mean BMI of both the groups (15.11 for residential and 16.118 for non-residential school adolescents) was found statistically significant. When the adolescents were categorised into three categories for their nutritional status based on WHO Z score charts for BMI (viz. Underweight, healthy weight and overweight), the percentage of underweight students was found to be 72.5% in residential school. (Table 1)

Table 2: Morbidity profile of tribal adolescents

Variable Residential School		Value		'p' value
		Non-residential School		
History of worm infestation 'n' (%)		3 (7.5)	12 (30)	**0.011**
History of diarrhoea 'n' (%)		5 (12.5)	13 (32.5)	**0.032**
History of respiratory illness		17 (42.5)	19 (47.5)	0.653
Signs of Vitamin B Deficiency 'n' (%)		8 (20)	18 (45)	**0.016**
Signs of Vitamin C Deficiency 'n' (%)		3 (7.5)	20 (50)	**0.000**
Eye changes 'n' (%)		7 (17.5)	16 (40)	**0.026**
Pallor 'n' (%)		11 (27.5)	13 (32.5)	0.626
Hair changes 'n' (%)		8 (20)	14 (35)	0.133
Breakfast	Taken 'n' (%)	40 (50.0)	25 (31.2)	**0.000**
	Not taken 'n' (%)	0 (0.0)	15 (18.8)	
Evening snacks	Taken 'n' (%)	40 (50.0)	2 (2.5)	**0.000**
	Not taken 'n' (%)	0 (0.0)	38 (47.5)	

Table 3: Food groups

Food timing	Mean food groups (SD)		'p' value
	Residential School	Non-residential School	
Breakfast	2.35 (0.483)	1.18 (0.844)	0.000
Lunch	4 (0.000)	2 (0.000)	0.000
Evening snacks	1.98 (0.158)	0.08 (0.350)	0.000
Dinner	3.50 (0.877)	2.03 (0.158)	0.000

Percentage of episodes (Table 2) like worm infestation and diarrhoea was more in non-residential school adolescents (30% and 32.5% respectively) in the last 6 months. Occurrence of the symptoms of respiratory illness, clinical pallor and hair changes was almost similar in both the groups. Lesser number of adolescents from residential (ashram) school showed signs of vitamin B (20%) and vitamin C (7.5%) deficiency. The statistically significant difference was shown for vitamin B and vitamin C deficiency signs and eye changes (17.5% in residential adolescents and 40% in non-residential adolescents). Significant difference was observed between the food pattern and timely food consumption (Table 3) being followed by residential (ashram) and non-residential tribal school adolescents.

Discussion

In the present study, differential age-wise and sex-wise enrolment pattern was observed. In a study conducted by Rose-Clarke K et al., [5]it was observed that girls dropped out of school because they were required for household work (37%) or work on the family farm or business (22%). In a study conducted by Rao KM et al, [8]4% adolescent girls were married and less than 1% were either pregnant (0.4%) or lactating (0.7%) at the time of the survey. Lack of formal education among parents, involvement of parents in work such as farming and labour work, loss of either parent were other background characteristics found in the present study. Similar findings were observed in a study conducted for diet and nutritional status of rural adolescents where the major occupation of the heads of the households surveyed was agriculture. [6]In the same study, it was found that more than a third (37.3%) of the families with adolescents did not possess any land. Majority adolescents in the present study belonged to smaller families. Poor nutrition of adolescents is linked with rural areas and large families with uneducated or unskilled parents from lower-income households. [7] A significant association between undernutrition and socio-economic parameters like type of family, size of land holding and occupation of head of household was observed by Rao KM et al. [8] In the present study, mean BMI of residential school adolescents was found to be less than those studying in non-residential school. The proportion of underweight adolescents was 72.5% in residential and 50% in non-residential tribal school, which is comparable with other studies conducted for tribal adolescents and children. [8] [10]

More adolescents in non-residential schools had history of worm infestation and diarrhoea. Signs of vitamin B and vitamin C deficiency and eye changes were also more commonly observed in them. Pallor was observed in about one third students in both residential and non-residential schools. Findings of Comprehensive National Nutrition Survey suggest that in India in 2018, 18% of boys and 40% of girls in the age group of 10-19 years were anaemic. [9]

Fewer adolescents studying in non-residential school had breakfast or evening snacks and their all meals were constituted from fewer food groups when compared with residential school adolescents. It was observed by Rao KM et al that the mean intake of all the foodstuffs, especially the income elastic foods such as Pulses, Milk & Milk products, Oils & fats and Sugar & Jaggery were lower than the recommended levels of ICMR among tribal adolescents.[8] In the same study, it was also observed that the intake of all the nutrients were below the recommended level, while that of micronutrients such as iron, vitamin A and riboflavin were grossly inadequate in all the age and sex groups. [6][8] The dietary history in the present study suggests minimal food diversity among tribal adolescents studying in non-residential schools. The dietary recall data in a study conducted for tribal children in the same district revealed that 83% of the children had consumed food belonging to only 3 groups, the most common food eaten by the children was rice and dal (pulses) and only 13% of the children achieved a minimum level of diet diversity. [10]

The differential age-wise and sex-wise patterns of enrolment in both the residential and non-residential schools need to be studied further for the factors like underage and overage enrolment, delayed schooling and it's causes, gender bias, number of drop-outs and reasons for drop-out if any and difficulties faced while

availing the school facilities in residential schools.

The significant difference in the occurrence of worm infestation and diarrhoea signifies the need of strengthening of hygiene and sanitation practices in non-residential tribal schools. This needs to be studied on a larger scale involving more of such schools. Growth of adolescents needs to be monitored prospectively to differentiate growth disturbance because of poor nutrition from other growth disorders. Strategy for the involvement of teachers and parents can be evolved.

The study was undertaken on a pilot basis which is record based and sample size is too small. Quantitative assessment of calories consumed could not be done as details of food quantity were not available. Extensive multi-centric study with larger sample size needs to be undertaken to explore the determinants of nutritional status which will be considering parameters like childhood malnutrition history, nutritional status of parents (for inter-generational cycle of malnutrition), food security, accessibility to food, cooking practices, detailed quantitative assessment of actual food consumption and biochemical tests for the exact diagnosis of nutritional morbidities.

The findings of the study re-emphasize the need of systematic, well planned, culturally relevant well implemented programme of nutritional education, supplementation and hygiene in tribal schools.

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Ethical Clearance : Taken form the institutional Ethics Committee

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