



RESEARCH ARTICLE

NUTRITIONAL STATUS OF SCHOOL AGE CHILDREN RESIDING IN CHILD CARE INSTITUTION IN COMPARISON TO THOSE RESIDING IN THEIR HOME - A CROSS SECTIONAL STUDY

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Abstract

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Introduction:-

Children of today are the citizen of tomorrow. The comprehensive healthcare towards the adequate growth and development of children play a vital role in the progress of the nation. Growth and development are phenomena peculiar to children. Growth refers to increase in size and development refers to increase in skill and functions.¹ School age children are those aged between 5-15 years. Malnutrition during this age can slow the physical and mental development of child and effects are lifelong. Stunting is responsible for long-term consequences such as impairment of intellectual achievement and poor performance in school, also decrease in adult body size and further leading to reduced capacity to work.²

Normally children residing at home have their parents and relatives to take care of their emotional and nutritional needs. But some of the children are disadvantaged because of the parental death or they are unable to take care of their children. Child Care Institutions (CCI's) are those facilities recognized under the Juvenile Justice Act for providing care and protection to children, who are in need of such service. CCI's include orphanages, children home, observation home etc.³ Those children residing in home even though they have parents or other relatives to take care of their needs still there is higher prevalence of malnutrition⁴, maybe because of educationally, socially and economical backwardness of parents, unawareness of nutrition facts, food taboos and food habits etc. Whereas in CCI's there may not be individual attention, lack of emotional support and lack of supervision of feeding habits due to inadequate staff. Poor personal hygiene and overcrowding may lead to repeated infections or infestations. Food provided to children may lack in nutritive value.⁵ All above factors together may lead to decreased food intake or decreased absorption of nutrients leading to malnutrition. Our study is one of the backward districts and studies among under five children have shown higher prevalence of malnutrition, but the studies among school age children are lacking especially among those residing in CCI's. As malnutrition is known to affect all the school age children and if the study is done only among children residing in CCI then the obtained burden of malnutrition can't be decided whether it was because of place of residence or the higher burden in the study area itself. Hence having a comparison group which represents the children residing in their home (attending non residential school) is important and considered in the study.

Review of Literature:-

Institutionalized care is not the ideal setting for children to grow up but the circumstances will lead to many children being obliged to stay in the institutions (CCI's). These children have a right to good nutrition, both to maintain their health and to allow them to

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grow into healthy adults but many children living in institutionalized care were consistently at high risk of undernutrition and/or micronutrient deficiencies. With few exceptions, mostly of older children, children living within institutionalized care were significantly below standards for growth, diet and micronutrient status and were often below comparison groups of their community peers.⁶

Various anthropometric parameters like weight for age, height for age, weight for height, mid arm circumference etc exist for assessing the nutrition status of children. In that mid arm circumference is mainly used for children below 5 years of age. W weight for age is inadequate for monitoring growth beyond childhood due to its inability to distinguish between relative height and body mass, hence BMI for ages should be used as complement to height for age (stunting) in the assessment of thinness, overweight and obesity in school-aged children.

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A study done by Alauddin Chowdhury⁸ et al in Dhaka city, Bangladesh

Nutritional status of children in orphanage revealed that 60.3% of the children were malnourished in the orphanage, in that 43.1% were mild, 16.8% moderate and 0.4% severe malnutrition. The study concluded that Malnutrition is highly prevalent among children and adolescents under residential care and study suggested for early identification and intervention.

A study done by Shukla⁹ et al in Salem, Chennai, India to know the physical health status of children in orphanage revealed that 57.7% of the children were malnourished, 50% of them were having dental caries, 83% had dandruff, 25% had pediculosis, 1.96% had Bitot's spot, 33.5% had gingivitis. Study suggested the measures like periodic assessment of orphanage children, camp to create awareness regarding importance of growth and development and rehabilitation program

A study done by Lone¹⁰ et al in Jammu and Kashmir to know the health and nutritional status of orphan children living in orphanages revealed that 33% of children were malnourished. 53% children were having one or other signs/symptoms of malnutrition. Those signs/symptoms were discoloration of hair, xerosis of skin, spongy bleeding gums, mottled dental enamel, cheilosis etc. study also revealed that dietary intake was incomplete or deficient for all nutrients, poor planning of menus, hygienic condition of these orphan children was also found to be poor.

Objectives:-

1. Assessing the nutritional status of school age children residing in child care institution
2. Comparing the nutritional status of children residing in child care institutions with those residing in their home

Material and Methods:-

A cross-sectional study was conducted during August 2021 to September 2021 after obtaining Ethical approval from the institutional ethical committee of four college and obtaining permission from the respective authorities of school and child care institution. One of the child care institution located in the district taken based on feasibility and availability of the children during study period. These selected child care institution is a non-governmental children home for boys and girls covered under juvenile justice act 2000. A total of 156 children were residing in that institution during the study period and all the children were included in the study. A private non-residential school was selected from the same district randomly. All the children attending the school physically during the visit were included in the study. A total of 111 children were included from the private school. The study was originally intended for children studying from 1st-10th standard (5-16 years) but as during the study period only 7th to 10th standard students were available in school/CCI because of pandemic hence only those were studied.

Assent from the children and written consent from the guardian was obtained for the study. Data was obtained through a pre-designed and pre-tested questionnaire by interviewing the students and the guardian and by examining the children. Questionnaire included demographic information like age (completed years and month), sex, religion, type of diet, place of residence etc. Clinical examination was done to look for the nutritional deficiency signs like pallor, bitot's spot, corneal xerosis, angular stomatitis, bleeding gum etc. Anthropometric measurement was done by using tools like, height measured by stadiometer to the nearest 1 cm and weight measured by weighing machine to the nearest 100 gm. BMI calculated using the formula $BMI = \text{weight in Kg} / (\text{height in metre})^2$. Children were classified as severe thinness (<-3SD), thinness (<-2SD), normal (-2SD to +1SD), overweight (>+1SD) and obesity (>+2SD) based on the WHO growth standards as per BMI for age (2007 reference). Children were also classified as stunted and normal based on height for age criteria of WHO 2007 reference. Stunted are those

$e < 2SD$ of height for age and severe stunting are those with height for age $< 3SD$. Data was entered in excel sheet and was analyzed using SPSS software and is presented in suitable tabular form. Categorical data is presented in percentages. Chi-square test was used to compare the nutritional status between the two groups and $p < 0.05$ was considered significant.

Observations and Results:-

A total of 267 children were included in the study, in that 156 were from childcare institute and 111 were from private non-residential school. As shown in table 1; Among the 267 children studied 102 (38.2%) were females and 165 (61.8%) were males. There was no significant difference in gender distribution among both the study groups, in private school 36% were females and 64% were males, in childcare institution 39.7% were females and 60.3% were males. Majority of the study participants were belonging to Hindu religion (91%), There was significant difference in Religion wise distribution in both the groups. In Private school group 10.8% were of Muslim religion and none belonging to Christian religion but in childcare institution group 0.6% were Muslim and 7.1% were Christian religion. The study participants were belonging to the 11-

16 years of age in both the groups. Mean age of the private school group was 13.94 years (SD-1.49) and it was 14.42 years (SD-1.01) in childcare institution group the difference was statistically significant. 5-

10 years age group was not studied as due to the pandemic and

government regulations during the study period they were not available at the school or at childcare institutions. In childcare institution group 92.9% were consuming mixed diet whereas in private school group 53.3% were consuming mixed and 47.7% were vegetarians, the difference in type of diet was statistically significant.

Table 1:- Distribution of children based on socio-demographic characters.

Socio-Demographic characters		Private school	CCI	Total	p value
Gender	Female	40(36.0%)	62(39.7%)	102(38.2%)	0.539
	Male	71(64.0%)	94(60.3%)	165(61.8%)	
Religion	Hindu	99(89.2%)	144(92.3%)	243(91.0%)	<0.001
	Muslim	12(10.8%)	1(0.6%)	13(4.9%)	
	Christian	0(0.0%)	11(7.1%)	11(4.1%)	
Age	11	12(10.8%)	0(0%)	12(4.5%)	<0.001
	12	11(9.9%)	5(3.2%)	16(6.0%)	
	13	11(9.9%)	26(16.7%)	37(13.9%)	
	14	24(21.6%)	42(26.9%)	66(24.7%)	
	15	43(38.7%)	64(41.0%)	107(40.1%)	
	16	10(9.0%)	19(12.2%)	29(10.9%)	
Type of diet	Mixed diet	58(52.3%)	145(92.9%)	203(76.0%)	<0.001
	Vegetarian	53(47.7%)	11(7.1%)	64(24.0%)	

As shown in Table 2 overall only 57.3% children were having normal nutritional status based on their BMI for age. There was a statistically significant difference ($p < 0.001$) in nutritional status among both the groups. In childcare institution group 28.2% were having thinness and 8.3% were having severe thinness whereas in private school group 14.4% were having thinness and 3.6% were having severe thinness. Overweight and obesity were 16.2% and 9% respectively in private school group whereas in childcare institution group overweight was 4.5% and obesity was 1.3%.

Table 2:- Distribution of children based on nutritional status (BMI for age).

Nutritional status (BMI for age)	Private school	CCI	Total
Obesity	10(9.0%)	2(1.3%)	12(4.5%)
OverWeight	18(16.2%)	7(4.5%)	25(9.7%)
Normal	63(56.8%)	90(57.7%)	153(57.3%)
Thinness	16(14.4%)	44(28.2%)	60(22.5%)
Severe Thinness	4(3.6%)	13(8.3%)	17(6.4%)
Total	111(100.0%)	156(100.0%)	267(100.0%)

As shown in table 3, a total of 14.7% of the children were stunted in CCI group in that 3.2% were having severe stunting and 11.5% moderate stunting. In private school group a total of 10.8% were stunted, in that 7.2% were having moderate stunting and 3.6% were having severe stunting. There was no statistically significant difference in stunting in both the groups ($p = 0.497$)

Table3:- Distribution of children based on nutritional status (Height for age) Nutritional status (height for age) Private school CCI

			Total
Normal	99(89.2%)	133(85.3%)	232(86.9%)
Stunting	8(7.2%)	18(11.5%)	26(9.7%)
Severestunting	4(3.6%)	5(3.2%)	9(3.4%)
Total	111(100.0%)	156(100.0%)	267(100.0%)

As shown in Table 4, in Child care institute group 22.4% of children were having lack of fluster in hairs whereas in Private school only 0.9% were having lack of fluster and this difference was statistically significant. In Child care institute 1.3% were having dyspigmentation of hair whereas in private school none were having dyspigmentation. There was statistically significant higher facial depigmentation and pallor in child care institution group compared to private school. 10.9% were having conjunctival pallor and 7.7% were having depigmentation on face in CCI group whereas in Private school group none were having dyspigmentation and 5.4% were having pallor. 1(0.9%) child was having atrophic papillae in private school group and 1(0.6%) child was having black pigmentation. In private school 90.1% of the children were having normal teeth compared to 75.6% children in Child care institution and difference was statistically significant. In CCI 3.2% were having teeth with attrition, 5.8% with dental caries and 15.4% were having mottled enamel. In Private school 6.3% were having dental caries and 3.6% were having mottled enamel. In CCI group 1(0.6%) child was having pyorrhoea and 2(1.3%) were having recession of gums, in private school all were having normal gums. Dryness of skin (xerosis) was seen in 19.9% of children in CCI and only 7.2% of children in private school, the difference was statistically significant. Only one child in CCI was having knocked knees suggestive of rachitic change whereas in private school none were having any signs suggestive of rickets. 28.8% of the children in CCI group were having pallor in nails and 4.5% were having koilonychia along with pallor. These findings were significantly higher compared to private school group where 17.1% were having pallor and 1.8% koilonychia.

Table4:- Distribution of children based on their physical examination findings.

Physical examination findings		Private school	CCI	Total	p value
Hairs	Dyspigmentation	0(0.0%)	2(1.3%)	2(0.7%)	<0.001
	Lack of fluster	1(0.9%)	35(22.4%)	36(13.5%)	
	Normal	110(99.1%)	119(76.3%)	229(85.8%)	
Face	Diffusedepigmentation	0(0.0%)	12(7.7%)	12(4.5%)	0.002
	Pallor	6(5.4%)	17(10.9%)	23(8.6%)	
Tongue	Normal	105(94.6%)	127(81.4%)	232(86.9%)	0.34
	Atrophic papillae	1(0.9%)	0(0.0%)	1(0.4%)	
	Black pigment	0(0.0%)	1(0.6%)	1(0.4%)	
	Normal	110(99.1%)	155(99.4%)	265(99.3%)	
Teeth	Attrition	0(0.0%)	5(3.2%)	5(1.9%)	0.003
	Caries	7(6.3%)	9(5.8%)	16(6.0%)	
	Mottled	4(3.6%)	24(15.4%)	28(10.5%)	
	Normal	100(90.1%)	118(75.6%)	218(81.6%)	
Gums	Pyorrhoea	0(0.0%)	1(0.6%)	1(0.4%)	0.34
	Recession of gums	0(0.0%)	2(1.3%)	2(0.7%)	
	Normal	111(100.0%)	153(98.1%)	264(98.9%)	
Skin	Follicular Hyperkeratosis	1(0.9%)	0(0.0%)	1(0.4%)	0.008
	Xerosis	8(7.2%)	31(19.9%)	39(14.6%)	
	Normal	102(91.9%)	125(80.1%)	227(85.0%)	
Rachitic changes	Knock knees	0(0.0%)	1(0.6%)	1(0.4%)	0.39
	Nil	111(100.0%)	155(99.4%)	266(99.6%)	

Nails	Koilonychia	2(1.8%)	7(4.5%)	9(3.4%)	0.031
	Pallor	19(17.1%)	45(28.8%)	64(24.0%)	
	Normal	90(81.1%)	104(66.7%)	194(72.7%)	

Discussion:-

In the present study overall prevalence of thinness & severe thinness was 22.5% and 6.4% respectively which was similar to the study done by Masthi NR¹¹ et al, where it was 20.9% and 9.1%. But overall overweight and obesity was higher in our study, it was 9% but in the study done by Masthi NR¹¹ et al it was 5.7%. It was clearly evident in the present study that undernutrition was higher in the children in child care institution and overnutrition was higher in the non-residential/private school. Higher prevalence of thinness in child care institution may be because of lack of parental care and attention that normally a child requires for consumption of proper food. Higher prevalence of overweight and obesity among the private school group can be because of COVID lockdown hence decreased physical activity among the children and also may be having an access to junk foods.

In the present study overall prevalence of stunting was 13.1% which was little lesser compared to the study done by Masthi NR¹¹ et al in which it was 19.3%. The difference may be due to the different age group studied. There was no significant difference in stunting among both the groups in our study. As stunting indicates chronic malnutrition, our study finding may highlight that nutrition status on long run may not be just dependent on place or residence but influenced by many other factors.

In the present study 33.3% children were having anaemia (based on nail pallor and koilonychia), findings were similar to the study done by Srivatsava¹² et al in that study anaemia prevalence was 37.5%. In the present study the anaemia was significantly higher in child care institution group indicating that better nutrition (iron rich food) in those residing in their home.

In the present study 0.6% were having rachitic changes and the findings were similar to the study done by Srivatsava¹² et al in which it was 0.8%. Difference in prevalence of rickets among both the groups can't be made as prevalence is low hence the sample size is inadequate for differentiation under the low prevalence.

In the present study 6% children were having dental caries, findings were different from the study done by Shivaprakash¹³ et al study, in which dental caries was seen in 28.3% children. As caries is lesser in our study it may be because of higher age group in our study compared to Shivaprakash¹³ et al study in which only 6-12 years was used and it was seen that dental caries decreased with age from 6-12 years. There was no significant difference in caries in both the groups in our study. Mottled enamel in our study (10.5%) was little higher compared to study done by Shivaprakash¹³ et al (3.9%), it may be because of higher age in our study and also the study district is known for being an endemic area for fluorosis with many water sources having high fluoride content than the recommended guideline. High fluoride in the water can also be one of the reasons for low prevalence of dental caries in the study.

Various studies have shown prevalence of Vitamin A deficiency to be 1-5% in school age children but in our study none have shown Vitamin A deficiency signs like bitot's spot or corneal/conjunctival xerosis. It may be an indicator of decreasing Vitamin A deficiency disorder with functioning Vitamin A prophylaxis programme.

Presence of lack of luster of hairs, facial depigmentation, skin dryness all add to the findings of overall undernutrition among the children and presence of these significantly higher among those children in child care institution compared to those in non-residential school highlights that undernutrition to be higher in child care institution.

Limitations: As the study participants in private school (non-residential school) included only those attending offline/physical class during the study period. Findings may differ in those attending online classes if the characters of those students are different. Study findings can't be generalized to the 5 to 10 years age group children as in our study we couldn't include children from that age group because of unavailability (government policy as pandemic response).

Conclusion:-

Malnutrition continues to be high prevalent among the school age children. Undernutrition (thinness and severe thinness) is more prevalent among those children residing in child care institution compared to those residing in their home and overnutrition (o

verweight and obesity) among those residing in their home. Stunting also continues to be a problem among school age children and there was no difference in its occurrence among those in CCI and non-residential school. Anemia (pallor), dental caries, mottled enamel, hairs with lack of fluster are the common nutritional related (deficiency/excess) signs observed among the school age children. Most of the nutritional related signs were significantly higher in children residing in CCI compared to those residing in their home.

Summary:

School age children are an important asset of any country. Malnutrition during this age can slow the physical and mental development of child and effects are life long. Children residing in Child care institution may be at more risk of malnutrition because of lack of parental care and support. Hence the study was done with the objective of finding the nutritional status of school age children residing in child care institution and comparing the status with those children residing in their home. A cross sectional study was done in one of the child care institution and in one private non residential school, all children available during the visits were included in the study. Data was collected by interviewing the children and guardian and also by examining the children. In child care institution group 28.2% were having thinness and 8.3% were having severe thinness whereas in private school group 14.4% were having thinness and 3.6% were having severe thinness. Overweight and obesity were 16.2% and 9% respectively in private school group whereas in child care institution group overweight was 4.5% and obesity was 1.3%. A total of 14.7% of the children were stunted in CCI group in that 3.2% were having severe stunting and 11.5% moderate stunting. In private school group a total of 10.8% were stunted, in that 7.2% were having moderate stunting and 3.6% were having severe stunting. Anemia (pallor), dental caries, mottled enamel, hairs with lack of fluster are the common nutritional related signs observed among the school age children. Most of the nutritional related signs were significantly higher in children residing in CCI compared to those residing in their home. Our study findings suggest the children in Child care institution are more vulnerable for thinness and micronutrient deficiencies compared to those children residing in their home. Our study recommends for more focus on nutritional aspects among the school age children especially those residing in child care institution.

References:-

1. Park K. Park's textbook of preventive and social medicine. 25th ed. Jabalpur, India: Banarasidas Bhanot; 2019. 593.
2. Scrimshaw NS, Sangiovanni JP. Synergism of nutrition, infection, and immunity: an overview. *Am J Clin Nutr* 1997; 66(2): 464-77.
3. Gazette of India. Juvenile justice (care and protection) act 2015. Available from <http://cara.nic.in/PDF/JJ%20act%202015.pdf> last accessed on 22/11/2021
4. Pal D, Kanungo S, Bal B, Bhowmik K, Mahapatra T, Sarakar K. Malnutrition scenario among school children in Eastern India: an epidemiological study. *Epidemiology* 2016; 6: 228.
5. Vaidan N. Nutritional status of children living in orphanages in District Budam, J&K. *Int J of Humanities and Social Science Invention* 2013; 2(2): 36-41.
6. DeLacey E, Tann C, Groce N, Kett M, Quiring M, Bergman E et al. The nutritional status of children living within institution alized care: A systematic review. *Peer J*. 2020; 8: 1-36.
7. Onis M de, Onyango A W, Borghi E, Siyam A, Nishida C, Siekmann J. Development of a WHO growth reference for school-aged children and adolescents. *WHO Bull* 2007; 85: 660-7.
8. Chowdhury AA, Wasiullah S, Imdadul Haque M, Muhammad F, Hasan MM, Ahmed KR, Chowdhury M. Nutritional Status of Children Living in an Orphanage in Dhaka city. *Mal J Nutr*. 2017; 23(2): 291-298.
9. Shukla, B. and Shukla, D. (2011) "Study to Assess Physical Health Status of Children at Selected Orphanage in Salem, Chennai" India", *IARS' International Research Journal*. Vic. Australia, 1(2). doi: 10.51611/iars.irj.v1i2.2011.10
10. Lone MA, Ganesan P. Health and Nutritional Status of Orphan Children's Living in Orphanages with Special Reference to District Anantnag of Jammu and Kashmir. *The International Journal of Indian Psychology* 2016; 3(2): 163-9.
11. Masthi NR, Madhusudan M, Gangaboriaiah B. Nutritional status of school age children (6-15 years) using the new WHO growth reference in a rural area of Bangalore, South India. *Nat IJ Res Community Med* 2017; 6: 144-50.