

Assessment of nutritional status of school going girls (7-9 years) residing in shelter homes of Udaipur city

Umang Nigam, Sarla Lakhawat and Geetika Sharma

The present study was conducted with the objective to assess and compare the nutritional status of school going girls (7-9 years) residing in government and non-government shelter homes in Udaipur city (Rajasthan) and to impart nutrition education to the workers and assess their gain in knowledge. A comprehensive list of shelter homes was obtained from Department of social welfare. One twenty school going girls (60 girls each from Government and non-government shelter home) of age 7-9 years were selected. The data was collected by using questionnaire technique and analyzed using frequency, per cent, mean per cent score and paired t-test. Information was collected on general profile, anthropometric measurement, clinical assessment, dietary assessment (24 hours recall method) and nutritional knowledge of workers among shelter home. Among both the shelter homes (28.33%), (39.16%) and (32.5%) girls were in the age of 7, 8 and 9 years. The mean height, weight and BMI of school going girls were, significantly ($P < 0.05$) lower than their respective standard values in both the shelter homes. According to Gomez classification (18.33%) girls among non-government shelter home and (6.66%) girls in government shelter home were malnourished in the age of 8 years. According to BMI for age z- score of WHO (2006), (44.16%) of the respondents were in normal and (30.83%) of respondents were in severe undernutrition range. Clinical findings indicates that 11.66 per cent of respondents suffered from lack of luster in hair, 9.16 per cent suffered from pale conjunctiva and 11.66 per cent suffered from cheilosis among both the shelter homes. As per haemoglobin estimation majority of girls were anaemic in the age of 8 and 9 years. The intake of pulses, roots and tubers, other vegetable, green leafy vegetables, sugar and jaggery and fats and oils were significantly ($P < 0.05$) lower than RDI except milk and milk products were found non-significant in both shelter homes. The intake of protein, fats, β - carotene, iron, riboflavin, niacin, Vitamin-C and carbohydrates content was significantly ($P < 0.05$) lower than respective RDA except the intake of Energy, Thiamine and Calcium were found non-significant in both shelter homes.

Key Words : Anthropometric measurements, Malnutrition, Recommended dietary intake, Recommended dietary allowances

How to cite this article : Nigam, Umang, Lakhawat, Sarla and Sharma, Geetika (2018). Assessment of nutritional status of school going girls (7-9 years) residing in shelter homes of Udaipur city. *Food Sci. Res. J.*, 9(1): 26-32, DOI : 10.15740/HAS/FSRJ/9.1/26-32.

INTRODUCTION

Shelter homes are the registered welfare

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organization, has been in existence since 1981 to help abused, abandoned, neglected or at-risk children.

The large numbers of homeless children, pavement dwellers, street and working children and child beggars, left on their own and in need of care and support, is an urban phenomena of great concern. 29% of India's population resides in urban areas, half of which live in conditions of extreme deprivation compounded by lack of shelter and access to basic services like sanitation, safe drinking water, education, health care, recreational

facilities, etc. The urban population is also expanding rapidly because of intense rural-urban migration, swelling cities and towns, further compromising the ability of civic authorities to meet people's basic needs. A large proportion of the migrant population ends up residing in inhuman conditions in slums, squatter colonies, railway platforms, pavements, bus stops, tourist spots, etc. As a result, urban poverty and hunger are increasing. In this situation, children suffer the most. A vast majority of them, with or without parental support, end up at traffic intersections, railway stations, streets, sabzi mandi (vegetable market), etc. They can be seen begging for alms, wiping automobile windscreens, rag picking, vending wares and may also be involved in petty thefts, drug peddling or controlled by a begging or stealing mafia. Many of these children also peddle sex for survival. These children are very often victims of adult abuse of all kinds: physical, sexual, emotional as well as economic exploitation (Manual, DWCD, Delhi).

Nutrition status is a sensitive indicator of child's health. Thus the assessment of nutritional status plays an important role. The principal aim of the nutritional assessment of a community is to map out the magnitude and geographical distribution of malnutrition as a public health problem, to discover and analyze the ecological factors that are directly or indirectly responsible and where possible to suggest appropriate corrective measures, preferably capable of being applied with continuing community participation. It is widely accepted that for practical purposes anthropometry is the most useful tool for assessing the nutritional status of children. Of the various Parameters, weight for age, weight for height, arm circumference and height for age, either singly or in combination are extensively used for this purpose.

The school going girls is in a state of process of growing up from puberty to maturity. Adolescent account for 1/5 of the world's population and in India they account for 22.8% of total population. They are tomorrow's adult. Their growth and development is closely linked to the diet they receive during childhood. They may represent a window of opportunity to prepare nutritionally for a healthy adult life. They have to encounter a series of serious nutritional challenges not only affecting their growth and development but also their livelihood as adults. Thus it is not surprising that girl population who are "mother to be" is considered as the most important section on which the future of nation

depends.

The school age period is nutritionally significant because this is the prime time to build up body stores of nutrients in preparation for rapid growth of adolescence. Nutrition plays a vital role, as inadequate nutrition during childhood may lead to malnutrition, growth retardation, reduced work capacity and poor mental and social development. Also most of the research work that has been conducted on nutritional status of children is limited to infants and preschool children only. There is dearth of information on nutritional status of school going girls particularly from shelter homes. Therefore it is imperative that dietary patterns of school going girls are thoroughly assessed which can help in imbibing simple changes in their daily diet, thus improving their nutritional status. Thus, considering the importance of nutritional needs of school going girls, the present study was planned with the following objective :

- To assess the nutritional status of the school going- girls (7-9 years) of government and non-government shelter homes in areas of Udaipur city.

METHODOLOGY

The study was conducted in Udaipur city of Rajasthan. According to the comprehensive list of shelter homes from Samaaj Kalyaan Vibhaag there were 14 shelter homes in Udaipur city. From this list one government (Nirarshrit Balika Garh, Sector-14) and one non-government (Meera Nirarshrit Balika Garh, Udaipur) shelter home was selected purposively as these two homes were providing shelter to girls only whereas remaining 12 centers are for boys. Total of 120 girls (60 girls from government and 60 girls from non-government shelter homes) in the age group of 7-9 years enrolled in schools and resident of shelter home were selected by random sampling.

For assessment of nutrition status of school going girls in shelter homes :

A well-structured questionnaire was developed. The information was gathered on the various aspects like general background information, dietary intake, anthropometric measurements and clinical assessment of the subject.

General profile:

It consist of particulars related to the respondents

i.e. name, age, class and food habits.

Anthropometric measurements:

Nutritional status of respondents was assessed by measuring body height (cm), weight (kg) and BMI was measured for each respondent.

Assessing severity of under nutrition :

The nutritional status of the sample was ascertained with the help of indicators such as Gomez classification (% reference weight for age), Water low classification (height for age) and WHO (2006) classification (BMI for age) and results were calculated.

Clinical assessment :

Clinical assessment including biochemical estimation (Haemoglobin) was carried out with the assistance of doctors from Primary Health Centre for the examination of clinical symptoms of nutritional deficiencies and presence of infections and others illness along with Rapid clinical survey.

Dietary assessment:

Dietary survey was conducted of the respondents using 24 hour recall method for one day. The intake of different food groups for the day was compared with the balanced diet (NIN, 2010). The nutrient intake was calculated using food composition tables (Gopalan *et al.*, 1989) and with the help of a computer programme developed by Choudhary *et al.* (2001) in DBMS package. The intake of nutrients was compared with Recommended Dietary Allowances as suggested by Indian Council of Medical Research (2008).

Statistical analysis:

After collecting data, it is necessary to analyze it with help of statistics to arrive at proper and adequate conclusion. Following statistical measures were used to analyze the data Frequency and percentage and Independent sample t- test.

OBSERVATIONS AND ASSESSMENT

The results of the present study as well as relevant discussions have been presented under following sub heads:

General background information:

Out of 120 respondents surveyed, 60 were girls from government and 60 were girls from non-government shelter home. 28.33 per cent respondents were in age group of 7 years and 39.16 per cent in age group of 8 years and the rest 32.5 per cent of respondents belonged to 9 years age group. From the findings it could be stated that all the respondents (100%) were vegetarian. Majority of respondent were residing in II class which was (42.5%).

Anthropometric measurement:

Data regarding anthropometric measurement showed that the height and weight of respondents ($p < 0.05$) was lower than reference value and for assess malnutrition gomez classification, waterlow classification, BMI for age was used. Maximum subjects (18.33%) were malnourished in the age of 9 years among girls according to Gomez classification in shelter homes and 11.66 per cent stunted 18.33 per cent wasted in the age group of 8 years according to waterlow classification among girls of shelter home. (9.16 %) subjects belonged to over-

Table 1 : Mean daily food intake of school girls residing in government shelter home

(n=60)

Food group (g)	RDI (g)	Mean / SD	t value	Overall intake % age of RDI
Cereals	180g	120.5±0.50	921.77*	66.94
Pulses	60g	32.5±2.52	84.52*	54.16
Fats and oils	30g	15.5±0.50	224.63*	51.66
Sugars and jaggery	20g	15.25±0.25	147.17*	76.25
Green leafy vegetables	100g	50±0.50	774.59*	50
Roots and tubers	100g	62.5±2.52	115.26*	62.5
Other vegetables	100g	70±10.08	23.05*	70
Fruits	100g	50.25±0.25	1541.44*	50.25
Milk and milk products	500g	225±25.21	84.49*	45

RDI- Recommended Dietary Intake (NIN, 2010)

* indicates significance of value at P=0.05

weight and (2.5%) obese grade category of both the shelter home. Data reveals that among both the shelter home 30.83 per cent of respondents were in severe undernutrition range. According to BMI for age z- score of WHO (2006), 44.16 per cent of the respondents were in normal range among both shelter home.

Clinical assessment:

Clinical findings indicates that 87.5 per cent of subjects had normal appearance at the same 12.5 per cent had fair appearance among both the shelter home. 11.66 per cent of respondents suffered from lack of luster in hair. 9.16 per cent suffered from pale conjunctiva. 11.66 per cent suffered from cheilosis among both the shelter home. The haemoglobin estimation of girls among government and non-government shelter home in the age group of 7-9 years was conducted and results reveals that 3.33 per cent girls from government and 1.66 per

cent girls from non-government shelter home were anaemic in the age of 8 years. In the age of 9 years 6.66 per cent girls from government and 5 per cent girls from non-government shelter home were anaemic. Few girls 1.66 per cent in the age of 7 years were anaemic and majority 33.33 per cent in the age group of 7-8 years were non-anaemic. Table 4 clearly shows that most of the girls were anaemic in the age group of 8-9 years due to inadequate iron intake among girls in the shelter home.

Findings of the study are also in line with study of Shivaprakash and Joseph (2014) on 484 children which reported that the overall prevalence of underweight was 30.3 per cent (147) and stunting was 27.9 per cent (135). Pallor was noted in 123 (25.4%). Hair changes were seen in 19 children (3.9%). Eye changes noted in the form of conjunctival xerosis in 100 (20.7%) and bitot's spots in 10 children (2.1%). Teeth changes were noted in the form of dental caries in 137 (28.3%) and enamel

Table 2: Mean daily food intake of school girls from non- government shelter home (n=60)

Food group (g)	RDI (g)	Mean / SD	t value	Overall % intake of RDI
Cereals	180g	135±15.126	23.04*	75
Pulses	60g	40±5.04	30.73*	66.66
Fats and oils	30g	10.5±0.50	302.09*	35
Sugars and jaggery	20g	11±1.00	69.71*	55
Green leafy vegetables	100g	7.5±2.52	284.32*	7.5
Roots and tubers	100g	30±2.01	269.76*	30
Other vegetables	100g	60±5.04	61.47*	60
Fruits	100g	62.5±2.52	115.26*	62.5
Milk and milk products	500g	225±25.21	84.49*	45

RDI- Recommended dietary intake (NIN, 2010)

* indicates significance of value at P=0.05

Table 3 : Mean daily nutrient intake of school girls from government shelter home (n=60)

Nutrients	Government shelter home			t value
	RDA	Government (n= 60)	Overall % intake of RDA	
Energy (Kcal/d)	1690	963.30±36.98	57	152.21*
Protein (g/d)	29.5	29.95±1.60	101.52	2.17*
Fat (g/d)	30	27.52±1.600	91.73	12.0*
β- carotene (ug/d)	4800	3740±87.05	77.91	94.32*
Thiamine(mg/d)	0.8	0.84±0.033	105	11.68*
Riboflavin(mg/d)	1.0	0.89±0.062	89	12.72*
Niacin (mg/d)	13.0	7.07±0.15	54.38	306.22*
Carbohydrate (g/d)*	253.5	148.941±4.03	58.75	200.97*
Ascorbic acid (mg/d)	40	64.26±2.12	160.65	88.64*
Iron (mg/d)	16	17.22±0.27	107.62	35.0*
Calcium (mg/d)	600	449.31±36.58	74.88	31.56*

RDA- Recommended Dietary Allowances (ICMR, 2010)

* indicates significance of value at P=0.05 level

*CHO-60%

*Non-significant

mottling in 19 children (3.9%). Skeletal changes were noted in 7 (1.4%) children. Flat nails or koilonychia were noted in 57 children (11.8%).

Dietary adequacy:

The mean per daily intake of cereals by school going girls of 7-9 year from government shelter home was 120.5 ± 0.50 g/d. This was 66.94 per cent of the RDI. The recommendation for pulse consumption according to RDI is 60 g/d while the mean intake of pulse in the girls of government shelter home under study was only 32.5 ± 2.52 g/d, which was 54.16 per cent of RDI. The intake was significantly ($p < 0.05$) lower than RDI due to less consumption. The mean intake of milk and milk products was 225 ± 25.21 ml/d; which was 45 per cent of RDI. The intake was significantly lower ($p < 0.05$) than RDI. The mean intake of green leafy vegetables was 50 ± 0.50 , which was 50 per cent of RDI. The mean intake of roots and tubers was found to be 62.5 ± 2.52 , which was 62.5 per cent of RDI. It was found that consumption of root and tubers was significantly lower ($p < 0.05$) than RDI. Mean intake of other vegetables was 70 ± 10.08 g/d which was significantly ($p < 0.05$) lower than RDI with 70 per cent of RDI. Mean intake of fruits was 50.25 ± 0.25 g/d. The mean intake of sugar was 15.25 ± 0.25 which was 76.25 per cent of RDI. The consumption of sugar was less significant ($p < 0.05$) when compared with RDI. The mean intake of fat was 15.5 ± 0.50 g/d (visible) which was 51.66 per cent of the RDI. The mean intake was significantly ($p < 0.05$) lower than RDI.

The mean per daily intake of cereals by school going

girls of 7-9 year from non-government shelter home was 135 ± 15.126 g/d. This was 75 per cent of the RDI. The mean intake of pulse in the girls of non-government shelter home under study was only 40 ± 5.04 g/d, which was 66.66 per cent of RDI. The intake was significantly ($p < 0.05$) lower than RDI due to inadequate consumption which may lead to protein energy malnutrition girls. The mean intake of milk and milk products was 225 ± 25.21 ml/d; which was 45 per cent of RDI. The intake was significantly lower ($p < 0.05$) than RDI. The mean intake of green leafy vegetables was 7.5 ± 2.52 , which was 7.5 per cent of RDI. The mean intake of roots and tubers was found to be 30 ± 2.01 , which was 30 per cent of RDI. Mean intake of other vegetables was 60 ± 5.04 g/d which was significantly ($p < 0.05$) lower than RDI with 60 per cent of RDI. Mean intake of fruits was 62.5 ± 2.52 g/d. The consumption of fruits was found significantly ($p < 0.05$) lower than RDI. The mean intake of sugar was 11 ± 1.00 which was 55 per cent of RDI. The consumption of sugar was significant ($p < 0.05$) when compared with RDI among non-government shelter home. The mean intake of fat was 10.5 ± 0.50 g/d (visible) which was 35 per cent of the RDI. The mean intake was significantly ($p < 0.05$) lower than RDI.

Nutrients intake (Table 3):

The mean intake of energy of the school girls from government shelter home was found to be 963.30 ± 36.98 kcal/d which was 57 per cent of RDA which reflects no significant difference between the energy intake of the school girls and the RDA at ($p < 0.05$) among both the

Table 4 : Mean daily nutrient intake of school girls from non- government shelter home (n=60)

Nutrients	Non-Government shelter home			t value
	RDA	Government (n= 60)	Overall % intake of RDA	
Energy (Kcal/d)	1690	969.68±85.28	57.37	65.42*
Protein (g/d)	29.5	33.48±3.78	113.49	8.15*
Fat (g/d)	30	22.46±0.84	74.86	69.52*
- carotene (ug/d)	4800	1394.275±86.58	29.04	304.70*
Thiamine(mg/d)	0.8	0.8465±0.098	105.75	3.63*
Riboflavin(mg/d)	1.0	0.74±0.079	74	25.19*
Niacin (mg/d)	13.0	6.595±0.719	50.73	69.05*
Carbohydrate (g/d)*	253.5	158.37±15.63	62.47	47.14*
Ascorbic acid (mg/d)	40	35.25±2.00	88.12	18.39*
Iron (mg/d)	16	8.445±0.99	52.78	59.11*
Calcium (mg/d)	600	454.195±43.76	75.69	25.80*

RDA- Recommended Dietary Allowances (ICMR, 2010)

* indicates significance of value at $P=0.05$ level

*CHO-60%

**Non-significant

shelter homes. Mean intake of protein of the school girls of government was found to be 29.95 ± 1.60 g/d which represents 101.52 per cent of RDA. Mean intake of fat for the school going girls from government shelter home was observed to be 27.52 ± 1.60 g/d which was 91.73 per cent of RDA. The intake was significantly lower ($p < 0.05$) than the RDA. The intake of fat were somewhat similar in both the shelter home. Average dietary intake of carbohydrate by school girls was 148.94 ± 4.03 g/d as per the data showcased in Table 3 in government shelter home. It was 58.75 per cent of RDA which indicates that intake was significantly ($p < 0.05$) less than RDA by the subjects. The mean intake of calcium among school girls of government shelter home was found to be 449.31 ± 36.58 . It was 74.88 per cent of RDA, respectively. Intake of calcium was significantly ($p < 0.05$) similar in both shelter home but lower when compared to RDA. The mean intake of iron among school girl of government shelter home was 17.22 ± 0.27 mg/d. The mean intake of carotene among school girls of government shelter home was found to be 3740 ± 87.05 ug/d which was 77.91 per cent of RDA. The mean intake of ascorbic acid for school girls of government shelter home was 64.26 ± 2.12 mg/d which was 160.65 per cent of RDA. The mean intake of thiamine by the girls of government shelter home was found 0.84 ± 0.033 mg/d. which was 105 per cent of RDA which indicates that there is no significant difference in the intake of thiamine among both shelter home. The mean intake of riboflavin was found to be 0.89 ± 0.062 mg/d, which was 89 per cent of RDA among government shelter home. The riboflavin intake was significantly ($p < 0.05$) lower than RDA. The mean intake of niacin among girls was found to be 7.07 ± 0.1 mg/d, which was 54.38 per cent of RDA. The intake of niacin was found to be significantly ($p < 0.05$) lower in both the shelter home than RDA.

The mean intake of energy of the school girls from non-government shelter home was found to be 969.68 ± 85.28 kcal/d which was 57.37 per cent of RDA which reflects no significant difference between the energy intake of the school girls and the RDA at ($p < 0.05$) among both the shelter homes. Mean intake of protein of the school girls of government was found to be 33.48 ± 3.78 g/d which represents 113.49 per cent of RDA. Significant difference was observed in the mean intake of protein in non-government shelter home and the RDI at ($p < 0.05$). Mean intake of fat for the school going girls from non-

government shelter home was observed to be 22.46 ± 0.84 g/d which was 74.89 per cent of RDA. The intake was significantly lower ($p < 0.05$) than the RDA. The intake of fat were somewhat similar in both the shelter home. Average dietary intake of carbohydrate by school girls was 158.37 ± 15.63 g/d in non-government shelter home. It was 62.47 per cent of RDA which indicates that intake was significantly ($p < 0.05$) less than RDA by the subjects. The mean intake of calcium among school girls of government shelter home was found to be 454.195 ± 43.76 . It was 75.69 per cent of RDA, respectively. Intake of calcium was significantly ($p < 0.05$) similar in both shelter home but lower when compared to RDA. The mean intake of iron among school girl of non-government shelter home was 8.445 ± 0.99 mg/d. The mean intake of carotene among school girls of non-government shelter home was found to be 1394.275 ± 86.58 ug/d which was 29.04 per cent of RDA. Mean intake of ascorbic acid for school girls of non-government shelter home was 35.25 ± 2.00 mg/d which was 88.12 per cent of RDA. The mean intake of thiamine by the girls of non-government shelter home was found 0.8465 ± 0.098 mg/d. which was 105.75 per cent of RDA which indicates that there is no significant difference in the intake of thiamine among both shelter home. The mean intake of riboflavin was found to be 0.74 ± 0.079 mg/d, which was 74 per cent of RDA among non-government shelter home. The riboflavin intake was significantly ($p < 0.05$) lower than RDA. The mean intake of niacin among girls was found to be 6.595 ± 50.73 mg/d, which was 50.73 per cent of RDA. The intake of niacin was found to be significantly ($p < 0.05$) lower in both the shelter home than RDA.

Conclusion:

It is clear that the problem of malnutrition in India is of alarming magnitude. A major part of this problem is contributed by vulnerable population. Tackling malnutrition in area requires a holistic approach, especially vulnerable children residing in shelter homes. From the finding of the present study it can be concluded that, even after the efforts of government the knowledge about nutrition has not reached to vulnerable children residing in shelter homes and workers upto desired level. The health and nutritional standards of school going girls among both the shelter home in this study were found to be quite satisfactory. The above results revealed that some of the respondents were lying in category of under nutrition among both the

shelter homes. The mean intake of the food and nutrient was found to be lower than the reference values but some nutrients and food intake were found non-significant among both the shelter homes. The study illustrates that most school going girls among shelter home fail to meet dietary intake recommendations in most of the food groups. The mean intake of the nutrients *i.e.* protein, fat, carbohydrates, β - carotene, riboflavin, niacin, carbohydrate, ascorbic acid and iron was found to be inadequate except energy, thiamine and calcium which was found non-significant.

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Received : 19.06.2017; **Revised:** 23.01.2018; **Accepted :** 09.02.2018