



# ASSESSMENT OF THE NUTRITIONAL STATUS OF URBAN SCHOOL CHILDREN (6-10 YEARS) OF NARAINGARH (DISTT, (AMBALA) HARYANA

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## ABSTRACT

Malnutrition is a global health problem, adversely affecting the development of people and nations. In developing countries like India where the population is high and hunger and malnutrition are wide spread. Survey conducted by National Nutrition Monitoring Bureau has revealed that protein energy malnutrition and other deficiency diseases are prevalent in a large proportion of the Indian population. More than 75 percent of the children are suffering from one or the other form of malnutrition causing major illnesses.

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## INTRODUCTION

In our country, children in school age group constitute more than 26.5 crore. Due to their large proportion, children in school age group exercise dominating influence on overall health status of population and thus justifiably deserve the priority attention of health authorities. The current situation in our country is very pathetic. A nutrition insult during childhood regards the growth and hampers the brain development which leads to poor cognitive development, impaired learning abilities and in later year's results in poor scholastic achievements. In girls pre-pubertal acceleration of growth take place during later half of this period. During this stage girls outgrow boys. The body requirements of calories and protein are increased steadily.

Malnutrition is a global health problem, adversely affecting the development of people and nations. In developing countries like India where the population is high and hunger and malnutrition are wide spread. Little information is available on the situation of malnutrition among school going, children and adolescents. Malnourished girls are more prone to remain undernourished and when they get pregnant, they deliver babies that have low birth weight. According to Global Nutrition Reports 2018, one in three people suffer from malnutrition, one in 20 children complain of hunger, and one in every five deaths around the world is attributed to poor diet. Widely accepted methods for assessing the nutritional status of children are anthropometry methods such as mid-arm



circumference, weight for age, body mass index and weight for height.

Socio-economic status of the family has a definite intake of the children. The higher socio-economic classed being able to provide a diet better in quality and quantity. Comparatively studies of the food intake pattern among children of different socio-economic strata have revealed that children from the public school consumed a diet high in carbohydrate and lacked in essential nutrients, where as that of private schools consumed a well-balanced diet. Food habits are the most entrenched aspects of any culture they have deep psychological roots and are associated with love, affection, self-esteem, self image and social prestige.

Discrimination in feeding practice (against female) persists throughout the childhood. Inequality of food distribution at the household level has prevailed in India, since pre-historic time. Even among young children, culturally determined behavior, places the female child at a nutritional and health disadvantage as compared to male child. Allocation of choice food and larger portion of boys and men are justified on the grounds that men are bread winner of the families and therefore need special attention.

Keeping these facts in mind, the present study was undertaken on urban school children aged (6-10) years with the following objectives:

**OBJECTIVES**

1. To assess the nutritional status of urban school children.
2. To assess the nutritional intake of the subjects on the basis of two day’s diet survey.
3. To compare the nutritional intake of the subjects with the respective RDA’s

**METHODOLOGY**

This study was carried out in Bali Model school of Naraingarh city (Distt. Ambala)Haryana. The

**4.1 Demographic Profile**

**Table 4.1: Distribution of the Subjects According to their Age and Sex**

Age Group	Number of Subjects	
Years	Boys	Girls

children (both the sexes) belonged to same socio-economic background. An open-end structured questionnaire was drafted with definite and concrete questions, keeping in mind the objectives of the study. It contained questions regarding the age, sex, size, composition and type of family, occupation, education and income of the family.

Anthropometric measurement included the body weight, height and upper mid upper arm circumference. The part of the questionnaire comprised of a list of deficiency, symptoms, related directly or indirectly to specific nutrient deficiency. The information regarding the food consumption was collected by the 24 hours recall method for three consecutive days including one holiday. Food preferences, food patterns and food habits were also recorded.

**RESULTS AND DISCUSSION**

The present study was conducted on 50 subjects who were randomly selected from Bali Model School Naraingarh. The subject was divided into two categories i.e., boys and girls. All the subjects were in age group of 6-10 years. The results of the present study have been presented under the following headings:

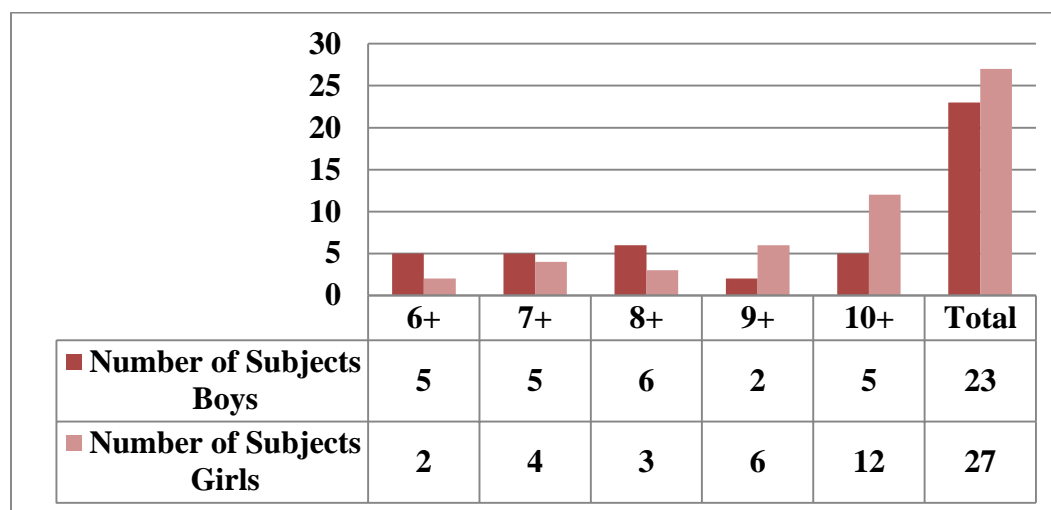
**1. Anthropometric Measurement of the Subject:**

- Weight
  - Height
  - Mid-upper arm circumference
2. Clinical Examination
3. Dietary Survey
- Food Intake
  - Nutrient Intake

The study sample consisted of 50 subjects in the age group of 6-10 years. The subjects were divided into two categories i.e., boys and girls and were further classified into five groups i.e. 6+, 7+, 8+, 9+, and 10+ years.



6+	5	2
7+	5	4
8+	6	3
9+	2	6
10+	5	12
Total	23	27



**Figure 4.1 Distribution of the Subjects according to their Age and Sex**

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The percentage of the boys in the study sample was 44 percent and when classified into 5 groups, and they were 8 percent, 12 percent, 14 percent, 4 percent and 6 percent respectively. The percentage of girls was 56 percent and was 2 percent, 8 percent, 14 percent and 28 percent respectively.

#### 4.2 General Information:

**Table 4.2 General Information about the Type of Family, Size of Family, Education of Parents, Occupation of Parents and Per Capita Income N-50**

Factors	Boys	Girls	Total
<b>Family Type</b>			
Nuclear	15	20	35
Joint	8	7	15
<b>Family Size</b>			
Small (1-4 members)	6	14	20
Medium (4-8 members)	15	15	30



Large (9-12 members)	--	--	--
<b><u>Education of Parents</u></b>	Mothers	Fathers	
Illiterates	--	--	
Primary Schooling	--	--	
Secondary Schooling	3	3	
Matriculates	4	6	
Graduates	23	20	
Post-graduates	20	21	
<b><u>Occupation</u></b>			
Service	15	21	
Business	1	29	
Housewives	34	--	
Mean (Monthly) per capita income	Rs. 1187.2±6.91		

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As shown in Table 4.2, it is clear that large number (35) of the subjects belonged to nuclear families but smaller number of subjects (15) belonged to joint families. Regarding the size of family, the greater number of subjects (30) belonged to families with 4-8 members as compared to 20 subjects from families with 1-4 members and there was none from very large families (9-12) members. The educational level of the parents revealed that 42 percent of fathers and 40 percent of mothers were postgraduates, and 40

percent of father and 46 percent of mothers were graduates, 12 percent of fathers and 8 percent of mothers were matriculate and only 6 percent of mothers had completed their secondary schooling. Occupation of the parents was another factor that was studied. The percentage of fathers and mothers in service was 36 each and 64 percent of fathers and 2 percent of mothers were engaged in business, 62 percent of mothers were housewives. Mean per capita income was Rs. 1187.2 ± 6.91.

### 1)Anthropometric Measurement of the Subjects:

**Table 4.3:the Mean Weight, Height and Mid Upper Arm Circumference (MUAC) of the Subjects according to their Age and Sex**

Subjects	Weight (Kg.)	Height (Cm.)	MUAC (Cm.)
Boys 6+ N=5	21.5±0.37	118.5±0.37	15.21±0.36



Girls 6+ N=2	21.0±0.16	117.0±0.50	14.50±0.42
Boys 7+ N=5	22.6±0.10	122.9±0.35	15.51±0.32
Girls 7+ N=	23.75±0.31	123.0±0.31	15.03±0.39
Boys 8+ N=6	25.42±0.80	127.8±0.31	16.32±0.39
Girls 8+ N=3	25.5±0.75	127.5±0.75	15.51±0.32
Boys 9+ N=2	28.5±0.08	132.8±0.55	16.52±0.29
Girls 9+ N=6	28.14±0.18	133.5±0.55	16.07±0.37
Boys 10+ N=5	30.66±0.34	139.3±0.23	17.50±0.31
Girls 10+ N=12	29.85±0.15	140.0±0.14	17.0±0.37

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- **Weight:**

The mean weight of the subjects both (boys and girls) according to their age has been shown in Table 4.3. The average weight of the boys and the girls belonging to 6+, 7+, 8+, 9+ and 10+ age group, as compared with ICMR values and NCHS standards.

The mean weight of boys in the age group of 6+ was 21.5±0.37 kg and girls in the age group 6+ were 21±0.16 kg. The weight of the 6+ age group boys was found to be 97 percent and 6+ age group girls was found to be 97 percent of the standard respectively.

The mean weight of the boys in the age group of 7+ was 22.6±0.10 kg whereas for girls of 7+ was 23.75±0.31 kg when compared with the value of well to do Indian children given by ICMR, the weight of the 7+ age group boys and girls was 92 percent and 97 percent of the standard respectively.

The mean weight of the boys and girls in the age group of 8+ was 25.42±0.80 kg and 25.5±0.75 kg when compared with the values of ICMR; the weight of the 8+ age group

boy and girls was 96 percent and 98 percent of the standard respectively.

The mean weight of the boys and girls in the age group of 9+ was 28.5±0.0 kg and 28.14±0.18 kg. The weight of the 9+ age group boys and girls were found to be 95 percent and 94 percent of ICMR values.

The mean weight of the boys and girls in the age group of 10+ was 30.66±0.34 kg and 29.85±0.15 kg. The weight of the 10+ age group boys and girls were found to be 95 percent and 89 percent of the ICMR values respectively.

- **Height:**

The mean height of boys and girls according to their age is presented in Table 4.3. The mean height of both the sexes of 6+, 7+, 8+, 9+ and 10+ age group was compared with the ICMR values and NCHS standards.

The mean height of boys in the age group of 6+, 7+, 8+, 9+ and 10+ was 118.5±0.37 cm, 122.9±0.35 cm, 127.8±0.31 cm, 132.8±0.55 cm and 139.3±0.23 cm respectively. When compared with the values of well to do Indian children given by ICMR, the mean value of the 6+ boys were found to be 99.6 percent and 102 percent of the two standards respectively, 7+



age group boys were found to be 99.6 percent and 100.9 percent of two standards.

The mean height of the girls in the age group of 6+, 7+, 8+, 9+ and 10+ was  $117 \pm 0.50$  cm,  $123.9 \pm 0.50$  cm,  $127.5 \pm 0.75$  cm,  $133.5 \pm 0.50$  cm and  $140 \pm 0.14$  cm respectively. The average height of the 6+ age group was found to be 99 percent, 7+ age group girls was 100 percent, 8+ age group was 100 percent, 9+ age group girls was 100 percent and 10+ age group girls was 100.8 percent.

• **Mid Upper Arm Circumference:**

The mean value of mid upper arm circumference of boys and girls of both the age group has been given in Table 4.3.

The mean of mid upper arm circumference of the boys in the age group of 6+ was  $15.21 \pm 0.36$  cm, 7+ was  $15.51 \pm 0.32$  cm, 8+ was  $16.32 \pm 0.25$  cm, 9+ was  $16.52 \pm 0.37$  cm and 10+ was  $17.50 \pm$

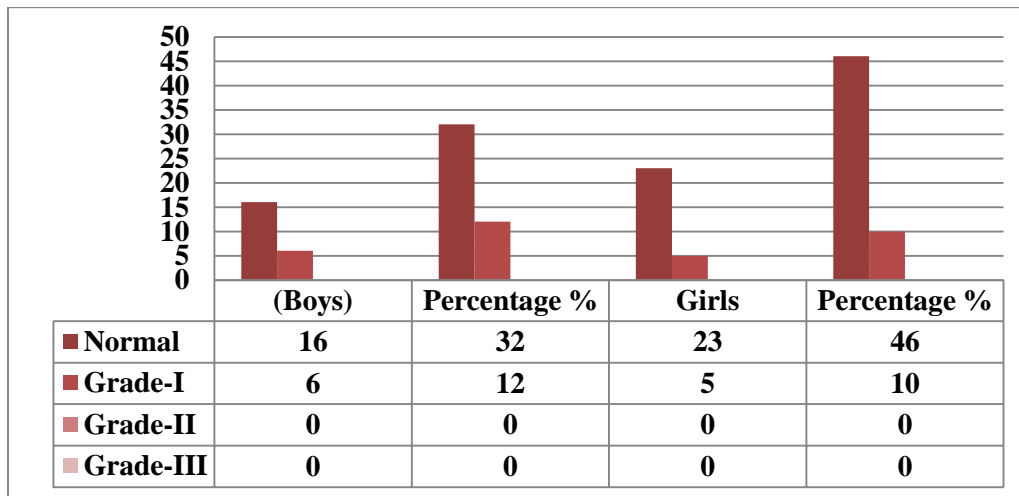
0.31 cm respectively. When comparing the values of well to do Indian children, the mean value of 6+ boys was found to be 92 percent, 7+ boys was 89 percent, 8+ boys was 94 percent of the values, 9+ boys was 93 percent and 10+ boys was 94 percent of the values.

The mean MUAC of the girls in the age group of 6+, 7+, 8+, 9+ and 10+ was  $14.50 \pm 0.42$  cm,  $15.03 \pm 0.39$  cm,  $15.51 \pm 0.32$  cm,  $16.52 \pm 0.29$  cm and  $17.00 \pm 0.37$  cm respectively. These values were found to be 89 percent, 87 percent, 89 percent, 91 percent and 93 percent of the values.

On the basis of the various anthropometric measurement, that were taken and their comparison with the standards of reference. It can be said that the boys had better nutritional status than the girls.

**Table 4.4. Distribution of the Subjects according to Nutritional Grade (Gomez Classification)**

Grade	(Boys)	Percentage %	Girls	Percentage %
Normal	16	32	23	46
Grade-I	06	12	05	10
Grade-II	0	0	0	0
Grade-III	0	0	0	0



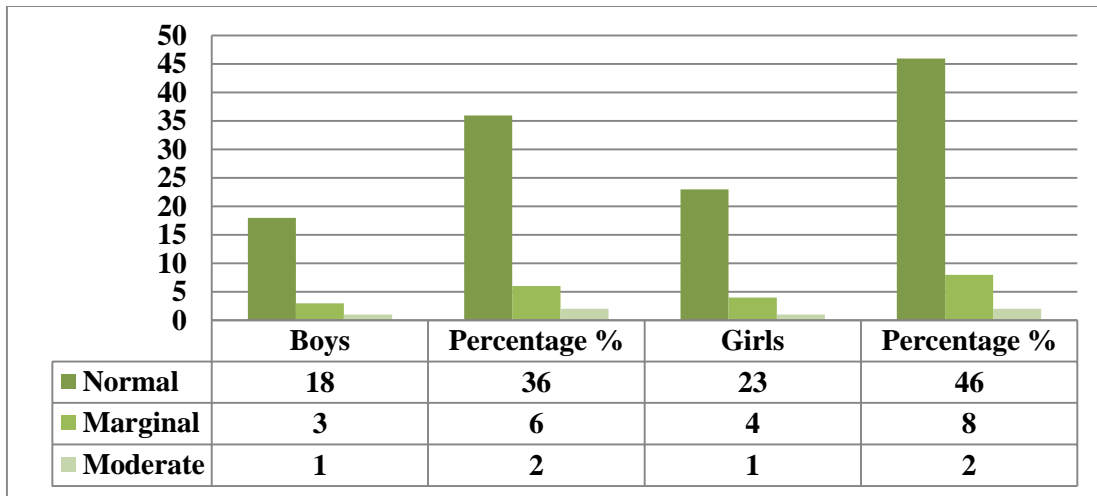
**Fig 4.2 Distribution of the Subjects according to Nutritional Grade (Gomez Classification)**

In case of girl's 46 percent were normal and 10 percent had grade-I malnutrition. None of the subjects were in Grade-II or Grade-III malnutrition category. Larger percentage of girls (46 %) was normal as compared to boys (32%). Lesser number of girls i.e. 10 % was suffering from Grade-I malnutrition as compared to 12% of boys.



**Table 4.5 Classification of the Subjects according to Nutritional Grade Water Law’s Classification of Height**

Grade	Boys	Percentage %	Girls	Percentage %
Normal	18	36	23	46
Marginal	3	06	4	08
Moderate	1	02	1	02



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**Fig. 4.3 Classification of the Subjects according to Nutritional Grade Water Law’s Classification of Height**

The subjects were further classified into different grades of nutrition on the basis of Water Law’s classification of height for age. In case of boys’ 36 percent were found to be normal, 6 percent were found to be marginally malnourished. None of the boys were found to be severely malnourished. In case of girls’ 46 percent were found to be normal, 8 percent were found to be marginally malnourished, 2 percent were found to be moderately malnourished. None of the girls were found to be severely malnourished.

**2) Clinical Examination:**

Clinical examination is another important practical parameter for assessing the nutritional status of a community. Clinical examination of the subjects was done to detect deficiency symptoms of various nutrients, if any. The method for clinical examination is based on examination for changes believed to be related to inadequate nutrition that can be seen or felt in superficial, epithelial tissues, especially the

skin, hair, eyes, buccal mucosa and organs near the surface of the body such as the parotid and thyroid glands.

The results of the clinical examination of the present study were presented in Table 4.6. It was found that vitamin A deficiency observed from the presence of bitot’s spot, conjunctival xerosis and keratomalacia were present in 2 percent of the subjects (including both boys and girls). Percentage prevalence of Bitto’s spot and conjunctival xerosis were 4.8 and 7.9 percent respectively. Iron deficiency observed from the presence of brittle and ridged nails was found in 14 percent of the subjects.

Lack of luster, thinners and dys-pigmentation of hair indicated protein calorie malnutrition was observed in 32 percent of the subjects. Clinical signs of riboflavin deficiency were found in 14 percent of the subjects. Clinical signs of main deficiency such as edema, scarlet and raw tongue, and atrophic papillae were observed in 20 percent of the subjects. Dental caries



indicated fluorine deficiency was observed in 8 percent of the subjects. Flouris observed from the presence of mottled enamel and enamel erosion was observed in 26 percent of the

subjects. Spongy and enamel gums indicated ascorbic acid deficiency were observed in 24 percent of the subjects.

**Table 4.6 Classical Signs of Nutrient Deficiencies in the Subjects**

Organ	Deficiency Signs	No. of Subjects	Percentage (%)
Hair	Lack of Luster	7	14
	Thinners	9	18
	Dyspigmentation	--	--
	Normal Hair	34	68
Eyes	Pale Conjunctiva	4	8
	Bitot's Spot	1	2
	Conjunctival Xerosis	--	--
	Keratomalacia	--	--
	Normal Bright Eyes	45	90
Lips	Angular Stomatitis	3	6
	Angular Scars	--	--
	Chelosis	--	--
	Normal Pink Lips	47	94
Tongue	Oedema	2	4
	Scarlet and Raw Tongue	5	10
	Atrophic Papillar	3	6
	Normal Tongue	40	80
Teeth	Mottlet Enamel	10	20
	Carries	4	8
	Enamel Erosion	3	6
	Normal Teeth	33	66
Gums	Spongy	8	16
	Bleeding Gums	4	8
	Normal Gums	38	76
Skin	Xerosis	--	--
	Follicular	--	--
	Hyperkeratosis	--	--
	Normal Skin	50	100
Nail	Brittle	6	12
	Ridged Nails	1	2
	Normal Nails	43	86

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### 3.) Dietary Survey

Dietary survey refers to a group of methods that are used to collect food consumption data to study the diets of individuals or groups. Common methods in dietary surveys are

- Food frequency questionnaires

- Food dairies
- 24-hour recall

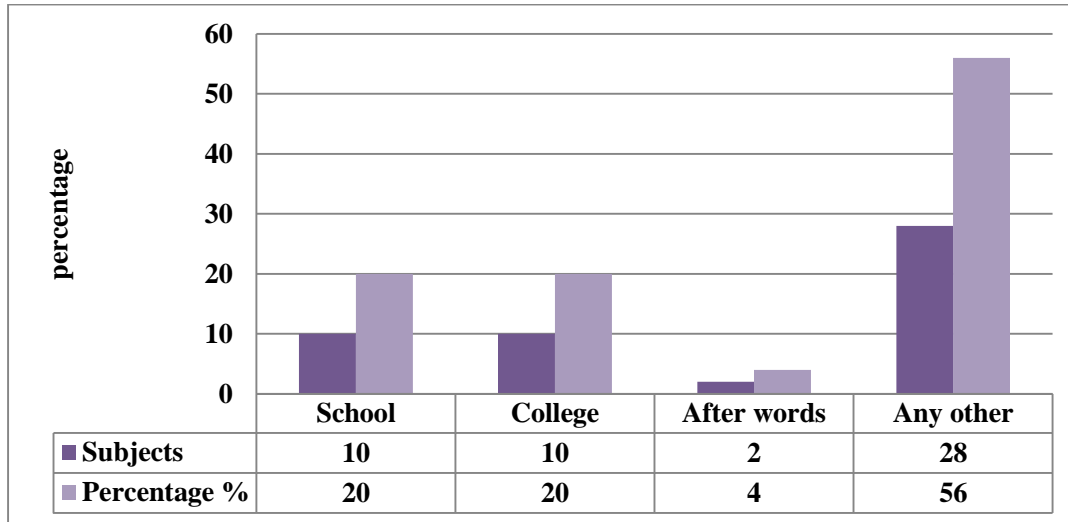
Diet survey also fields information regarding the economic and social cultural factors influencing food availability and consumption.





**Table 4.7 Basic Knowledge of Mothers of the Subjects regarding Food and Nutrition**

Sources of Knowledge	Subjects	Percentage %
School	10	20
College	10	20
After words	02	4
Any other	28	56



**Fig 4.4 Basic Knowledge of Mothers of the Subjects regarding Food and Nutrition**

Table 4.7 revealed that 20 percent of the mothers of the subjects had some knowledge about food and nutrition at the school level, 20 percent at college level, 4 percent afterwards and 56 percent of the mothers of the subjects had some knowledge from any other sources. It was found that 40 percent of the respondents obtained knowledge of food and nutrition by reading magazines. The magazines usually read by the respondents were Manorma, Grihshobha etc. when the respondents were questioned about the importance of quality along with quantity of food, all of them answered in the affirmative, however mothers of the subjects could not implement this knowledge practically due to their economic condition, as good quality foods were considered to be expensive and hence not within their reach. The respondents were also questioned regarding the food sources of various nutrients and their individual importance. 56 percent of the respondents were aware about the importance of these nutrients and their relation to good health. It was found that 85 percent respondents believed

in hot and cold foods. Some of the common food stuffs branded as hot foods, were jiggery, ginger, egg, tea, coffee, honey, dates, garlic and Niger seeds. While the food which was considered cold were curd, ice-cream, citrus fruits, lassi, cold drinks etc. The intake of this hot and cold food by children was restricted by their mothers according to different season. Mothers were also questioned regarding the special food's beings given that 48 percent gave special food to their children such as Dalia, halwa, kheer and Ladoo etc.

**Results:** Most of the head of the families was businessman and majority of the mothers was housewives (68 percent). Most of the subjects belonged to nuclear families (78 percent) and majority of them belonged to families with a size of 4-6 members. Regarding the educational level, 38 percent of mothers and 40 percent fathers were post-graduate and 46 percent mothers and 40 percent fathers were graduate. Mean per capita income of the family were found to be Rs. 1187.2± 1.69. With respect to anthropometric



measurement the height except the average height of 7+ age group girls and 10+ age group boys and girls, which were meeting the respective standard, weight and MUAC were lower than the respective standard. On classifying the subjects according to Gomez's classification, it was found that 32 percent of the boys and 46 percent of the girls were normal. 12 percent of the boys and 10 percent of them were in grade-I category of malnutrition. Fortunately, none of the subjects were in grade-II and grade-III category of malnutrition. According the Water Law's classification 36 percent of the boys and 46 percent of the girls was normal. 6 percent of the boys and 8 percent of the girls was marginal and 1 percent of each category was in moderate malnutrition. Data regarding visual clinical examination of children revealed that majority of the children showed mottled enamel, spongy bleeding gums, and signs of pale conjunctiva. Few children showed deficiency signs of angular stomatitis, edema and scarlet, and raw tongue. 20 percent of the mothers had formal knowledge regarding food and nutrition; it was found that 20 percent respondent obtained knowledge about food and nutrition by reading magazines.

#### Conclusion:

On the basis of the results of the present paper it can be concluded that:

- Most of the head of the families was businessman and majority of the mothers was housewives (68 percent).
- Most of the subjects belonged to nuclear families (78 percent) and majority of them belonged to families with a size of 4-6 members.
- Regarding the educational level, 38 percent of mothers and 40 percent fathers were post-graduate and 46 percent mothers and 40 percent fathers were graduate.
- Mean per capita income of the family were found to be Rs. 1187.2± 1.69.
- With respect to anthropometric measurement the height except the average height of 7+ age group girls and 10+ age group boys and girls, which were meeting the respective standard,

weight and MUAC were lower than the respective standard.

- On classifying the subjects according to Gomez's classification, it was found that 32 percent of the boys and 46 percent of the girls were normal. 12 percent of the boys and 10 percent of them were in grade-I category of malnutrition. Fortunately, none of the subjects were in grade-II and grade-III category of malnutrition.
- According the Water Law's classification 36 percent of the boys and 46 percent of the girls was normal. 6 percent of the boys and 8 percent of the girls was marginal and 1 percent of each category was in moderate malnutrition.
- Data regarding visual clinical examination of children revealed that majority of the children showed mottled enamel, spongy bleeding gums, and signs of pale conjunctiva. Few children showed deficiency signs of angular stomatitis, edema and scarlet, and raw tongue.
- 20 percent of the mothers had formal knowledge regarding food and nutrition, it was found that 20 percent respondent obtained knowledge about food and nutrition by reading magazines.

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#### References

1. Mahak Sharma, Brij Pal Singh, (2022). Nutritional Status of School Going Children in India: A Review, International Journal of Medical Research & Health Sciences, 10(10): 130-138
2. P. Sasikala\* (2016). Assessment of Nutritional Status of Boys and Girls in Government School Children in Rompicherla Mandal Andhra Pradesh, India, Journal of Education and Practice ISSN 2222-1735 (Paper) ISSN 2222-288X (Online) Vol. 7, No. 10, 2016
3. Shahid Ahsan, Zahida Saleh, Sikander Ali Sheikh, Muhammad Faisal Fahim, Muhammad Saleh Memon, Sidra Shakil (2020). Nutritional Status of School Going Children Of 5-15 Years of Age: Urban Slums Scenario in Karachi, Pakistan, Biostatistics and Biometrics Open Access Journal ISSN:



- 2573-2633 Volume 10 Issue 2- DOI  
10.19080/BBOAJ.2020.10.555781
- 10 (2016) <https://doi.org/10.18203/2320-6012.ijrms20163340>
4. Anoop Kumar, Pinki Khanna, (2021). Nutritional Status of School Going Children (7-9 years) on the Basis of Food Habit in Rural area of Kanpur Dehat District (Uttar Pradesh), *International Journal of Current Microbiology and Applied Sciences* ISSN: 2319-7706 Volume 10 Number 06 (2021) [doi.org/10.20546/ijcmas.1006.062](https://doi.org/10.20546/ijcmas.1006.062)
  5. Hira Akram, Safa Akram, Sajid Khan Tahir and Ahmad Ali, (2020). Assessment of Nutrition Status of School Going Children of Age 8-16 Years: District Lahore – Pakistan, *ACTA SCIENTIFIC NUTRITIONAL HEALTH* (ISSN: 2582 – 1423) Volume 4 Issue 10 October 2020
  6. Durray Shahwar A. Khan, Jai K. Das, Shagufta Zareen, Zhora S. Lassi, Afsah Salman, Muhammad Raashid, Aftab A. Dero, Aijaz Khanzada, Zulfiqar A. Bhutta, (2022). Nutritional Status and Dietary Intake of School-age Children and Early Adolescents: Systematic Review in a Developing Country and Lessons for the Global Perspective, *SYSMATIC REVIEW* article front. Nutr., 02 February 2022 Sec. Nutrition and Metabolism Volume 8 – 2021| <https://doi.org/10.3389/fnut.2021.739447>
  7. Juan Sebastian Botero-Meneses, Paula Andrea Aguilera-Otalvaro, Ivan Pradilla, Claudia Talero-Gutierrez, Angela Maria Ruiz-Sternberg, Alberto Velez-van-Meerbeke, Angela Maria Pinzon-Rondon, (2020). Assessment of nutrition and learning skills in children aged 5-11 years old from two elementary school in Choco, Colombia, *Heliyon* Volume 6, Issue 4, April 2020, e03821
  8. M. Kamran Shaikh, Nitin Kamble, Dhiraj Bhawnani, Samir Bele, Sita Rama Rao, (2016). Assessment of nutritional status among school children of Karimnagar, Telangana, India, *International Journal of Research in Medical Sciences*, VOL. 4 No.

