

Original Research Article

Assessment of nutritional status of school going children

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Abstract

A study of this sort will certainly help in deciding the guidelines for improvement of health status of school going children and help in combating malnutrition to certain extent. More over this would also help to place in proper perspective the potential benefits of school lunch programs and anemia correction programs, both of which are current national programs.

Key Word: ICMR- Indian council of India, I.C.D.S- integrated child development services., NCHS- national center for health statistics, R.D.A. - Recommendation dietary allowance. W. H. O. World health organization.

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INTRODUCTION

“Many of the things we need can wait, the children cannot, right now is the time his bones are being formed, his blood is being made and his senses are being developed. To him, we cannot answer “tomorrow”. His name is “today”.” By - gabrila mistral (noble prize winning poet from chile) Our children are our greatest national resource, on their tender shoulder lies the future of the nation, to lay a firm foundation of a just and happier society it is essential to take care of the interests of the generations of children who need to be nursed and nourished, helped and equipped to play their roles in the world of tomorrow, if we want to have a healthy and strong working population, it is essentially absolutely true that we should have healthy and strong children first. All physical, mental and intellectual traits of a grown person are laid down in him during the early periods of his life. “Quality is never an accident. It is always the result of

intelligent efforts”. The quality of life is surely dependent on the quality of food. Even our religious book “THE BHAGWAT GITA recognizes the basic dictum: “Food is beings made” At birth children come into the world with certain biologically determined equipment and are thus programmed to cope with demands made of them. Some children are clearly programmed more adequately than others. But each child encounters a different set of demands and grows up in a unique environment. How one grows from childhood to adult status is the result of interaction between heredity and environment. The basic aim of the study done is the assessment of nutritional status and physical work capacity of school going children in Gwalior region taking in to consideration children of different socio-economic group. The socio-economic status of a child is surely indicative of the environment he or she is being brought up. In this the view of **Charles Darwin** is acknowledged; he said that facts are of no use unless they support a point of view on the other hand of course, point of view are of little value unless they are supported by facts. **Charles Darwin’s** dictum is not easier to apply to child development studies because there is no one major theory encompassing all observation. But this is no reason to jump to the conclusion that there is total disarray in the ranks of these who write about child development; there are coherent ways of fitting observations together to support firmly held points of view, and of the points of studying child development rather than just watching children is to enable this coherence to emerge. A proper environment

during childhood is a key factor in the development of a child. There is evidence that MALNUTRITION an important environmental factor during this period can lead to retarded growth reduce physical stamina lower work out put poor cognitive development and impaired learning abilities. In this context a comparative study considering height and weight of American and Indian school going children of same age group (published in atlas of India –ICMR publication) clearly indicates that weight wise Indian children are about 20 - 25 % less whereas height wise the Indian child is 6-8% shorter. In Indian conditions also the average height and weight of children of higher socio-economic group is higher than children of low socio-economic group. FAO data for 1988-90 tells us that there are still 786 million chronically under nourished people in developing countries, or 20% of all the people living in these regions. –HINDUSTAN TIMES APRIL 3 1996. Data on malnutrition children under age 5 (taken from human development report 1994) tells us that in 1992 there were 192 million such children in developing countries out of which as many as 69 million (36%) were from India alone. It is estimated that 22% of the school going children in India show one or more signs of nutritional deficiency. 1991 census provide following data regarding population male, female sex ratio, literacy rate etc. of India, M.P. and GWALIOR in particular. Keeping above data in consideration it was planned to undertake the present study with a view to know the existing food habits and nutritional status correlated with physical work capacity of school going children in Gwalior region. The diet of students in this region is not balanced. Over 80% of calories are derived from starchy roots and cereals. The lack of variety in their foods and particularly the shortage of protective foods leads to deficiency diseases particularly protein calorie malnutrition. Growing children are most vulnerable to effects of under nutritional. Nutritionally deprived children do not thrive well or gain height and weight. “

AIMS AND OBJECTIVE

To find out the nutritional status of school going children of Gwalior region.

Research Methodology: Research on child development are primarily promoted by a deep interest in the welfare of the children and are intended to serve an immediately practical purpose, success of any research is measured by the preciseness of results, reached at. This is possible only when the whole scientific endeavor is based on a sound and systematic footing. The main pursuit of the researcher is to remove incorrect notion and bring forward clear and accurate understanding about the aspects of the empirical world and thus to maximize the possibility of the reduction of various human problems and this itself

proves a serious challenge for the researchers, it is so because of many reasons, firstly there is no one major theory encompassing all observations in case of research conducted regarding child development the researcher should work out coherent ways of fitting observation together to support firmly held points of view and thus one of the points of studying child development rather than just watching children is to enable this coherence to emerge. Secondly, the information collected by the research is unduly influenced by the attitudes of the people administering them. It is very difficult to subject respondents to desired handling or experimentation. Thirdly, the procedural or methodological complexities and ambiguities hinder the researcher to move smoothly on ward, in the process of scientific pursuit the above difficulties are universal in nature. These can only be minimized and reduced to ensure the achievement of maximum objectivity in the study this work is done by farming a comprehensive research design compatible to the objectives of study under considerations, this comprehensive research design helps in the completion of the research work smoothly by way of providing necessary guidance and regulation.

Schematic plan of study

- **Study area-** General characteristics of the area.
- Selection of school
- Selection of subject
- Environmental characteristics.

Nutritional status:

Anthropometric assessment

- Weight- Gomez scale
- Height- NCHS scale
- Circumference of head
- Circumference of chest
- Circumference of mid-arm

DIET SURVEY: Food frequency

CLINICAL ASSESSMENT

Study Area: Gwalior region is selected. Gwalior is chosen because it is one of the major big city of M.P. It has a population of 14,14,038 (1991 census) out of which 5,80,051 reside in rural areas and 8,33,977 reside in urban region.

Sex ratio is 831 (females per 1000 males) It has total literacy of 46.38% and literacy rate of rural region is 41.6% whereas that of urban region is 51.77%. A standard performa prepared and based on ICNND nutritional schedule contained in “Nutritional assessment of community- W.H.O. TECHNICAL REPORT SERIES” (1966) was used to carry out the study. Performa was prepared and a pilot study was conducted before full scale application and change were made wherever necessary. Help of a doctor was sought during examining cases for clinical signs symptoms.

Selection of school and profile of study children:

Impossibility of the use of census or population technique leads the researcher to have an option and preference to the use of sampling technique. A sample is generally defined as the smaller and representative part of a larger quantity and the way it is selected known as sampling technique. The researcher used random sampling technique for selecting rural and urban school for choosing children firstly general information such as sex, age, type of family, members of family, attendance of student were collected in both rural and urban region. Another observation highlighted that in rural region attendance of students in schools conducting mid-day meal programme was higher as compared to schools not conducting this programme.

Environmental characteristics: PHYSICAL ENVIRONMENT

- This including the consideration of the type of house space available, lighting arrangements, source of drinking water and toilet facility.

SCHOOL ENVIRONMENT AND EDUCATION SETUP

- Information regarding school environment covering following areas:

- Management of school : private or government
- Physical facilities in school like number of classrooms, drinking water.
- Availability of facilities for sports.

Nutritional Status: Assessment of nutritional status of school going children between 9 to 12 years of age was made by anthropometric measurement clinical examination and dietary survey.

Anthropometric: The anthropometric measurement were recorded using standard techniques. A calibrated platform clinical beam balance with a vertical measuring rod and horizontal cross bar was used weight were recorded nearest 0.1 kg. Without footwear. Standing height were measured to nearest 0.5 cm. head, chest and mid-arm (left) circumferences were measured using flexible not stretchable tape.

Dietary Assessment: Dietary assessment is an important part of nutritional assessment, but it cannot be used alone to make a diagnosis of nutrition health. It is an aid in the interpretation of anthropometric and clinical assessment, provide a foundation for dietary counseling. However, obtaining accurate information on food intake and the interpretation of that information has been less for many years. There is more than one method for dietary assessment. These methods are as follows:

- Twenty – four hour recall
- Food diary
- Observation of food eater
- Weight intake
- Diet history
- Dietary evaluation

- Food frequency.

We use the food frequency methods which consists in asking the students by surveying how often (daily weekly) specific foods are eaten. To find out the food habits and dietary patterns of the school going children a diet survey was conducted. The method adopted for diet survey was questionnaire. In this survey special attention was given to the quality of food taken.

Clinical Assessment: For clinical assessment a schedule for grading different deficiency sign was prepared and in each case the clinical assessment was made as per schedule.

Classification of nutritional grade: Based on these anthropometric measurements, children were in different grades of nutrition, using NCHS standard (1983) and weight for age cut off points of Gomez classification.

- Children who had over 90% of expected weight for age were consider normal.
- Those with weights between 75 and 90% were considered as suffering from grade 1 malnutrition.
- Those with weight between 60 and 75% were classified as having grad II.
- Those with weight less than 60% were classified as having grade III malnutrition.

Height for age as indicator

- Children whose height were over 90 % of expected height for age were considered normal.
- Those whose height were below 90% of standard were considered as short.
- All children who had body weight for age between 60 and 75% of standard (Gomez grade II malnutrition) were sub-dived into two groups, based on height.

OBSERVATIONS AND RESULTS

Table 1: Distribution Of Cases Under Study

Sr. No.	Cases Under Study	No Of Case	Percentage %
1.	Urban School Children	250	41.67 %
2.	Rural School Children	250	41.67 %
3.	Urban +S.L.P.	50	8.33 %
4.	Rural+ S.L.P.	50	8.33 %
	Total	600	100.00 %

The above table shows that 600 students was selected for study. Out of these 600 students 300 were from an urban area and 300 from rural areas. Which include 50 students (8.33%) each from the rural and urban school during mid-day meal programme. No of male is 174 out of 300 i.e.58% and no. of the female students is 126 that is 42% in urban school.

In rural region number of male is 222 i.e.74% and female is 78 i.e. 26%.

Nutritional Survey: Diet Survey: Average daily intake of food stuffs by school going children from urban and rural areas. Distribution of cases according to food habits, meal pattern, with lunch box or without lunch box, food stuffs of cereals pules, milk and milk products, fats and oil, leafy vegetable, other vegetable, fruits, egg, meat, fish, sugar, jaggery.

Table 2:

Sr. No.	Food stuff	Recommended By ICMR (gm)		Urban Veg	Urban None veg	Rural veg	Rural None veg
		Veg	non-veg				
1.	Cereals	220	220	191.29	184.29	197.41	200.00
2.	Pulses	70	60	39.60	30.00	34.60	30.00
3.	Milk and milk products	600	400	351.40	126.91	240.50	412.51
4.	Fats and oil	30	30	34.04	36.15	16.20	20.00
5.	Green leafy	75	75	45.00	27.38	38.36	37.50

The above table shows that average intake of almost all food stuff with one or two expectation is lower than the recommended standard. Against the recommended amount of 220 gm for vegetarians and non-vegetarian in urban region for vegetarian amount is found to be 191.29 gms. And for non-vegetarians is 184.61 gm. Consumption of pulses is 39.6 gm in case of urban vegetarian 30 gm for urban non vegetarians. In case of rural region consumption is 34.6 gm for vegetarians and 30 gm for non-vegetarians where as recommended amount is 70 and 60 each for vegetarians and non – vegetarians respectively.

Table 3: Nutritional status: anthropometric measurement

Sr No.	Height % of the expected (NCHS)	GOMEZ'S WEIGHT FOR AGE			GRADES		TOTAL 300
		NORMAL 73	GRADE I 96	GRADE II -124	GRADE III 07		
1.	> 95 % (NORMAL)	41 (56.10%)	27 (28.15%)	13 (10.48%)	-	81 (27.00%)	
2.	90-95 % (GRADE I)	29 (39.72%)	43 (44.79%)	76 (61.29%)	-	148 (49.30%)	
3.	85 – 90 % (GRADE II)	03 04.10%	23 (23.95%)	31 (25.00%)	04 (57.14%)	61 (20.40%)	
4.	< 85 % (GRADE III)	-	03 (03.12%)	04 (03.22%)	03 (42.86%)	10 (03.30%)	

Distribution of study children in different height groups and also in relation to weight for age classification in urban region. The above table shows that out of 73 students, 41 i.e. 56.16% students had normal height and normal weight and 07 students to grade III of weight i.e.

42.86% students belonged to grade III of height. Distribution of study children in different height groups and also in relation to weight for age classification in rural region.

Table 4:

S no.	Height % of the expected (NCHS)	GOMEZ'S WEIGHT FOR AGE		GRADES		TOTAL 300
		NORMAL n= 09	GRADE I n =32	GRADE II n =142	GRADE III =117	
1.	> 95 % (NORMAL)	03 (33.33%)	11(34.37%)	11(07.75%)	01 (00.90%)	26 (08.60%)
2.	90-95 % (GRADE I)	04 (44.44%)	04 (12.50%)	41 (28.87%)	19 (17.27%)	68 (22.60%)
3.	85 – 90 % (GRADE II)	02 (22.22%)	16 (50.00%)	63 (44.36%)	54 (49.09%)	135 (45.00%)
4.	< 85 % (GRADE III)	-	01 (03.12%)	27 (19.02%)	43 (39.09%)	71 (23.80%)

The above table shows that out of 09 students, 03 students ie 33.33% students of normal weight has normal height and 117 students to grade III of weight ie 39.09 students belonged to grade III of height. Distribution of children according to nutritional grade by height and weight for age in urban region.

Table 5:

Sr. No.	Nutritional grades *	Height as indicator N %	Weight as indicator ** N %
1	Normal	081 27.0	073 24.34
2	Grade I	148 49.33	096 32.00
3	Grade II	061 20.33	124 41.33
4	Grade III	010 03.34	007 02.33
	Total	300 100	300 100

Table 6:

Sr. No.	Nutritional grades *	Height as indicator N %	Weight as indicator ** N %
1	Normal	026 8.66	009 3.00
2	Grade I	068 22.67	032 10.67
3	Grade II	135 45.00	142 47.33
4	Grade III	071 23.67	117 39.00
	Total	300 100	300 100

Both above table shows the % height and weight of different grads of 300 students from rural areas and urban areas. Anthropometric measurement of URBAN boys and girls (9-10 yrs.) in relation to their nutritional status. [mean + - SD] normal boys 17, gr. I 23, gr II 34, gr III 00 Normal girls 04, gr I 11, gr II 22, gr III 41

Table 7:

Sr. No	Characteristics	Boys URBAN			Girls URBAN				
		Normal n=17	Gr. I n=23	Gr. II n=34	Gr. III	Normal n=04	Gr. I n=11	Gr. II n= 22	Gr. III n= 41
1		28.26 ± 2.1	26.70 ± 1.4	25.60 ± 1.2	-	26.35 ± 3.1	24.90 ± 1.9	23.98 ± 1.7	20.50 ± 1.1
2	Weight(kg)	130.40 ± 4.6	127.60 ± 3.61	125.00 ± 5.1	-	131.40 ± 3.7	129.10 ± 2.9	125.60 ± 3.1	123.70 ± 3.7
3	Height (cms)	52.10 ± 2.3	51.30 ± 2.3	50.20 ± 1.4	-	51.90 ± 1.3	51.10 ± 1.2	50.70 ± 1.5	49.10 ± 1.0
4	Head circumferen	59.20 ± 2.5	57.10 ± 1.4	52.10 ± 1.8	-	58.10 ± 2.7	56.20 ± 1.5	55.70 ± 1.6	52.10 ± 1.1
5.	Chest circumferen	16.70 ± 1.0	15.30 ± 1.0	14.20 ± 0.9	-	16.10 ± 1.1	14.70 ± 0.8	14.10 ± 0.7	13.00 ± 0.4
	circumference (cms)								

Table 8: Anthropometric measurement of RURAL boys and girls (9-10 yrs.) in relation to their nutritional status [mean + - SD]

Sr. No	Characteristic	Boys			Girls				
		Normal n=17	Gr. I n=23	Gr. II n=34	Gr. III n=12	Normal n=04	Gr. I n=11	Gr. II n= 22	Gr. III n= 41
1.	Weight(Kg)	29.10 ± 1.8	27.70 ± 1.5	25.30 ± 1.1	23.60 ± 0.2	-	27.60 ± 1.1	24.30 ± 1.2	22.10 ± 0.8
2.	Height (cm)	134.90 ± 1.3	129.10 ± 1.2	127.4 ± 1.8	126.10 ± 1.5	-	127.3 ± 4.5	126.70 ± 4.2	124.4 ± 4.4
3.	Head circumferen	52.70 ± 2.5	51.80 ± 1.2	50.10 ± 1.1	49.00 ± 1.5	-	51.70 ± 1.8	50.90 ± 1.2	50.10 ± 1.0
4.	Chest circumferen	59.10 ± 2.5	57.10 ± 1.8	54.30 ± 1.6	54.10 ± 0.9	-	59.20 ± 2.8	55.30 ± 1.8	52.80 ± 1.2
5.	Mid-arm circumferen (cms)	15.80 ± 1.0	14.70 ± 0.8	13.70 ± 0.9	13.00 ± 0.6	-	14.80 ± 0.9	13.90 ± 0.8	13.30 ± 0.6

The both above table shows that the anthropometric measurements of urban boy girl and rural boy girls 9 to 10 years in relation to this nutritional status. Show the characteristic height, weight, head, chest mid-arm circumference of school going children.

NUTRITIONAL STATUS: CLINICAL EXAMINATION: Clinical examination in relation to

nutritional status is being made taking into account following parameters:

1. General appearance- normal built/ thin / sick /appearance.
2. Hair – normal /dull / depigmentation /easily – pluckable.
3. Face – normal / dissepimental / moon – face / monkey face.

4. Eye – refractive error – yes / no. Conjunctive - normal/ pale / congested. Bitot spote - present /absent.
5. Lips – normal /angular stomatitis.
6. Hearing - normal / impaired.
7. Speech - normal/ abnormal.
8. Tongue - normal / pale / flabby.
9. Teeth - 1. Total no of teeth present.
10. Carries – present / absent.
11. Skin - normal / dry /scaly / dissepimental.
12. Nails - normal / kailangchia / clubbing.
13. Odema - present / absent.
14. Rachitic - present / absent.

In both rural and urban children in one way or other more less these parameters are influenced by nutritional grade of the child.

SUMMARY AND CONCLUSION

Six hundred children (300 each from rural and urban school) aged between nine to twelve years studying in different schools located in urban and rural vicinity of Gwalior city were investigated with a view to assess the nutrition status of school going children. Children who could be considered normal or those who were not so under nourished or diseased were finally selected for investigation many of those children appear to have minor chronic ailments, but those were considered unlikely to effect the performance in any of the functional tests. Judged by the criterion of weight for age (Gomez) out of 300 urban school children 24 to 34 were normal 32% had mild and 41.3% had moderate malnutrition while a small proportion 2.3% had severe malnutrition judged by criteria of both height and weight only 13.7 % of urban school children out of the total sample could be considered normal. Similarly out of 300 rural children selected 3% were normal 10.67% had mild and 47.3 % had moderate malnutrition 39% of rural children were found to be severely malnourished. Judged by criteria of both height and weight on 1% out of the total sample could be considered normal. The most important conclusion that emerges from this study is that growth retardation observed in children of poor and rural communities associated with impairment of physical work capacity. To sum up, the salient features of study are as follows: In urban region vegetarians constitute 84% and non – vegetarians 16 %. In rural region vegetarian are 81% and non-vegetarians 19%. Urban respondents mostly follows 4 meal and 3 meal pattern whereas, 3 meal and 2 meal pattern is more prevalent in rural area. It is observed that only 26 % children are not carrying school lunch box whereas in rural area more than 82 % children are not carrying school lunch box.

Suggestions: Our children are our greatest national resource and there is sensitiveness of the need to provide special measures for improving the dietary and nutritional status of our children, which is not only necessary for their development (both mental and physical) but also for improving the work capacity. Many enforcement agencies integrated network are pursuing this aim, yet there is much left to be done. On the basis of the analysis of the present study it is possible to make some suggestions for the improvement of nutritional status which in turn will improve physical work capacity of school going children. The following food stuffs and the amount (in grams) are shown:

Table 9:

Food stuff	In grams
1. Cereals	1. 425
2. Pulses	2. 70
3. Green leafy vegetable.	3. 100
4. Other vegetables.	4. 75
5. Oil.	5. 30
6. Jiggery or sugar	6. 30
7. Milk	7. 115
8. Fruits.	8. 30.

The amount of food stuffs given in the above list is estimated to provide 2400 calories and 60-70 grams of proteins. Above food stuff cannot be considered to be ideal but under the existing economic conditions, it provides all the nutrients well above the margin of safety. For those who can afford the extra cost, the following modification are suggested, these will provide more variety and avoid monotony in the diet but the cost will go up to about 3.30 rs.to 5.40 paise per day. The improvements suggestions are: include at least one EGG per day, increase the intake of milk from 115 ml.to 200 ml. and ground nuts if vegetarian, for non-vegetarian add 30 grams of meat.

Nutritional Needs: Basic knowledge of nutrients: School going children needs a wide range of nutrients to perform various functions in the body and to lead a healthy life. The nutrients include proteins, fat, carbohydrates, vitamins and minerals.

Protein: They are vital to any living organism. Protein are the important constituent of tissues and cell of the body. They supply the body building material and make good the loos that occur due to wear and tear. Protein as antibodies help the body to defend against infection.

Fats: It is an important part of diet and serves a number of function in the body. It is a concentrated source of energy and it supplies per unit weight more than twice the energy furnished by either protein or carbohydrate.

Carbohydrates: They are a class of energy yielding substances which include starch, glucose, cane sugar,

milk, sugar etc. Grain foods and roots and tubers are largely composed of starch, a complex carbohydrate. Starch and other sugars present in diet is the main source of energy in the body.

Vitamins: They are organic substances present in small amounts in many foods required for carrying out many vital functions of the body and many of them are involved in the utilization of the major nutrients like proteins, fat, and carbs. Although they are needed in small amount, they are essential for health and well-being of the body.

Minerals and trace metals: A large number of minerals and trace metals are present in the body. Some of these form part of body structural component and some other act as catalytic agents in many body reactions.

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