



Research Article

ASSESSMENT OF NUTRITIONAL STATUS AND ITS EFFECTS ON IQ LEVEL OF PRIMARY SCHOOL CHILDREN IN PATAN CITY, GUJARAT

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Received: March 14, 2017; Revised: March 27, 2017; Accepted: March 28, 2017; Published: April 28, 2017

Abstract- This study was conducted to assess the nutritional status of primary school children and its effect on their IQ level. Total 350 (229 boys and 121 girls) children, were randomly selected from three schools of Patan city, Gujarat for conducting the present study. Mean height and mean weight of children was compared to ICMR standard value. The nutritional status was assessed by anthropometric measurements and categorized according to Water low's classification. There was no significant difference found in mean height and weight of boys and girls in age group of 11-12 and >12 years children. Further, results showed that 51.71% children were from normal nutritional status category, while 28.57 %, 12.28 % and 7.42 % children belonged to wasted, stunted and wasted and stunted respectively. This study concluded that majority of the malnourished children fell in lower level of intelligence. On the other hand, reverse trend was observed in case of normal children who represented better level of intelligence. Nutritional status was positively and highly significantly correlated (0.20**) with their level of intelligence.

Keywords- Anthropometric measurement, Nutritional status, IQ level, Primary school children.

Citation: Chamar Nilam, et al., (2017) Assessment of Nutritional Status and Its Effects on IQ Level of Primary School Children in Patan City, Gujarat. International Journal of Microbiology Research, ISSN: 0975-5276 & E-ISSN: 0975-9174, Volume 9, Issue 4, pp.-881-883.

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Academic Editor / Reviewer: Banerjee A., Dr Vinod Kumar Singh, Dr D P Shrivastava

Introduction

The foundation of good health and sound mind is laid during the school age period. So, it is basic milestone in the life of an individual and responsible for many changes that take place during later life. Primary school age is a dynamic period of physical growth and mental development of the child. Children who fail to grow optimum during this crucial period may not make-up the loss in growth even on excellent diet in later life. Studies have shown that the performance of children, who had earlier suffered from malnutrition, was clearly inferior to that of children who had not gone through malnutrition [1]. The consequences of malnutrition are severe. A child suffering from malnutrition will undergo more frequent, long lasting and severe illness than a child receiving proper nutrition. In addition researchers attribute higher mortality and an increased prevalence of stunting and wasting to the existence of malnutrition during childhood.

The present scenario of health and nutritional status of the school age children in India is very unsatisfactory. Poor growth is associated with impaired development which is apparent in the relationship between growth status, school performance and intellectual achievement. Malnutrition also increases a child's risk of contracting respiratory infections, diarrhea, measles and other diseases that often kill children or permanently harm their physical, psycho-social and cognitive development [2].

The impact of malnutrition depends on the stage of the child's development as well as the severity and duration of malnutrition. Therefore the problem of malnutrition and under nutrition pose a serious threat to growth and development along with poor academic performance, adverse effect on gross motor activities, skilled motor activities, perception, cognition, memory, attention span, language development and inter social relationship, in turn the personality of the children. On the whole the effect of malnutrition delays physical growth and motor development which have impact on cognitive development resulting in lower

intelligence quotient (IQ), impairment in memory, less attention span, deficiency in learning and lower educational achievement. The longer the developmental delays remain uncorrected, the greater the chance of permanent effects in the individuals [3]. Information regarding the nutritional status of the children and its effect on their participation in extracurricular activity in the Gujarat state is again very scanty. Patan city, North Gujarat, has limited information available in this aspect. Keeping this point in mind present study was planned to assessment of nutritional status and its effects on participation in extracurricular activities of primary school children in Patan city, Gujarat.

Methodology

This study was conducted in Patan city, Gujarat. The study sample consists of children who were purposively selected from there schools. Initially three hundred fifty children were selected by simple random sampling.

Nutritional status of children was assessed by anthropometric measurements like weight (kg) and height (cm) measured by using weighing balance and stadiometer, which were compared with ICMR standards [4]. The prevalence of malnutrition was assessed by Water low's classification [5].

IQ level was measured by "Desai Bhatt Samuh Buddhi Kasoti (1990)" which was prepared and standardized by Dr. Krushnakant Desai. IQ test was administered individually to each boy and girl and scoring procedure was applied as per manual.

Statistical analysis

Mean, Percentage, 't' test and coefficient of correlation was used.

Results and Discussion

Children were divided in two groups i.e., boys (229) and girls (121) within the age

group of 11 to more than 12 years. The Mean height and weight of children were compared with ICMR standard values, given in [Table-1]. The mean height of 11-12 years and >12 years of boys was found 139.23 and 143.66 cm respectively and their weight was 31.98 and 35.11 kg respectively, while mean height of girls of both age groups was found to be 140.93 and 143.66 cm respectively and weight was 32.14 and 36.61 kg. On the whole, 140.97 and 142.98 cm mean height and 33.24 and 34.07 kg mean weight of boys and girls were reported. Similar findings of the study conducted by Pande *et al.* (2000) [6] is supporting these results, which found that girls of all age groups except the 14 years had lower mean weight for age compared to ICMR standard. The height for age was

also less in both boys and girls than the standard. Sharma and Kalia [7] also found similar results in Himachal Pradesh. Easwaran and Poorani [8] also reported that all girls and boys were lower in height and weight when compared to standard ICMR values.

In the present study, there was no significant difference found in the mean height and weight of boys and girls between the age groups of 11-12 and more than 12 years. This result is supported by a study by Suvarna and Itagi (2007) [9] which showed that there was no significant difference in the mean height and weight of boys and girls.

Table-1 Anthropometric measurements of children by age and gender of Patan city, Gujarat

Age (years) Anthropometric Measurement	11-12		>12		Total	
	Boys	Girls	Boys	Girls	Boys	Girls
Mean Height (cm)	139.23	140.93	143.66	143.66	140.97	142.98
ICMR standard*	143.91	145.08	153.00	150.00	147.52	147.07
t value	-1.59 ^{NS}		0.02 ^{NS}		-1.64 ^{NS}	
Mean Weight (kg)	31.98	32.14	35.11	36.61	33.24	34.07
ICMR standard*	34.84	36.20	40.90	44.00	37.25	39.35
t value	-0.15 ^{NS}		-1.22 ^{NS}		-0.99 ^{NS}	
Note: *ICMR: Indian Council of Medical Research (1990) NS: non-significant						

The children were divided into four categories according to nutritional Water low's by utilizing respondent's height for age and weight for height indicators. The children were distributed according to their nutritional status by age and gender as given in [Table-2]. Half of the children (51.71 per cent) belonged to normal nutritional status category followed by 28.57, 12.28 and 7.42 per cent children belonged to wasted, stunted and wasted and stunted respectively. It was also clearly seen that 57.14 percent of the children of more than 12 years belonged to normal nutritional status, while 22.85, 12.14 and 7.85 per cent had wasted, stunted and wasted and stunted nutritional status respectively. Similarly in age

group of 11-12 years, 48.09 per cent belonged to normal nutritional status, while 32.38 per cent in wasted nutritional status, 12.38 per cent in stunted nutritional status followed by 7.14 percent in wasted and stunted nutritional status respectively. Similarly, 50.65 per cent boys and 53.71 per cent girls belonged to normal nutritional status. On the other hand, 27.94 and 29.75 per cent of boys and girls in wasted category, 12.22 and 12.39 percent of boys and girls respectively fell in stunted category. Only 9.17 per cent boys and 4.13 per cent of girls were found in wasted and stunted category.

Table-2 Nutritional status of the respondents according to Water low's classification by age and gender

Age (years)	Normal	Nutritional Status			Total
		Wasted (SDM)	Stunted (LDM)	Wasted and stunted (C and LDM)	
11-12	101 (48.09)	68 (32.38)	26 (12.38)	15 (7.14)	210
>12	80 (57.14)	32 (22.85)	17 (12.14)	11 (7.85)	140
Gender					
Boys	116 (50.65)	64 (27.94)	28 (12.22)	21 (9.17)	229
Girls	65 (53.71)	36 (29.75)	15 (12.39)	5 (4.13)	121
Overall	181 (51.71)	100 (28.57)	43 (12.28)	26 (7.42)	350 (100)
Note: Figures in the parenthesis indicate percentage SDM – Short duration malnutrition, LDM – Long duration malnutrition, C and LDM – Current and long duration malnutrition					

[Table-3] represented the relationship between nutritional status and level of intelligence of the children. Half of the children with normal nutritional status 53.59 per cent belonged to average intelligence and 28.72 percent belonged to inferior intelligence level, while 6.62 per cent belonged to very inferior intelligence followed by 7.18 and 3.86 per cent belonged to additional intelligence and superior level. It is alarming to note that none of the children in stunted and wasted group belonged to superior level, while 42.30 and 34.15 per cent of children belonged to inferior intelligence and average intelligence and 19.23 per cent children belonged to very inferior intelligence, only 3.84 per cent belonged to additional intelligence level respectively. In case of wasted category 48 per cent children belonged to inferior intelligence and 33 per cent children belonged to average intelligence,

while 10 per cent belonged to very inferior intelligence followed by 7 and 2 per cent children belonged to additional intelligence and superior level. In stunted category 41.86 and 32.55 per cent children belonged to inferior intelligence and average intelligence, while 16.27 per cent belonged to very inferior intelligence followed by 6.97 and 2.32 per cent children belonged to additional intelligence and superior level. Nutritional status was positively and highly significantly correlated (0.20**) with their level of intelligence. This study was supported by Suvarna and Itagi (2007) [9] found that the nutritional status was positively and significantly correlated with level of intelligence and it highlights that the children with normal nutritional status exhibited better level of intelligence than wasted and stunted children.

Table-3 Relation between nutritional status and level of intelligence of the children

IQ range		Level of Intelligence									
		Genius	Very Superior	Superior	Additional Intelligence	Average Intelligence	Inferior intelligence	Very Inferior intelligence	Mentally retarded		
Nutritional	status	>140	139-130	129-120	119-110	109-90	89-80	79-70	<70	Total	r value
Normal	-	-	7 (3.86)	13 (7.18)	97 (53.59)	52 (28.72)	12 (6.62)	-	181	0.20**	
Wasted	-	-	2 (2.00)	7 (7.00)	33 (33.00)	48 (48.00)	10 (10.00)	-	100		
Stunted	-	-	1 (2.32)	3 (6.97)	14 (32.55)	18 (41.86)	7 (16.27)	-	43		
Wasted and stunted	-	-	-	1 (3.84)	9 (34.15)	11 (42.30)	5 (19.23)	-	26		
Overall	-	-	10 (2.85)	24 (6.85)	153 (43.71)	129 (36.85)	34 (9.71)	-	350 (100)		
Note: Figures in the parenthesis indicate percentages											
**. Significant at the 0.01 level											

Note: Figures in the parenthesis indicate percentages

** Significant at the 0.01 level

Conclusion

The present study focused on nutritional status of children and its effects on IQ level of children in some selected schools in Patan city, Gujarat. Anthropometric measurements were used to assess nutritional status and "Desai Bhatt Samuh Buddhi Kasoti" used for measured IQ level of selected children. Anthropometric indicators revealed that on the whole no significant difference was found between mean height and weight of boys and girls. Out of total 51.71% children had normal nutritional status, 28.57% children had wasted, 12.28% children had stunted and 7.42% children had wasted and stunted respectively. It was noted that children with normal nutritional status shown better level of intelligence than malnourished children.

Acknowledgement: Author are thankful to Department of Food Science and Nutrition, ASPEE College of Home Science and Nutrition, S.D. Agricultural University, Sardarkrushinagar, 385 506, Dantiwada, Gujarat

Author Contributions: All author equally contributed

Ethical approval: This article does not contain any studies with human participants or animals performed by any of the authors.

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