INTERNATIONAL JOURNAL OF PEDIATRIC NURSING
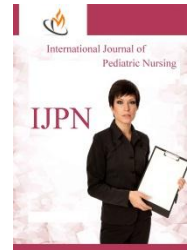
CORRELATION BETWEEN NUTRITIONAL STATUS AND MEMORY AMONG SCHOOL CHILDREN

S. Sreelakshmi[1*], R.K.Muniswamy[2]

[1]Senior Lecturer, Department of Child Health Nursing, MIMS College of Nursing, Malappuram, Kerala, India.
[2]Department of Child Health Nursing M.S.Ramaiah Institute of Nursing Education and Research, Bangalore, Karnataka, India.

ABSTRACT

The aim of the study was to assess the correlation between nutritional status and memory among the school children and to find the association between the study variables and selected socio-demographic variables. A descriptive survey approach with correlational descriptive survey design was used for the study. Simple random sampling technique was used to select 50 school children. Height and weight of each child was monitored to calculate BMI and thereby to assess the nutritional status. Level of memory of each child was assessed through interview schedule by using Modified NIMHANS Tests of memory for children. Data was collected and analyzed using descriptive and inferential statistics. Out of the sample, 30% were undernourished, 48% were normally nourished, 20% had overweight and 2% were obese. According to the level of memory majority of subjects 56% had average memory, whereas 20% had below average memory and 24% had above average memory. The study findings revealed that there was a weak positive correlation that exists between nutritional status and memory [r= 0.281, p< 0.05]. Also, there was a significant negative correlation between BMI scores of overweight children and their memory. [r=-0.732, p< 0.05]. Significant association was found between nutritional status of children and education of mother [$\chi2$ = 28.86, p< 0.05]. Hence, study concludes that majority of school children are having normal nutritional status and average memory; and that there is a weak positive correlation between nutritional status and memory. A negative correlation was found between BMI scores of overweight children and their memory scores, which highlights that, in case of overweight children, as BMI increases memory decreases.

INTRODUCTION

Nutritional status during school age is a major determinant of nutritional and health status in adult life. Globally, health hazards associated with undernutrition and micronutrient deficiencies remain a major public health problem. At the same time, past three decades have witnessed the emergence of overnutrition as a problem in school-age children in developed countries and in affluent urban segments in developing countries [1].

Anthropometric measurements such as height, weight, mid arm circumference, skin fold thickness are valuable indicators of nutritional status. WHO has recommended various indices based on anthropometry to evaluate nutritional status of school children. BMI is the most appropriate variable for nutritional status [2].

Corresponding Author

Sreelakshmi S
Email: sree154@gmail.com

Research Article

Undernourishment not only affects physical appearance and energy levels, but also directly affects many aspects of the children's mental functions, growth and development which has adverse effects on children's ability to learn and process information and grow into adults who are able to be productive and contributing members of society. Stunting in early childhood is common in developing countries and is associated with poorer cognition and school achievement in later childhood [1].

Normal cognitive abilities like attention, concentration and most importantly the memory are essential factors which directly or indirectly determine the scholastic and overall achievements of an individual. These are the basic milestone of an individual and it is responsible for many changes that take place during the later life. Moreover school age is considered as the dynamic period of growth and development because children undergo physical, mental, emotional, and social changes. The school children are easily accessible, capacitive and responsive group. Keeping in view all these facts, this study was taken up to assess the relation between nutritional status and memory of school children.

MATERIALS AND METHODS
Research design
The study design was a non-experimental correlational descriptive survey design.

Setting of the study
The study was conducted at Iyer High School, Bangalore and Gnana Teja English Higher Primary School, Bangalore.

Sampling
Fifty School children between 7-11 years were selected using simple random sampling technique.

Description of the tool
Section A: Socio-demographic data consisting of age, gender, class of study, number of siblings, ordinal position in the family, education of parents, occupation of parents and type of food habit.

Section B: Nutritional assessment using BMI reference chart.

Section C: Memory assessment using Modified NIMHANS Tests of Memory For Children.
Content validity was established by submitting the tool to eleven experts. The Reliability of the tool was done by using coefficient Test- retest Method. The reliability found was 0.96.

Statistical analysis
The data obtained were analyzed in terms of objectives of the study by using descriptive and inferential statistics. Karl's Pearson's correlation (r) test was used to find the correlation between nutritional status and level of memory. χ^2 test was used to find the association between nutritional status and level of memory with the selected socio demographic variables.

RESULTS
The results reveal that majority of subjects were 10 years old (32%), were males (54%), belonged to 4th standard (32%), had more than one sibling (46%), were youngest according to ordinal position (42%) and had mixed dietary pattern (80%). (Table 1).With regard to education of mother, majority (32%) were graduates. (Figure 1). Overall BMI scores of the school children reveal that 48% of children had normal nutrition, 30% of children had undernutrition, whereas 20% were overweight and 2% were obese. The mean score obtained for BMI was 16.57 with SD of $\pm$3.22.(Figure 2).

Figure 3 illustrates that out of the fifty sample, majority (56%) of children had average memory, 24% had above average memory and 20% had below average memory. The mean value of memory scores was 51.34 with SD $\pm$10.83.

Table 3 reveals that calculated correlation coefficient (r) value between nutritional status and memory was 0.281. The table (r) value was 0.273 (at 0.05 level) which was less than calculated 'r' value. Hence there was a significant positive correlation identified between nutritional status and memory among school children.

Table 4 shows that the calculated correlation coefficient (r) value between BMI of overweight children and their memory was -0.732. The table (r) value was 0.549 (at 0.05 level of significance) which was less than calculated 'r' value. So there was a negative correlation found between BMI scores of overweight children and their memory scores.

The calculated χ^2 values were less than the table values for all socio-demographic variables except for education of mother ($\chi 2$ = 28.86). Hence no association was found to exist between nutritional status and mentioned socio-demographic variables. At the same time findings reveal a significant relationship between nutritional status and education of mother. In terms of memory also, calculated χ^2 values were less than the table values in terms of all selected socio-demographic variables. Hence, there was no significant association between level of memory and selected socio-demographic variables.

Research Article

Table 1. Frequency and Percentage Distribution of Socio Demographic Data of School children

Socio-demographic variables	Frequency [n=50]	Percentage (%)
Age		
7 years	8	16
8 years	7	14
9 years	12	24
10 years	16	32
11 years	7	14
Gender		
Male	27	54
Female	23	46
Class of study		
2nd standard	7	14
3rd standard	12	24
4th standard	16	32
5th standard	11	22
6th standard	4	8
Number of siblings		
No siblings	10	20
One sibling	17	34
More than one sibling	23	46
Ordinal position		
Single child	10	20
Eldest child	15	30
Middle child	4	8
Youngest child	21	42
Type of food habit		
Vegetarian	10	20
Mixed	40	80

Table 2.Mean and standard deviation of weight, height, BMI scores and memory scores.

| Sl. No	Variables	Maximum score	Mean	Standard deviation
1	Weight	--	29.86	$\pm$7.93
2	Height	--	133.56	$\pm$8.92
3	BMI	--	16.57	$\pm$3.22
4	Memory Score	80	51.34	$\pm$10.83

Table 3. Correlation between nutritional status and memory among school children

Sl. No.	Variables	Mean	SD	Correlation coefficient (r)
1	Nutritional status	16.57	$\pm$3.22	0.281
2	Memory	51.34	$\pm$10.83	S*

Table 4. Correlation of BMI scores of school children in overweight, normal nutrition and undernutrition category with their memory scores

Sl. No.	Nutritional status	Memory		
		Mean	SD	Correlation coefficient (r)
1	Overweight	55.7	$\pm$7.67	-0.732S*
2	Normal nutrition	54.33	$\pm$10.27	-0.31
3	Undernutrition	43.53	$\pm$10.26	0.031

Research Article

Fig 1. Percentage distribution of subjects with regard to their mother's education
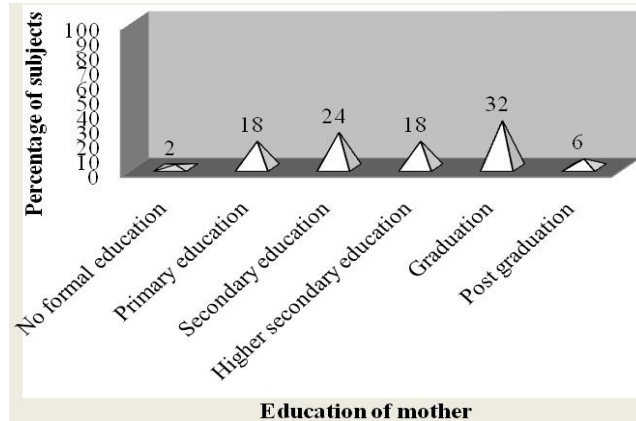
Fig 2. Percentage distribution of subjects with regard to their nutritional status.
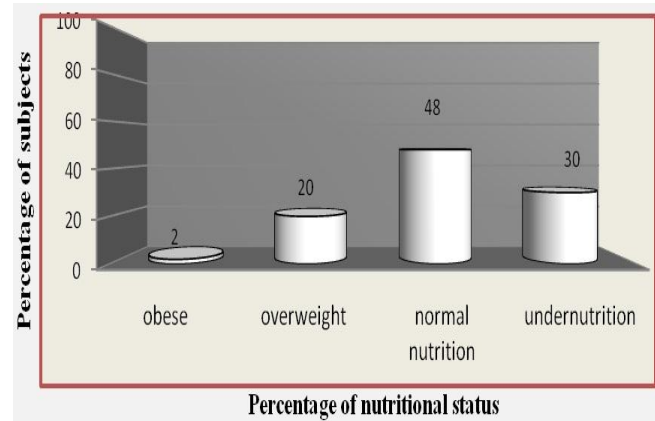
Fig 3. Percentage distribution of subjects with regard to their level of memory.
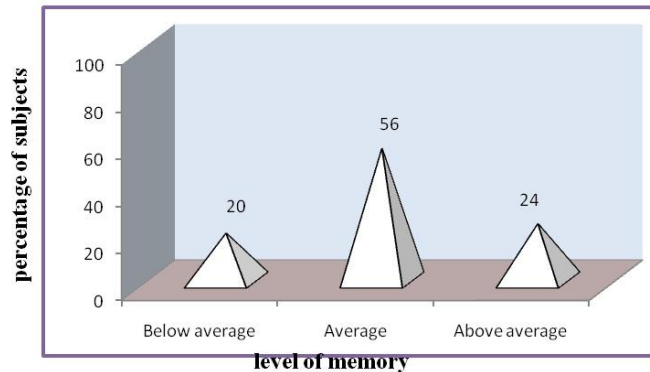
DISCUSSION

Present study results reveal that majority of school children are normally nourished (48%) and are having average memory (56%).The study findings on nutritional status of children are supported by a cross-sectional study on Prevalence and determinants of overweight and obesity among adolescent school children of South Karnataka, in 2007, revealed that out of 1000 children between 12-15 years 23.9% (215) were underweight, 60.6% (546) were normal, 11.4% (103) were overweight and 4% (36) were obese [3].

Also a significant positive correlation was found between nutritional status and memory among school children (r=0.281 at 0.05 level of significance). Findings are supported by a correlational study on Nutritional status and level of intelligence among school children which was conducted in Dharwad district, Karnataka. Sample of study comprised of randomly selected 102 school children aged between 7-9 years, studying in 3rd standard at Government English Medium School. The study revealed that nutritional status was positively and significantly correlated (0.67%) with level of intelligence, which is again a cognitive ability as like memory. It was highlighted that the children with normal nutritional status

exhibited better level of intelligence than wasted and stunted children [4].

The findings reveal a significant relationship only between nutritional status and education of mother. This is supported by a study which was conducted in Patna, on Differentials of nutritional status in school-age children and the associated factors. Nutritional status of 700 school children between 6 to 11 years were assessed. A clear association was inferred between the education of mother and nutritional status of the child; value of χ2 and p being 53.2330 and 0.0001 respectively. In case of illiterate, primary educated and undergraduate mothers the percentage of grade III and II malnutrition showed higher incidence. But in contrast malnutrition was almost nil in families were mother possessed technical or post graduate qualification.[21]But the findings of same study contradict in case of association between nutritional status and number of siblings as well as education of father and gender of the child. Families with single child had the highest percentage of normally nourished children (44.4%) and with an increase in the family size, a

Research Article

significant decrease in the percentage of normally nourished children, lowest being 8.82 % in a family with six children, was observed. It was also observed that the nutritional status of the female children were markedly poor in comparison to the male children in the middle income group. A clear association was inferred between the education of father and nutritional status of the child; value of $\chi 2$ and p being48.56 and 0.0006 [5].

There was no significant association between level of memory and selected sociodemographic variables.The study findings can be supported by the findings of a study conducted on Effect of socio-economic variables on immediate memory span of School Children at Hisar. A sample of 204 school children between 10-12 years was selected from the schools of Hisar city. The association between memory span and various variables showed that there is no statistical significance with age, sex, family type and type of school. At the same time study findings contradicts in case of income, caste, education of parents, occupation of parents and school environment which showed a statistically significant relationship [6].

CONFLICT OF INTEREST

The authors declare that they have no conflict of interest.

REFERENCES

1. Misra A. (2009). Nutrition and Physical Performance in school age children.
2. Krishnaswamy K, Bhaskaram P, Bhat RV, Ghafoorunissa, Raghuram TC, Raghuramulu N. (2010). Dietary guidelines for Indians.
3. Kotian MS, Kumar SG, Kotian SS. (2010). Prevalence and determinants of overweight and obesity among adolescent school children of South Karnataka, India. *Indian J Community Med*, 35,176-178.
4. Itagi SK. (2008). Nutritional status and level of intelligence of school children**. *Indian J Med Res*, 90(6), 320-327.
5. Kumari K. (2007). Differentials of nutritional status in school-age children and the associated factors. *Health and population- perspectives and issues*, 30(4), 268-277.
6. Mandakini M, Meena S, Kaur P. (2009). Effect of socio-economic variables on immediate memory span of school children of Hisar. *Int J Edu Sci,*1(1),15-18.