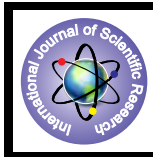


Assessment of Nutrient Intake and Developmental Milestones in 1 to 5 Year Old Children of an Indian Rural Population.



Medical Science

KEYWORDS : milestones, nutrient deficiency, rural population

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ABSTRACT

This study aims to study the nutrient deficiency and developmental milestones in 1-5 year old children of an Indian rural population. A community based cross-sectional descriptive study was carried out in field practice area of RHTC Naila, attached to SMS Medical College, Jaipur. Thirty cluster sampling technique was used to cover whole field practice area and total sample size taken was 330. Status of intake of nutrients was deficient among 52 to 60% of study children while excess intake was observed among only 1-8% of children. Milestones like making simple sentence, riding tricycle, telling a story, knows gender & full name were delayed in most of the children of the corresponding age (>60%) but standing without support and playing a ball game were delayed in 19-22%. Similar results were found in other studies from our country and other developing countries.

INTRODUCTION

Proper nutrition is a powerful good: people who are well nourished are more likely to be healthy, productive and able to learn. Giving the child a solid nutritional start has an impact for life on her or his physical, mental and social development. Malnutrition is the condition that results from taking an unbalanced diet in which certain nutrients are lacking, in excess or in wrong proportion.¹ Malnutrition of macronutrients and micronutrients is rampant in our country and developmental milestones is not very well studied. The developmental assessment needs to be done with utmost perfection and all the spheres of early child development needs special attention if found deficient.² This study aims to study the nutrient deficiency and developmental milestones in 1-5 year old children of an Indian rural population.

MATERIALS AND METHODS

A community based cross-sectional descriptive study was carried out to find out nutritional Status of children (1 to 5 year of age) residing in field practice area of RHTC Naila, attached to SMS Medical College, Jaipur. Thirty cluster sampling technique was used to cover whole field practice area. Data collection for this study was carried out from on 01.08.12 to 28.02.13.

Calculation of sample size: Sample size was calculated 328 subjects at allowable error of 20% at 95% confidence interval and design effect of two, assuming 38.38 % of children (1-5 years)² having low weight for age. (i.e. **P=38.38%**).

Sample size₄ = 4PQ/L², here Q = 100 - P = 61.6%, L =

Error (20% of P) = 7.6%

Therefore, $4 \times 38.38 \times 61.6 / 7.6^2 = 164$ but Design effect₄ =

2 so SS = 164 * DE = 164 * 2 = 328

So for the study purpose, from each of 30 cluster 11 children of 1-5 years were identified for survey i.e. from 30 clusters total 330 of children 1-5 years (child whose 1st birthday has gone and child whose 5th birthday is awaited) having normal term, normal delivery and normal birth weight and parents are willing to participate in the study were surveyed. Data thus collected was entered into Microsoft excel 2010 worksheet in the form of mas-

ter chart. Then data were classified and analyzed as per the aims and objectives.

Dietary History: Child's diet history was asked to his or her mother of last 24 hours. Calories and nutritive values of food items were calculated as per ICMR guidelines.³ Based on their consumption of calories and nutrients children were divided into three groups;

Normal: RDA or within -10% to +10% range of all nutrients.

Deficient: - less than 90% of RDA of each nutrient

Excess: - more than +10% of RDA of each nutrient

Milestones: Mothers were asked about the age at the appearance of the following milestones⁴:

S.No.	Milestones	Appropriate age at it appears (in months)
1.	standing without support	12
2.	plays a simple ball game	12
3.	walking without support	13
4.	Running	18
5.	ten words with meaning	18
6.	walking upstairs	24
7.	simple sentence	24
8.	riding tricycle	36
9.	telling a story	36
10.	knows gender and full name	36
11.	complete fluent speech	60

If any milestone was delayed for a period of >2 months it was recorded as delayed.

Results: Status of intake of all ten nutrients was deficient among 52 to 60% of study children while excess intake was observed among only 1-8% of children. (Table 1) Milestones like making simple sentence, riding tricycle, telling a story, knows

gender & full name were delayed in most of the children of the corresponding age (>60%) but standing without support and playing a ball game were delayed in 19-22%.(Table2). It was also seen that those who were nutritionally deficient were succumbed to delayed milestones and was statistically significant. (p<0.05)

Table No. 1 Distribution of study children according to status of intake of nutrients

S. No.	Nutrients	Deficient		Normal		Excess	
		No.	%	No.	%	No.	%
1	Calories	184	55.76	141	42.73	5	1.51
2	Protein	172	52.12	153	46.36	5	1.51
3	Carbohydrate	180	54.54	145	43.94	5	1.51
4	Fat	187	56.67	135	40.91	8	2.42
5	Iron	172	52.12	154	46.67	4	1.21
6	Calcium	175	53.03	132	40.00	23	6.97
7	Vit . A	192	58.18	121	36.67	17	5.15
8	Vit.B1	184	55.76	120	36.36	26	7.88
9	Vit.B2	200	60.61	107	32.42	23	6.97
10	Vit.B3	175	53.03	141	42.73	14	4.24

Table No. 2 Distribution of study children according to appearance of milestones

S. No.	Milestone	Appeared at appropriate age		Delayed		Total N(%)
		No.	%	No.	%	
1	Standing without support	260	78.79	70	21.21	330 (100)
2	Playing a ball game	267	80.91	54	19.09	321(100)
3	Walking without support	234	70.91	87	29.09	321(100)
4	Running	213	71.24	86	28.76	299(100)
5	Ten words with meaning	159	53.18	140	46.82	299(100)
6	Walking upstairs	165	62.26	100	37.74	265(100)
7	Simple sentence	88	34.38	168	65.62	256(100)
8	Riding tricycle	55	37.67	91	62.33	146(100)
9	Telling a story	47	32.19	99	67.81	146(100)
10	Knows gender & full name	54	36.99	92	63.11	146(100)

Discussion:

The present study showed that intake of all ten nutrients was deficient among 52 to 60% of study children while excess intake was observed among 1-8% of children. These findings are similar with the observations of other survey like R.N. Mishra (2005) and SP Mitra (2007). R.N. Mishra (2005) in his study found that calorie intake of 90% of pre-school children was below 50% of recommended daily allowances (RDA) while consumption of protein in more than 85% study subjects was less than 70% of RDA.⁵

⁶ Although intake of vitamin A was comparatively better with 47.7% of subjects consuming above 50% of RDA in case of iron and calcium, more than 90% of the pre-school urban slum children were consuming below 50% of the recommended dietary allowances. Ahmed N in 2012 also showed that diets were inadequate in most of the nutrients. Deficiency of major nutrients like energy, calcium, iron, thiamine etc. was common among the children.⁷

In this study it was revealed that milestones like speaking simple sentence, riding tricycle, telling a story, knowing gender & full name were delayed in most of the children (>60%) but standing without support and playing a ball game were delayed in 19-22%. According to different studies, exact figures that would document the prevalence of delay in speech children are difficult to obtain because of confused terminology, differences in diagnostic criteria, unreliability of unconfirmed parental observations, lack of reliable diagnostic procedures and methodologic problems in sampling and data retrieval. It can be said, however, that delay in speech is a common childhood problem that affects 3 to 10 % of children.⁸⁻¹⁰ According to ZafarMeenai and SheelaLongia (2009) study the prevalence of developmental delay was seen in 9.5% of apparently healthy children.¹¹ In a study by Heywood et al, it was noted that at any given age children of higher nutritional status by weight for age (W/A), length for age (L/A) or weight for length (W/L) are more likely to have attained a given developmental stage than children of lower nutritional status which was concurrent with our study.¹² Gross also reported that growth retardation, particularly the manifestation of chronic undernutrition in terms of length, is associated with the delay of important motor skills and hence delays the child's opportunities for actions independent of caregivers which is a similar finding as in our study.¹³ In the present study it was also found that certain aspects of development such as motor milestones were well remembered and others including speech milestones were not recalled accurately which was also seen in the studies of the past.¹⁴

CONCLUSION

The deficiency of macro as well as micronutrient intake is more than 50% and milestones are found to be delayed in later years of preschool period. The association with the nutrient deficiency and delayed milestones is well established here. Hence there is dire need to combat both type of deficiencies at individual and community level. The policymakers must consider the different nutrient deficiency in rural population due to lack of balanced diet and intervene with the aggressive steps to curb malnutrition which will also improve the growth and development of children.

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