Nutritional status of children (1 to 5 years of age) of Sirsi village of Jaipur district, Rajasthan: A cross sectional study

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Abstract—*Nutritional status of children of age 1 to 5 years provide an idea of nutrition of entire population. Malnutrition is a risk factor for morbidity and mortality in this age group of children. So it is a major public health problem in developing countries like India. That's why this cross sectional study on 170 children was conducted from January to June month of 2018 to find out to access the nutritional status of children of age 1 to 5 years in Sirsi village of Jaipur, Rajasthan through door to door survey. Statistical analysis was carried out by using Microsoft Excel for analyze the data. Majority of children belongs to age group of 2-3 years of age (32.3%) with male predominance (55.3% v/s 44.7%). As per mid upper arm circumference (MUAC) majority of children (93%) were in normal range and 81.2% children were found fully immunized. Although deficient intake of ten nutrients was found in 52-60% study children but among them 87% were having normal level of nutrition status (Mean ±2SD). In this study as per weight 22.94% children were undernourished (weight mean minus >2 SD) and 7.06% were in borderline (yellow or danger zone) as per MAUC. Undernourishment (below 2SD) was found significantly more (p < 0.001) in form of birth order difference (35.9%). In milestone developing simple sentence, telling a story, riding a tricycle and knows gender and full name were delayed in most of the children(>60%).*

Keywords: Nutritional Status, Children 1 To 5 Year, Malnutrition, Mid Upper Arm Circumference (MUAC).

I.   INTRODUCTION

Proper nutrition is a powerful good: people who are well nourished are more likely to be healthy, productive and able to learn. Good nutrition benefits families, their community and the world as a whole.[1]

Globally, child malnutrition is a public health problem with major consequences for child survival, damaging the cognitive and physical development of children and the economic productivity of individuals and societies.[2-3] Malnutrition contributes to50% of all child deaths and 11% of the total global disability-adjusted-life-years worldwide. Geographically, 70–80% of undernourished children worldwide live in lower and middle income countries.[4]

National Family Health Survey (NFHS-4) 2015-16[5] shows that Almost half of the children under five years of age (38.4%) were stunted and 35% were underweight. The proportion of children who were severely undernourished (more than three standard deviation below the median of the reference population) is also notable-24% according to height-for age and 16% according weight-for-age. Wasting is also quite a serious problem in India, affecting 20% of children under five year of age. Very few children under five year of age were overweight. Less than 2% had weight-for-height estimate more than two standard deviation above the median for the reference population and less than 1% were more

than two standard deviations above the median on the weight-for-age indicator. Children under-five year who are underweight has reduced from 42.5% as reported in NFHS-3 (2005-06)[6] to 35.7% in NFHS-4(2015-16).

So keeping this in mind, the present cross-sectional study was done in Sirsi village of Jaipur district of Rajasthan with the following Aims and Objectives. To assess the prevalence of nutritional status of children 1 to 5 year of age.

II. METHODOLOGY

This community based cross-sectional observational study was carried out on 170 children of 1-5 years in Sirsi Village of district Jaipur (Rajasthan) India, in the year 2018.

Accepting proportion of children (1-5 years) having low weight for age 38.38% and assuming allowable error 20% the sample size calculated at 95% confidence limit was 161 children (1-5 years). So for study purpose 170 children of 1-5 years were taken.

For study purpose children of 1-5 years i.e. child whose 1st birthday has gone and child whose 5th birthday is awaited, were included. Out of these seriously ill children and non cooperative respondent were excluded from study.

After selecting Jaipur district for this study a lottery method is applied for selecting of a block and then a village of having population of more than 1800 for which our study sample can be find out. A community based cross-sectional descriptive study was carried out to find out nutritional status of children (1 to 5 year of age) of Sirsi village of Jaipur, Rajasthan. Using the door to door visit was made in all households. All the families who could not be contacted or were uncooperative on first visit were revisited. If these were still not available, they were not included in the study. All these children were examined and general information as well as those who specific to the study subject were elicited by interviewing mother or head of the family. For assessing nutritional status of these children, anthropometric examination was done.

Anthropometric measurements were carried out following standard methods. The data included weight, recumbent length (for children less than24 months of age) and height (for children more than 24 months of age). Weight was measured to the nearest 0.1 Kg and Salter weighing machine was used for weight measurement. Height was measured against a non-stretchable tape fixed to a vertical wall, with the participant standing on affirm/level surface and it was measured to the nearest 0.5 cm. Recumbent length (for children less than 24 months of age) was measured by using an infant measuring board. nutritional status was examined as per FIMNCI guidelines and growth charts. Standard statistical method was used in the analysis of the data with use of MS Excel.

WHO classification was used for the assessment of malnutrition. Based on the age, body weight and height, a number of indices such as height-for-age, weight-forage and weight-for-height have been suggested. The children were classified using three categories:

'Underweight' (low weight-for-age)- Underweight is defined as low weight-for-age and it reflects past (chronic) and present (acute) under nutrition. Children with z-scores < -2.00 are said to be underweight.

'stunting' (low height-for-age)- Stunting is defined as a low height-for-age for children, and it measures the past (chronic) child under nutrition. Children with z-scores <-2.00 are said to be stunted.

'wasting' (low weight-for-height)- Wasting is defined as low weight-for-height for children, and it is a measure of current or acute under nutrition. Children with z-scores < - 2.00 are said to be wasted.

Data were collected using a pre-designed, pre-tested, semi-structured interview schedule. Performa includes name, fathers name, date of birth or age, sex, assessment of nutritional status (weight, heights, W/H SD score, visible severe wasting, pedal edema, mid upper arm circumference, birth order), immunization status, milestone of 1-5 year age, dietary history and any presenting complains.

Statistical analysis: Qualitative data will be compared by Chi square test. For significance, "p" value <0.05 was accepted as significant.

III.   RESULTS

Out of 170 study children, maximum children were in the age group of 2-3 year of age (32.3%) minimum were in 4-5 year of age (15.8%). Total male children were 94 and female children were 76 with M:F ratio and sex ratio is 808 female per 1000 males. (Table 1)

Out of total 170 children, fully immunized were 138 (81.2%) who received one dose of BCG, one dose of Measles, 3 dose of OPV and 3 dose of DPT vaccination Pentavalent up to 1 year of age. Any child who has missed any one of the doses was considered as partially immunized. Further it was observed that 11 (6.4%) were unimmunized children who have not received any type of vaccination. (Table 1)

Table 1
Characteristics of Study population

S. No.	Variables		Number (N=170)	Percentage (%)
1	Age	1-2 Years	36	21.1
		2-3 Years	55	32.3
		3-4 Years	52	30.5
		4-5 Years	27	15.8
2	Sex	Male	94	55.29
		Female	76	44.71
3	Immunization status	Fully Immunized	138	81.2
		Partial Immunized	21	12.4
		unimmunized	11	6.4

Out of 170 children, 39 (22.94%) were having under nutrition. And maximum children (93%) were in normal range of MUAC (Green) that is >12.5 cm and very few i.e. 12 (7.1%) children were in borderline (Yellow) group (11.5-12.5cm). There was no child who's MUAC was <11.5 cm. (Figure 2)
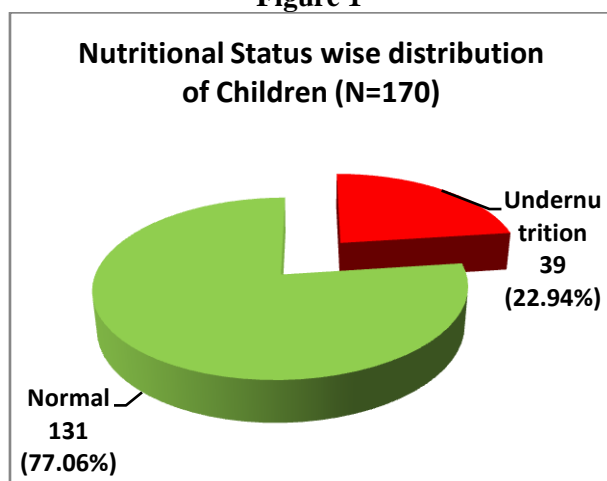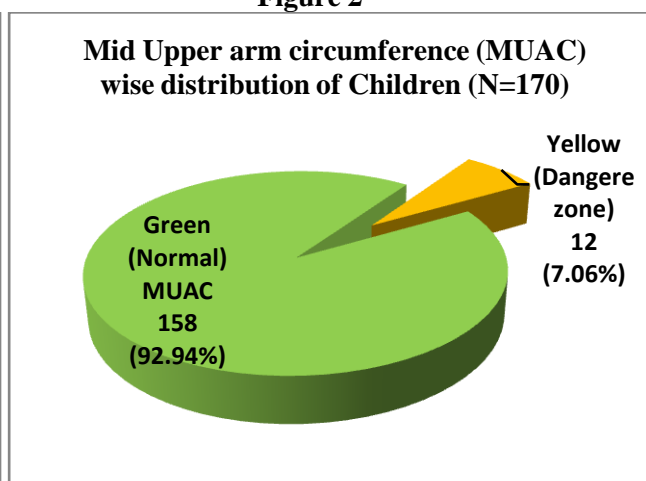
Figure 1

Nutritional Status wise distribution of Children (N=170)

Undernutrition 39 (22.94%)

Normal 131 (77.06%)

Figure 2

Mid Upper arm circumference (MUAC) wise distribution of Children (N=170)

Green (Normal) MUAC 158 (92.94%)

Yellow (Dangere zone) 12 (7.06%)

When association of age with undernutrition was analysed it was found that although majority of undernourished children were in 3-4 year of age (34.62%) but the difference of proportion of undernourished children as per age was found not significant (P>0.05). (Table 2)

Likewise difference in proportion of undernourished children as per birth order was also found significant (P < 0.001) with maximum (35.72%) undernourished children (below -2SD) with birth order >4 and minimum in birth order children 1st birth (8.48%). (Table 2)

Table 2
Association of Nutritional Status with age and birth order of Study population

S. No.	Variables		Normal Nourished (N=131)	Under Nourished (N=39)	P Value LS
			N0 (%)	N0 (%)	
1	Age	1-2 Years	33 (91.66)	3 (8.33)	0.038 S
		2-3 Years	43 (71.18)	12 (21.82)	
		3-4 Years	34 (65.38)	18 (34.62)	
		4-5 Years	12 (77.78)	6 (22.22)	
2	Birth Order	1	51 (38.93)	4 (10.26)	<0.001 S
		2	50 (38.17)	6 (15.38)	
		3	14 (10.69)	7 (17.95)	
		4	9 (6.87)	14 (35.9)	
		4+	7 (5.34)	8 (20.51)	

It was also observed that intake of all ten nutrients studied were deficient among 52 to 60% of study children while excess intake was observed among only 1-8% of children. (Table 3)

Table 3
Distribution of study children according to status of intake of nutrients

S. No.	Nutrients	Deficient		Normal		Excess	
		No.	%	No.	%	No.	%
1	Calories	94	55.29	73	42.94	3	1.76
2	Protein	91	53.52	77	45.29	2	1.17
3	Carbohydrate	92	54.11	74	43.52	4	2.35
4	Fat	96	56.47	69	40.58	5	2.94
5	Iron	91	53.52	76	44.70	3	1.76
6	Calcium	93	54.70	65	38.23	12	7.05
7	Vitamin A	96	56.47	65	38.23	9	5.29
8	Vitamin B_1	94	55.29	62	36.47	14	8.23
9	Vitamin B_2	101	59.41	57	33.52	12	7.05
10	Vitamin B_3	94	55.29	69	40.58	7	4.11

Milestones like making simple sentence, riding tricycle, telling a story, knows gender & full name were delayed in most of the children (>60%) but standing without support and playing a ball game were delayed in 15-22%% (Table 4)

Table 4
Distribution of study children according to appearance of milestones

S. No.	Nutrients	Appeared at Appropriate Age		Delayed		Total
		No.	%	No.	%	No.
1	Standing without support	134	78.82	36	21.18	170
2	Playing a ball game	144	84.7	26	15.3	170
3	Walking without support	122	81.3	28	18.7	150
4	Running	112	73.2	41	26.8	153
5	Ten words with meaning	80	52.28	73	47.72	153
6	Walking upstairs	78	57.4	58	42.6	136
7	Simple sentence	42	32.07	89	67.93	131
8	Riding tricycle	27	36	48	64	75
9	Telling a story	26	34.66	49	65.33	75
10	Knows gender & full name	27	36	48	64	75

IV. DISCUSSION

A study on Nutritional status of 1to 5 years children was done at Sirsi village of Jaipur district of Rajasthan. In this study it was observed that maximum children were Male 94 (55.3%) and Female children were 76 (44.7) with M: F ratio 1.24 and sex ratio was 808 female per 1000 males. As per census 2011 child sex ratio (0-6 years) 914 in India and in Rajasthan it is 883. Thought, the child sex-ratio in Rural India is 919. These findings were similar to Bisai Samiran's (2010).[7] In Bisai Samiran's (2010) study among urban, poor preschool children in West Bengal, INDIA 57.5% boys and 49.6% were girls. In the study it was revealed that fully immunized children were 81.2%, Partially immunized were 12.4% and unimmunized were 6.4%. These findings are non-comparable with the observation ofNFHS-4 report[5], 62% Children of 12-23 months age have been fully immunized (BCG, measles, and 3 doses each of polio and DPT) in India. Whereas according to NFHS-3 report[6], 43.5% Children of 12-23 months age were fully immunized (BCG, measles, and 3 doses each of polio and DPT) in India. According to NFHS-4 report, 61.3% and 63.9% Children of 12-23 months age have been fully immunized (BCG, measles, and 3 doses each of polio and DPT) in rural areas of India and urban areas of India respectively. The present study showed that mean value of mid upper arm circumference (MUAC) was in normal range (Green) of mid upper arm circumference (MUAC) that is >12.5 cm and very few i.e. 12 (7%) children were in borderline (Yellow) group (11.5-12.5 cm). There was no child who's MUAC was <11.5 cm. These finding were very similar to MD Dairo et al (2012) study which showed that there was 94.4% normal mid upper arm circumference among children 12-59 months and the overall prevalence of under nutrition among the respondents was 5.6%.[8]

The present study showed that intake of all ten nutrients was deficient among 52 to 60% of study population while excess intake was observed among 1-8% children. These finding are similar with the observation of among survey like R. N. Mishra (2005) and SP Mitra (2007). Both studies reported that maximum of children i.e. in R.N. Mishra report more than 90% of pre-school children and in SP Mitra study more than 81% of under-five pre-schoolchildren was below 50% of the recommended dietary allowances.[9-10] In the present study it was observed that although majority of undernourished children were in 3-4 year of age (34.6%) and minimum undernourished children were in 1-2 year of age (8.3%) but the difference of proportion of undernourished children as per age was found not significant

(P>0.05). These finding are well comparable to Bhavsar S et al (2012).[11] Saiprasad Bhavsar et al (2012) observed that the nutrition status of children had not significant association with age.

This study showed that according to birth order percentage of undernourished children was 1st -8.48%, 2nd -13.34%, 3rd -31.82%, 4th -26.67%, >4th -35.72%. Difference in proportion of undernourished children as per birth order was found significant (P <0.001). Maximum (35.72%) undernourished children were with birth order >4 and minimum (8.48%) with 1st birth order. These finding are similar to Baranwal K Study[12] 'factors influencing the nutritional status of under-five (1-5 years) children in urban- slum area of Varanasi' which states that higher birth order had higher prevalence of malnutrition.[10] In this study revealed that milestone like speaking simple sentence, riding tricycle, telling a story, knowing gender and name delayed in more than 60% children but standing without support and playing a ball game were delayed in 15-21%.

V. CONCLUSION

It can be concluded from this present study that 22.94% children were undernourished and 7.1% were border line as per MAUC. Undernourishment (below 2SD) was found significantly more (p< 0.001) in form of birth order difference (35.9%). In milestone developing simple sentence, telling a story, riding a tricycle and knows gender and full name were delayed in most of the children (>60%).

CONFLICT OF INTEREST

None declared till now.

REFERENCES

[1] https://www.unicef.org/nutrition/index.

[2] Black RE, Victoria CG, Walker SP, et al. Maternal and child undernutrition and overweight in low-income and middle-income countries. Lancet 2013;382:427–51.

[3] Ministry of Health and Population. Nepal Health Sector Program- Implementation Plan II(NHSP-IP 2) 2010-2015: Ministry of Health and Population. Government of Nepal, 2010 312010.

[4] Park SE, Kim S, Ouma C, et al. Community management of acute malnutrition in the developing world. Podiatry Gastroenterology Hepatol Nutr 2012;15:210–9.

[5] National Family Health Survey (NFHS-4) 2015-16.

[6] National Family Health Survey (NFHS-3) 2005-06.

[7] Samiran B 'Nutrition status based on mid arm circumference among urban, poor pre-school children in north 24 Parganas, West Bengal, India', Serbian journal of experimental and clinical Research 2010, vol. 11, br. 4, str. 141-145.

[8] Dairo MD, Fatokun ME, Kuti MReliability of the Mid Upper Arm Circumference for the Assessment of Wasting among Children Aged 12-59 Months in Urban Ibadan, Nigeria. International Journal Biomed Science 2012 Jun;8(2):140-143.

[9] Mishra RN, Mishra CP, Sen P, Singh TB. Nutritional status and dietary intake of pre-school2 children in urban slums of Varanasi. Indian Journal of community Medicine 2005; 26(2) :2001-04 – 2001-06.

[10] Mitra SP. A study of dietary intake and nutritional status of under five children in slums of Kolkata city. Indian journal of community medicine 2007; 32(1) :92.

[11] Bhavsar S, Mahajan H, Kulkarni R. Maternal and Environmental Factors Affecting the Nutritional Status of Children in Mumbai Urban Slum. International journal of scientific and research publication 2012; 2(1):2250-3153.

[12] Baranwal K, gupta VM, Mishra R N, Prakash S, Pandey O N, Factors influencing the nutritional status of under-five (1-5 years) children in urban-slum area of Varanasi. Indian Journal of community Health 2010; 21(2).