

## Original Article

# MATERNAL FACTORS ASSOCIATED WITH NUTRITIONAL STATUS OF 1-5 YEARS CHILDREN RESIDING IN FIELD PRACTICE AREA OF RURAL HEALTH TRAINING CENTRE NAILA, JAIPUR (RAJASTHAN) INDIA

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**Financial Support:** None declared

**Conflict of interest:** None declared

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**How to cite this article:**

Sonkaria L, Zafer A, Gaur KL, Manohar RK. Maternal Factors Associated with Nutritional Status of 1-5 years Children Residing in Field Practice Area of Rural Health Training Centre Naila, Jaipur (Rajasthan) India. Natl J Community Med 2014; 5(3);283-7.

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**Date of Submission:** 28-02-14

**Date of Acceptance:** 24-05-14

**Date of Publication:** 30-9-14

## ABSTRACT

**Background:** Good nutrition benefits families, their communities and the world as a whole. Maternal factors are important in maintaining the nutrition of 1-5 year children.

**Objective:** To ascertain the association of maternal factors with nutrition of 1-5 year children.

**Materials and Methods:** A community based cross sectional descriptive type of observational study was carried out in the field practice area of RHTC Naila in Jaipur district of Rajasthan. 30 Cluster sampling technique was used to cover whole field practice area of RHTC. 330 children 1-5 years were selected from clusters were. These children were examined and their mothers were interviewed. Information about nutritional status of children with relevant socio-demographic data were also collected. To find out associating factors chi-square tests of significance were used.

**Results:** Out of total 330 children 43 i.e. 13.03% were under-nourished. Undernourished children were more in children of 26-30 years age group mothers than extremes of reproductive ages ( $P < 0.001$ ). Likewise under-nourishment was found more in children of illiterate mothers ( $< 0.05$ ) and children of mothers having less birth spacing ( $P < 0.05$ ). Maternal BMI, maternal occupation, maternal age at marriage, maternal age at consummation, maternal age at 1<sup>st</sup> child birth and maternal anemia were not found to be associated with nutritional status of children.

**Conclusion:** Nutrition status of children was associated with maternal age, maternal education and spacing between children whereas it was not associated with maternal BMI, maternal occupation, maternal age at marriage, maternal age at consummation, maternal age at 1<sup>st</sup> child birth and maternal anemia.

**Key words:** Nutritional status, Maternal factors, Spacing, Under fives

## INTRODUCTION

Nutrition is the cornerstone that affects and defines the health of all people and it paves the way for us to grow, develop, work, play and resist infection. A good nutritional start has an impact for life on her or his physical, mental and social development. Malnutrition plays a major role in half of the 10.4 million annual child deaths in the developing world.<sup>1</sup> Globally, prevalence of wasting and severe wasting in 2012 estimated almost 8 percent and just less than 3 percent respectively.<sup>2</sup>

In India, as per NFHS-3 (2005-6)<sup>3</sup> survey 48% of children under 5 years were found stunted, 20% wasted and 43% underweight. And more than half (54%)

of deaths before age of 5 years are related to malnutrition.<sup>3</sup>

Rajasthan carries one of the highest burdens of under-nourished children in India and according to National Family Health Survey (2005-2006)<sup>3</sup> in Rajasthan, 44 percent of the children under the age group of 3 years are reported to be underweight.

Role of mother is important on her child's health. She feeds her child and keeps her child clean. She is the 1<sup>st</sup> teacher of her child also. The mental and social development of the child is dependent on the mother. Hence, the present study was conducted in rural area to ascertain the maternal factors associated with nutritional status of 1-5-year-old children in the field

practice area of Rural Health Training Centre (RHTC) Naila in Jaipur district of Rajasthan

**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)<sup>2</sup> having low weight for age. (i.e. **P=38.38%**).

Sample size<sup>4</sup> = 4PQ/L<sup>2</sup>, here Q = 100 - P = 61.6%, L = Error (20% of P) = 7.6%

Therefore, 4\*38.38\*61.6/7.6\*7.6 = 164 but Design effect<sup>4</sup>=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 1<sup>st</sup> birthday has gone and child whose 5<sup>th</sup> birthday is awaited) having normal term, normal delivery and normal birth weight and parents are willing to participate in the study were surveyed. Whole field practice area of RHTC was divided into 30 for equal representation of whole area. So from each of these 30 clusters, 11 children in the age group of 1-5 years were selected to have children ≥ sample size. These selected children along with their mothers were examined and mothers were interviewed as per a predesigned, pre-tested, semi-structured interview schedule.

Data thus collected was entered into Microsoft excel 2010 worksheet in the form of master chart. Then data were classified and analysed as per the aims and objectives. To get inferences Chi-square test was applied to compare two proportion and unpaired 't' test was applied to compare two means with help of Primer Version 6 statistical software.

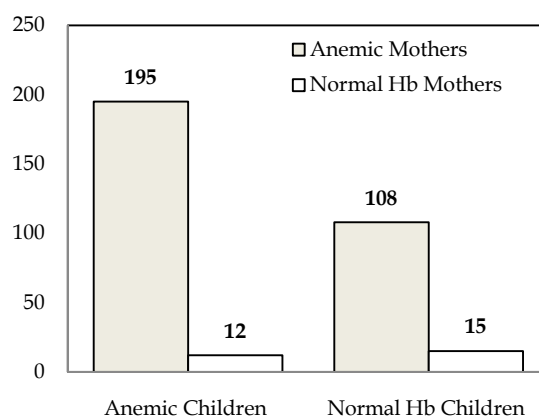
**RESULTS**

In the present study, out of total 330 children 43 i.e. 13.03% were under-nourished. When maternal factors associated with nutritional status of children were revealed it was found that variation in proportion of undernourished children as per maternal age was found significant (p < 0.001). Undernourished children were observed maximum (24.39%) in 26-30 year aged mothers. No undernourished child was found in <20 year age group and 36-40 year age group of mothers. As far as the BMI was concerned it was found that although undernourished children were maximum in the mothers whose BMI was <18.5 and none of the undernourished child was found among obese moth-

ers but difference in proportion of undernourished children as per maternal BMI was found not significant (P>0.05).

Likewise it was also observed in present study that difference in proportion of undernourished children as per maternal educational level was found significant (p < .05). Under-nutrition was found maximum in illiterate mothers (19.37%). Under nutrition in children was about 15 times more in illiterate mothers than literate mother (OR=14.79 with CL 0.077-0.459). But when occupation of mothers was concerned it was found that although undernourished children were more in working than non-working mothers (15% v/s 12.17%) but the difference in proportion of undernourished children as per maternal working status was found not significant (P>0.05).

Regarding maternal factors related to reproductive life of mothers it was observed that although undernourished children were found maximum among children of mothers whose age at marriage was within 19-21 years and none of undernourished child was found among children of mother whose age at marriage was >21 year but this difference in proportion of undernourished children as per maternal age at marriage was found not significant (P>0.05). Likewise under-nutrition was found maximum (14.91%) children of mothers whose age at consummation was within 18-20 years and minimum (10.96%) in children of mother whose age at consummation was <18 years. But this variation in difference in proportion of undernourished children as per maternal age at consummation was also not found significant (P>0.05). In the similar pattern although under-nutrition was found maximum (15.30%) among children of mothers whose age at first child birth was between 18-20 years and minimum (7.69%) in children of mothers whose age at first child birth was <18 years. This difference in proportion of undernourished children as per maternal age at first child birth was also not found significant (P>0.05).



Chi-square =3.396 with 1 degree of freedom; P = 0.065 LS: NS

**Fig 1: Association of Anemic Children to Anemic mothers**

It was also revealed in the present study that difference in proportion of undernourished children as per their birth spacing time was found significant ( $p < .001$ ). Although out of total 330 children 118 children were of 1<sup>st</sup> birth order so birth spacing could be observed only in 212 children, where it was observed that under-nutrition was found maximum in children having 1 to 2 year of spacing (28 out of 37 i.e.75.66%) and minimum in children with >3 year of spacing (1 out of 37 i.e.2.70%). Under nutrition in children was

about 20 times more in mothers having spacing less than 2 years than mother having spacing more than 2 years (OR=19.88 with CL 0.074-0.378)

Present study also observed that although proportion of anemic children were more in anemic mothers than the proportion of anemic children of normal mothers (64.36% v/s 44.44%) but this difference in proportion of anemic children as per anemic mothers was found not significant ( $p > 0.05$ ).

**Table 1: Association of Maternal Socio-demographic Factors with Nutritional Status of children**

Variables	Normal nourished (n=287)		Under nourished (n=43)		Total (N=330)	Chi-square (df)	P value
	Children	Percentage	Children	Percentage			
<b>Age of Mother</b>							
20 or less	9	100	0	0	9	26.128 (4)	< 0.001
21-25	158	94.61	9	5.39	167		
26-30	93	75.61	30	24.39	123		
31-35	17	80.95	4	19.05	21		
36-40	10	100	0	0	10		
<b>BMI of Mother</b>							
Obese ( $\geq 25$ )	15	100	0	0	15	2.544 (2)	0.280
Normal (18.5-24.9)	186	86.92	28	13.08	214		
Undernourished (<18.5)	86	85.15	15	14.85	101		
<b>Education of Mother</b>							
Illiterate	154	80.63	37	19.37	191	17.363 (5)	0.004
Primary completed	66	95.65	3	4.35	69		
Middle completed	30	90.91	3	9.09	33		
Secondary completed	13	100	0	0	13		
senior secondary completed	3	100	0	0	3		
Graduation completed	21	100	0	0	21		
<b>Maternal Occupation</b>							
Yes	85	85.00	15	15.00	100	0.273(1)	0.601
No	202	87.83	28	12.17	230		

**Table 2: Association of Maternal Reproductive Factors with Nutritional Status of children**

Variables	Normal nourished (n=287)		Under nourished (n=43)		Total (N=330)	Chi-square (df)	P value
	No.	%	No.	%			
<b>Age at Marriage</b>							
<15	58	86.57	9	13.43	67	4.741 (4)	<b>0.315</b>
15-17	40	93.02	3	6.98	43		
17-19	118	86.13	19	13.87	137		
19-21	57	82.61	12	17.39	69		
>21	14	100.00	0	0.00	14		
<b>Age at Effective Marriage</b>							
<18	130	89.04	16	10.96	146	1.053 (2)	0.591
18-20	137	85.09	24	14.91	161		
>20	20	86.96	3	13.04	23		
<b>Age at 1<sup>st</sup> child</b>							
<18	36	92.31	3	7.69	39	2.164 (2)	0.339
18-20	155	84.70	28	15.30	183		
>20	96	88.89	12	11.11	108		
<b>Spacing between children</b>							
1-1.5 year	24	70.59	10	29.41	34	25.382 (4)	<0.001
1.5-2 year	36	66.67	18	33.33	54		
2-2.5 year	28	82.35	6	17.65	34		
2.5-3 year	41	95.35	2	4.65	43		
>3 year	46	97.87	1	2.13	47		

**Table 3: Risk Ratio of Maternal Factors for Nutritional Status of children**

Variables	Nutritional Status of Children (N=330)		OR	CL	Chi-square; P Value; LS
	Normal (n=287)	Undernourished (n=43)			
Age of Mother (in Years)					
20 or less	260	39	1.013	0.336-3.050	0.067; 0.796; NS
31 and above	27	4			
BMI of Mother					
Undernourished (<18.5)	86	15	0.799	0.406-1.570	0.226; 0.635; NS
Not Undernourished (≥18.5)	201	28			
Education of Mother					
Illiterate	154	37	0.188	0.077-0.459	14.790; <0.001; S
Literate	133	6			
Maternal Occupation					
Yes	85	15	0.785	0.395-1.545	0.273; 0.601; NS
No	202	28			
Age at Marriage (in Years)					
<19	216	31	1.170	0.574-2.415	0.067; 0.796; NS
19 and above	71	12			
Age at Effective Marriage					
<20	167	40	0.626	0.177-2.211	0.203; 0.652; NS
20 and above	20	3			
Age at 1 <sup>st</sup> child (in Years)					
<20	191	31	0.770	0.379-1.567	0.300; 0.584; NS
20 and above	96	12			
Spacing between children (in yrs)					
< 2	60	28	0.168	0.074-0.378	19.880; <0.001; S
2 and above	115	9			

## DISCUSSION

The present study revealed that undernourished children were observed maximum (24.39%) in 26-30 year aged mothers and none was in <20 year or 36-40 year age group ( $p < 0.001$ ) may be because of lesser proportion of children in this group. Well comparable findings were reported by Mittal et al (2007)<sup>5</sup> who observed chances of being underweight decreased as the mother's age increased. But ParamitaSengupta et al (2010)<sup>6</sup> reported that mother's age was not significantly associated with underweight or wasting.

In the present study it was also observed that although undernourished children were maximum in the mothers whose BMI was <18.5 but difference in proportion of undernourished children as per maternal BMI was found not significant. These findings were well comparable to NFHS-3<sup>3</sup> and Md. IsratRayhan & M Sekandar Hayat Khan (2006)<sup>7</sup> studies.

In the present study it was observed that difference in proportion of undernourished children as per maternal educational level was found significant ( $p < .05$ ). Under-nutrition was found maximum among illiterate mothers (19.37%). Allmost similar was observed by Md. IsratRayhan and M Sekandar Hayat Khan (2006)<sup>7</sup> and Sai prasadBhavsar et al (2012)<sup>8</sup> reported prevalence was the highest where mothers were illiterate i.e. 60.9% vs 21.2% and 12.2% v/s 7.8% respectively. S. Chakraborty et al (2006)<sup>9</sup> in their survey in children (0 to 6 year) in a rural population of Jhansi district (U.P.) and ParamitaSengupta et al (2010)<sup>6</sup> also found highest prevalence of Protein Energy Malnutrition (PEM) among the children of illiterate mothers ( $p < 0.05$ ). KavitaBaranwal et al (2010)<sup>10</sup> in their research also observed that among the socio-

economic factors mothers, literacy was significantly associated with PEM. On contrarily Statistics from South Africa (2003)<sup>11</sup> reflected that the level of education of parents and caregivers had no effect on the prevalence of wasting, as undernutrition was also high amongst parents with higher education. This may be because Africa itself is a underdeveloped country.

The present study shows that although undernourished children were more in working than non-working mothers (15% v/s 12.17%) but the difference in proportion of undernourished children as per maternal working status was found not significant. In well in resonance with present study findings regarding mother's occupation were of SaiprasadBhavsar et al<sup>8</sup> but in contrast to this Fayyaz Ahmed Shaikh (2007)<sup>12</sup> study of five years old children in Pakistan where it was revealed that 50% of children of mothers who were working were undernourished.

The present study also observed that age at marriage, age at consummation of mother or age at first child birth was not associated with nutritional status of children. Likewise Ashishek et al (2011)<sup>13</sup> observed that nutritional outcomes gradually improved as mother's age at first birth increased from under 20 years to more than 30 years of age.

In the present study it was observed under-nutrition was found maximum in children having 1 to 2 year of spacing and minimum in children with >3 year of spacing i.e. 75.66% v/s.2.7% ( $p < .001$ ). This association was also similar in studies like ParamitaSengupta et al (2010)<sup>6</sup> who observed 44.4% v/s 29.6% prevalence of undernutrition with a birth interval  $\leq 2$  years and more. Basit et al (2012)<sup>14</sup> observed in their study

among children aged one to five years that under nutrition was associated with more than two children with a birth interval  $\leq 2$  years [OR- 4.93 (CI: 1.78 - 13.61)].

In the present study it was also observed that among anemic mothers there were more anemic children (64.36%) as compared to normal haemoglobin mothers (44.44%). This difference in proportion of anemic children as per anemic mothers was found not significant. Some studies also found similar findings like Mauricio S Leite et al (2013)<sup>15</sup> study among indigenous children in Brazil found that higher risk of presenting with anemia was documented in presence of maternal anemia..

## CONCLUSION

Nutrition status of children was associated with maternal age, maternal education and spacing between children whereas it was not associated with maternal Body Mass Index (BMI)<sup>16</sup>, maternal occupation, maternal age at marriage, maternal age at consummation, maternal age at 1<sup>st</sup> child birth and maternal anaemia

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