

## Original Research Article

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# A study to assess nutritional status and related factors among children of 6 months to 5 years in residing at field practice area of B. J. Medical Collage, Ahmedabad

Hely B. Patel, Vaishali C. Patel\*, Hetal Y. Patel, Rajan K. Parmar, Alpesh Patel

Department of Community Medicine, B. J. Medical College, Ahmedabad, Gujarat, India

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**\*Correspondence:**

Dr. Vaishali C. Patel,

E-mail: [vaishali2316@gmail.com](mailto:vaishali2316@gmail.com)

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## ABSTRACT

**Background:** Under nutrition continues to be an important public health problem, inspite of several nutrition intervention programs in India. The present study was carried out to know the prevalence of underweight, stunting and wasting among 6 months to 5 years children and to assess nutrition status and related factors among study population.

**Methods:** A community based cross sectional study using stratified random sampling. Total 165 samples were taken from 5 field practice area of B. J. Medical College, Ahmedabad. From each area 33 random samples were taken.

**Results:** Out of 165 children 80 and 85 were male and female. The prevalence of underweight, stunting and wasting was 45%, 46% and 29% respectively. SE class IV and V, low birth weight, higher birth order, late age of starting complementary feeding, parents education were significantly associated with undernutrition.

**Conclusions:** The risk of undernutrition is higher in field practice area of B. J. Medical College, Ahmedabad. There is a need to strengthen promotion of maternal nutrition; maternal education and improving household socio-economic condition along with health care services may improve nutritional status of children.

**Keywords:** Nutritional status, Related factors, 6 month to 5 year children, Field practice area

## INTRODUCTION

Malnutrition remains a major public health problem throughout the developing world and is an underlying factor in over 50% of the children deaths under 5 years who die each year of preventable causes.<sup>1,2</sup> Malnutrition and poor diets constitute the number-one driver of the global burden of disease.<sup>3</sup> Nearly half of all deaths in children under 5 are attributable to under nutrition. This translates into the unnecessary loss of about 3 million young lives a year.<sup>4</sup> Worldwide more than 20 million children are affected by sever acute malnutrition majority of them live in Sub-Saharan African and South East Asia region.<sup>5,6</sup>

Global Nutrition Report-2016 by WHO indicated India still lags behind in tackling malnutrition effectively. In terms of stunting, India ranks 114th out of 132 nations (incidence: 38.7%). For wasting, India ranks 120th among 130 countries (incidence: 15.1%).<sup>7</sup> In India 20% of children less than 5 years of age suffer from wasting due to acute under-nutrition. More than one third of the world's children who are wasted live in India.<sup>8</sup> 54 million (48%) children under-five years in India are stunted. India accounts for 33 per cent of stunted children in the world.<sup>8</sup>

In Gujarat, 12 lakhs of children are born each year and many mothers die during this process of pregnancy and child birth.<sup>9</sup> Infant mortality rate and under 5 mortality

rate is 34 and 43 respectively per 1000 live birth as per NFHS-4 Report.<sup>10</sup> In 2014, prevalence of underweight (too thin for age) in Gujarat is estimated to be at 10.4% whereas wasting (too thin for height) is estimated to be at 11.4%. Stunting (too short for age) is estimated to be at 37.2%.<sup>11</sup>

The factors influencing and precipitating malnutrition are various and are multidimensional. Those factors can lead to serious consequences like diseases, development delay, deficiency, disability and death. Malnutrition can be measured by different methods. Anthropometric measurements and clinical examinations are essential parts of examination the children to know their nutritional status. Integrated management of malnourished children is done through -3 tier approach.<sup>12</sup> Assessment of malnutrition is based on objective anthropometric measurements such as weight-for-height, height-for-age, weight-for-age.<sup>13,14</sup>

## METHODS

A community based cross sectional study was conducted during August 2018 to October 2018 at field practice areas of B. J. Medical College, Ahmedabad that include 6 months to 5 years children. There were total 165 participants taken from 5 field practice areas of B. J. Medical College, Ahmedabad. I selected 165 participants from field practice area purposively. From each area 33 random samples were taken. Interview was done by using pre-tested semi- structured questionnaire. Use of WHO classification for measurement of malnutrition was done. The height and weight of each child was compared with WHO growth reference data (2006) for that particular age and sex to get weight-for-age, height-for-age and weight-for-height indices. Children below-2 SD of the reference median on any of these indices was considered as undernourished and termed as underweight, stunted and wasted respectively. Children below-3 SD was considered to be severely undernourished and children with weights above +2 SD according to weight-for-height criteria were considered over weight. The study included as factors affecting malnutrition was gender of children, education of parents, socio-economic class, birth weight of children, birth order of children, types of family. Parents were interviewed by house to house visit. The results were expressed in percentages represented by tables and analysis was done by Ms Excel. Informed verbal consent was taken from the parents.

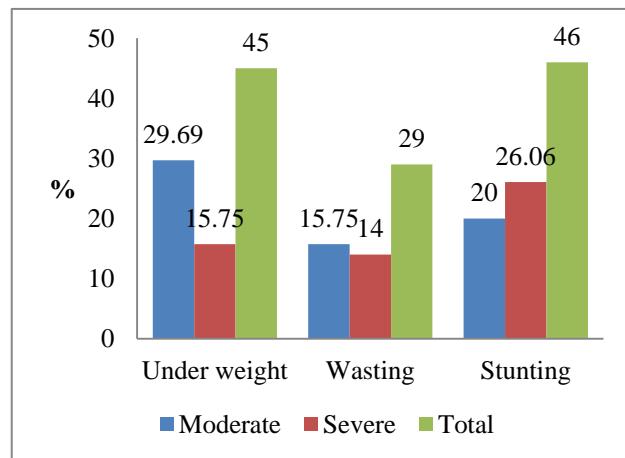
## RESULTS

In the present study comprising of 165 children aged 6months to 5 years, 48% were males and 52% were female's children. With regards to age distribution it was observed that highest children were found in 49 to 60 months 35.15%. Out of total children 50.9% children belonged to the joint family, 21.21% children belonged to the extended family and only 27.8% children belonged to nuclear family.

With regards to socio-economic status, majority 57.5% of children belonged to class IV according to modified B. G. Prasad's classification, 8.48% children belonged to class II, 23.03% children from class III and 10.9% of the children belonged to class V. There were no children in the class I.

In context to literacy status of parents, literacy rate among mothers were 82.43% and in fathers were 90.31%. Further among literate mothers, 40% had primary education, 36.96% had secondary and higher secondary education and only 5.45% had graduated.

Out of 165 children 56.3% children were found with low birth weight that was less than 2.5kg. 41.21% children had 1<sup>st</sup> birth order, 40% children had 2<sup>nd</sup> birth order, 12.72% children had 3<sup>rd</sup> birth order and 6.06% children had >3<sup>rd</sup> birth order.



**Figure 1: Prevalence of malnutrition.**

As shown in Figure 1, according to WHO growth chart standard, out of total 165 involved children in study, percentage of underweight (low weight-for-age) was 29.69% and percentage of sever underweight was 15.75%. So prevalence of underweight (acute malnutrition) was 45.44%. The prevalence of stunting (low height-for-age) and sever stunting was 20% and 26.06% which reflected the problem of chronic malnutrition. Wasting (low weight-for-height) was present in 15.75% of children and proportion of sever wasting was 14%.

Prevalence of wasting was more among those children whose complementary feeding was started after 12 month than whose complementary feeding was started between 6-12 months. Wasting and late age of starting complementary feeding was statistically significant (Table 1).

Table 2 shows association between V socio-economic class, illiteracy of father education, low birth weight, higher birth order and stunting was statistically significant.

**Table 1: Association between wasting and related factors.**

| Variables                                 | Wasting    |           | Total | P value        |
|---|------------|-----------|-------|----------------|
|   | N (%)      | N (%)     |       |                |
| <b>Gender</b>                             |            |           |       |                |
| Boys                                      | 25 (31.2)  | 55 (68.7) | 80    | $\chi^2=0.179$ |
| Girls                                     | 24 (28.2)  | 61 (71.7) | 85    | p=0.67         |
| <b>Socio economic class</b>               |            |           |       |                |
| II  | 3 (21.4)   | 11 (78.5) | 14    |                |
| III                                       | 10 (26.3)  | 28 (73.6) | 38    | $\chi^2=1.87$  |
| IV  | 32 (33.6)  | 63 (66.3) | 95    | p=0.59         |
| V   | 4 (22.2)   | 14 (77.7) | 18    |                |
| <b>Father education</b>                   |            |           |       |                |
| Illiterate                                | 5 (31.2)   | 11 (68.7) | 16    | $\chi^2=0.02$  |
| Literate                                  | 44 (29.5)  | 105 (70)  | 149   | P=0.88         |
| <b>Mother education</b>                   |            |           |       |                |
| Illiterate                                | 12 (41.3)  | 17 (58.6) | 29    | $\chi^2=2.3$   |
| Literate                                  | 37 (27.2)  | 99 (72.7) | 136   | p=0.129        |
| <b>Birth weight (kg)</b>                  |            |           |       |                |
| $\geq 2.5$                                | 26 (27.9)  | 67 (72.1) | 93    | $\chi^2=0.309$ |
| $<2.5$                                    | 23 (31.9)  | 49 (68.0) | 72    | p=0.57         |
| <b>Birth order</b>                        |            |           |       |                |
| 1   | 17 (25)    | 51 (75)   | 68    |                |
| 2   | 21 (31.8)  | 45 (68.1) | 66    | $\chi^2=1.502$ |
| 3   | 7 (33.3)   | 14 (66.6) | 21    | p=0.68         |
| $>3$                                      | 4 (40)     | 6 (60)    | 10    |                |
| <b>Exclusive breast feeding</b>           |            |           |       |                |
| Yes                                       | 28(26.4)   | 78(73.5)  | 106   | $\chi^2=1.529$ |
| No  | 21(35.5)   | 38(64.4)  | 59    | p=0.216        |
| <b>Age of starting complementary feed</b> |            |           |       |                |
| 6-12 m                                    | 33 (27.04) | 89 (72.9) | 122   | $\chi^2=8.445$ |
| $>12$ m                                   | 11 (61.11) | 7 (38.8)  | 18    | p=0.003        |

**Table 2: Association between stunting and related factors.**

| Variables                   | Stunting  |           | Total | P value        |
|-----------------------------|-----------|-----------|-------|----------------|
|                             | N (%)     | N (%)     |       |                |
| <b>Gender</b>               |           |           |       |                |
| Boys                        | 34 (42.5) | 46 (57.5) | 80    | $\chi^2=29.98$ |
| Girls                       | 71 (83.5) | 14 (16.4) | 85    | p=4.8          |
| <b>Socio economic class</b> |           |           |       |                |
| II                          | 5 (35.7)  | 9 (64.28) | 14    | $\chi^2=12.12$ |
| III                         | 9 (23.6)  | 29 (76.3) | 38    | p=0.006        |
| IV                          | 51 (53.6) | 44 (46.3) | 95    |                |
| V                           | 11 (61.1) | 7 (38.8)  | 18    |                |
| <b>Father education</b>     |           |           |       |                |
| Illiterate                  | 12 (75)   | 4 (25)    | 16    | $\chi^2=5.973$ |
| Literate                    | 64 (42.9) | 85 (57.0) | 149   | p=0.01         |
| <b>Mother education</b>     |           |           |       |                |
| Illiterate                  | 18 (62.0) | 11 (37.9) | 29    | $\chi^2=2.973$ |
| Literate                    | 60 (44.1) | 75 (55.1) | 136   | p=0.08         |
| <b>Birth weight (kg)</b>    |           |           |       |                |
| $\geq 2.5$                  | 34 (36.5) | 59 (63.4) | 93    | $\chi^2=7.74$  |
| $<2.5$                      | 42 (58.3) | 30 (41.6) | 72    | p=0.0053       |

Continued.

| Variables                                 | Stunting<br>N (%) | Normal<br>N (%) | Total | P value        |
|---|-------------------|-----------------|-------|----------------|
| <b>Birth order</b>                        |                   |                 |       |                |
| 1   | 21 (30.8)         | 47 (69.1)       | 68    |                |
| 2   | 38 (57.5)         | 28 (42.4)       | 66    |                |
| 3   | 9 (42.8)          | 12 (57.1)       | 21    | $\chi^2=14.55$ |
| >3  | 8 (80)            | 2 (20)          | 10    | $p=0.0022$     |
| <b>Exclusive breast feeding</b>           |                   |                 |       |                |
| Yes                                       | 47 (44.3)         | 59 (55.6)       | 106   | $\chi^2=0.353$ |
| No  | 29 (49.1)         | 30 (50.8)       | 59    | $p=0.552$      |
| <b>Age of starting complementary feed</b> |                   |                 |       |                |
| 6-12 m                                    | 57 (46.7)         | 65 (53.2)       | 122   | $\chi^2=1.136$ |
| >12 m                                     | 6 (33.3)          | 12 (66.6)       | 18    | $p=0.286$      |

**Table 3: Association between underweight and related factors.**

| Variables                                 | Underweight<br>N (%) | Normal<br>N (%) | Total | P value        |
|---|----------------------|-----------------|-------|----------------|
| <b>Gender</b>                             |                      |                 |       |                |
| Boys                                      | 34 (42.5)            | 46 (57.5)       | 80    | $\chi^2=0.547$ |
| Girls                                     | 41 (48.2)            | 44 (51.7)       | 85    | $p=0.45$       |
| <b>Socio economic class</b>               |                      |                 |       |                |
| II  | 4 (28.5)             | 10 (71.4)       | 14    |                |
| III                                       | 13 (34.2)            | 25 (65.7)       | 38    | $\chi^2=7.91$  |
| IV  | 52 (54.7)            | 43 (45.2)       | 95    | $p=0.047$      |
| V   | 6 (33.3)             | 12 (66.6)       | 18    |                |
| <b>Father education</b>                   |                      |                 |       |                |
| Illiterate                                | 10 (62.5)            | 6 (37.5)        | 16    | $\chi^2=2.076$ |
| Literate                                  | 65 (43.6)            | 84 (56.3)       | 149   | $p=0.149$      |
| <b>Mother education</b>                   |                      |                 |       |                |
| Illiterate                                | 17 (58.6)            | 12 (41.3)       | 29    | $\chi^2=2.46$  |
| Literate                                  | 58 (42.6)            | 78 (57.3)       | 136   | $p=0.116$      |
| <b>Birth weight (kg)</b>                  |                      |                 |       |                |
| $\geq 2.5$                                | 35 (37.6)            | 58 (62.3)       | 93    | $\chi^2=5.25$  |
| <2.5                                      | 40 (55.5)            | 32 (44.4)       | 72    | $p=0.02$       |
| <b>Birth order</b>                        |                      |                 |       |                |
| 1   | 26 (38.2)            | 42 (61.7)       | 68    |                |
| 2   | 32 (48.4)            | 34 (51.5)       | 66    | $\chi^2=2.934$ |
| 3   | 11 (52.3)            | 10 (47.6)       | 21    | $p=0.40$       |
| >3  | 6 (60)               | 4 (40)          | 10    |                |
| <b>Exclusive breast feeding</b>           |                      |                 |       |                |
| Yes                                       | 45 (42.4)            | 61 (57.5)       | 106   | $\chi^2=1.077$ |
| No  | 30 (50.8)            | 29 (49.1)       | 59    | $p=0.29$       |
| <b>Age of starting complementary feed</b> |                      |                 |       |                |
| 6-12 m                                    | 54 (44.2)            | 68 (55.7)       | 122   | $\chi^2=0.184$ |
| >12 m                                     | 7 (38.8)             | 11 (61.1)       | 18    | $p=0.667$      |

Prevalence of underweight was more in low birth weight children 55.5% as compared to normal birth weight children that was 37.6% same as prevalence of underweight was 54.7% in IV socio-economic class that more than in II and III socio-economic class (28.5% and 34.2%) (Table 3).

## DISCUSSION

The study was conducted to measure the nutritional status of the children aged 6months to 5 years and to know risk factors associated with malnutrition.

Prevalence of malnutrition was higher as compare to Gujarat in which 37.2% of children under five years of age were stunted, 11.4% were wasted and 10.4 % children were underweight.<sup>11</sup> Another study conducted by Ratnu et al, has estimated prevalence of underweight (26.4%), stunting (49%) and wasting (10.7%) in 0-5 year children of Junagadh district of Gujarat.<sup>15</sup> Rao et al in a study conducted for Regional Medical Research Center for tribals (ICMR study), Jabalpur, India revealed that 61.6% of preschool children were underweight, 51.6% were stunted and 32.9% were wasted.<sup>16</sup> The study also revealed that severe degree (below-3 SD) of underweight, stunting and wasting in 27.8%, 30.3% and 6.5% children respectively.

Problem of chronic malnutrition was higher among the children in our study which might be the effect of poor education of parents, low birth weight, higher birth order and poor economic condition. Prevalence of acute malnutrition was lower than chronic malnutrition.

In our study prevalence of underweight and stunting was higher in female and prevalence of wasting was higher in male but this difference was not statistically significant. This higher prevalence of acute and chronic malnutrition in female children might be due to some negligence at level of care in terms of less attention towards diet of female children as compared with male children. Similarly in another study conducted by Sengupta et al, in urban slums of Ludhiana. Significantly more females than males were found to be underweight. More females were also found to be stunted and wasted though the gender differences here were not statistically significant.<sup>17</sup> Meshram et al has concluded that male under-five children are more prone for underweight, stunting and wasting when compared to girl children.<sup>18</sup>

There was no statistically significant difference in prevalence of malnutrition and education status of mother in our study. Nationwide shows that maternal education has a strong inverse relationship with all three measures of nutritional status according to NFHS-3, also Meshram et al has reported increased risk of malnutrition in children of illiterate mothers.<sup>22,18</sup> In another study carried out by Mittal et al, in urban slums of Tripura, Patiala overall 70.75% of the mothers was literate though up to different levels. Prevalence was the highest where mothers were illiterate (60.9%) vs value of 21.2% where mother had education more than high school. Similarly, figures for stunting were 65.25% where mother was illiterate and 31.3% where education level was more than high school. Differences were statistically significant for both the cases.<sup>19</sup> That all due to better health care practices in terms of proper exclusive breast feeding, in-time complementary feeding and quality and quantity of complementary feeding among literate mothers as compared to illiterate mothers. The female literacy status was higher in our study as compared to national average of 72.9% female and state average of 70.7%.

Children of families belonging to V and IV SES were at increased risk of malnutrition when compared to children of II and III SES. The results were similar to studies done by Harishankar et al and Reddy et al in Uttar Pradesh.<sup>20,21</sup>

The association of low birth weight with malnutrition is very much significant in our study which was statistically significant. Our findings are concordant with NFHS-3 which reveals that children with a history of low birth weight.<sup>22</sup>

Similar to low birth weight, the association of higher birth order and stunting was statistically significant. According to NFHS-3 data, children of higher birth orders are much more likely to be underweight than children of lower birth orders.<sup>22</sup>

## CONCLUSION

The risk of undernourishment is higher in our study population. Chronic malnutrition was more in our study. No child was found to be overweight or obese. Low socio-economic class, low birth weight, higher birth order, parent's education and late age of starting complementary feeding were affecting malnutrition. Low birth weight was found to have adverse effect on nutritional status of children and that was statistically significant with underweight and stunting.

## Recommendations

There is a need to strengthen promotion of maternal nutrition; maternal education and improving household socio-economic condition along with health care services may improve nutritional status of children. There is important to focus on malnutrition because "a weak child today will make a weak nation tomorrow".

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