

## Original Research Article

# Study of nutritional status and feeding practices in under five children from Solapur city

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## ABSTRACT

**Background:** In spite of various nutrition programs, burden of malnutrition is still high in India. Therefore, it is necessary to find out the gaps in community. Objective was to study the proportion of malnutrition and its association with some of the socio-demographic factors and also to study the trends of complementary feeding practices in children from 0 to 5 years attending UHTC OPD.

**Methods:** This is a cross-sectional study conducted in 146 children under 5 years attending UHTC OPD during a study period of 2 months.

**Results:** There were 70.55% of participants having malnutrition. About 15.75% children were severely acute malnourished. About 75.34% mothers received advice about breast feeding and complementary feeding. Exclusively breastfed infants were 48.63% and 52.05% infants were started complementary feeding on time. Only 25.34% were eating food from  $\geq 4$  groups and 74.65% children received  $< 4$  food groups.

**Conclusions:** Efforts are needed to promote exclusive breastfeeding and age-appropriate complementary feeding among infants.

**Keywords:** Malnutrition, Under five children, Complementary feeding, Breast feeding

## INTRODUCTION

Malnutrition refers to deficiencies or excesses in nutrient intake, imbalance of essential nutrients or impaired nutrient utilization. The double burden of malnutrition consists of both undernutrition and overweight and obesity, as well as diet-related non communicable diseases.<sup>1</sup> Around 45% of deaths among children under 5 years of age are linked to undernutrition in low and middle income countries.<sup>2</sup> Malnutrition was the predominant risk factor for death in children younger than 5 years of age in every state of India in 2017, accounting for 68.2% of the total under-5 deaths, and the leading risk factor for health loss for all ages, responsible for 17.3% of the total disability-adjusted life years (DALYs).<sup>3</sup> People who are poor are more likely to be affected by different forms of malnutrition. Also, malnutrition

increases health care costs, reduces productivity, and slows economic growth, which can perpetuate a cycle of poverty and ill-health.<sup>1</sup>

Malnutrition causes impaired cell mediated immunity, diarrhoea, reduction in cardiac muscle mass as well as psychological effect like apathy, depression, anxiety, self-neglect and also the relative risk of low intelligence quotient (IQ) in malnourished children is increased in comparison to well-nourished children.<sup>4,5</sup>

While the causes of malnutrition around the world are complex, unhealthy diets remain one of the main contributors to the global burden of disease. Unhealthy diets were identified as the second-leading risk factor for deaths and disability-adjusted life-years (DALYs) globally in 2016, while in 2017 they accounted for

approximately 11 million deaths and 255 million disability-adjusted life-years DALYs. To address malnutrition, diets must improve.<sup>6</sup>

Globally, only 1 in every 6 children is receiving a minimum acceptable diet.<sup>7</sup>

According to NFHS five, in Solapur district only seven percentage of children in age group of six to twenty-three months receive adequate diet. Also, the prevalence of stunting and overweight has been increased in Solapur district as NHFS four reported 25.4% of stunted and 2.6% overweight children while NHHS five reported 36.3% stunted and 4.3 percentage overweight children.<sup>8</sup> Therefore this study was undertaken with following objectives.

### **Objectives**

To study the proportion of malnutrition and its association with some of the socio-demographic factors and also to study the trends of complementary feeding practices in children from 0 to 5 years attending UHTC OPD.

## **METHODS**

This is a cross sectional observational study.

### **Study setting**

This study was conducted under the settings of UHTC under community medicine dept. of Dr. V. M. G. M. C. Solapur.

### **Study participants**

All children from 0 months to 5 years of age and their mothers attending OPD.

### **Study sample size**

According to NFHS IV, the prevalence of underweight in India is 35.7%.

Sample size calculated was 146 using the prevalence of 35.7% of underweight in Solapur district as per NFHS IV at 5% level of significance with 8% margin of error.

Non response error=10%.

The sample size calculated was 146.

### **Inclusion criteria**

All children from zero months to five years of age whose parents were residents of Solapur corporation area for more than the six months will be included in the current study.

### **Exclusion criteria**

Mothers not willing for participation and children with congenital defects or mentally handicapped will be excluded from the study.

Informed consent taken from all parents.

Every third child coming to UHTC OPD was examined and mother was interviewed till the sample size was reached.

This data was collected from 1st September to 31st October 2017

## **RESULTS**

Out of total 146 participants, majority were females 80 (54.79%) and 66 (45.20%) were males. There were 84 (57.53%) participants who belonged to Hindu religion and 62 (42.46%) belonged to Muslim religion. Maximum mothers were literate 138 (94.52%), only 8 (5.47%) mothers were illiterate. Majority of the participants belonged to socioeconomic status (SES) IV 68 (46.57%) followed by SES V 35 (23.97%), whereas 5 (3.42%) belonged to SES I, 19 (13.01%) to SES II and 19 (13.01%) to SES III.

Out of 146 children only 43 (29.45%) children showed normal growth parameters, whereas 103 (70.54%) children had either abnormal weight for age, height for age, weight for height and BMI for age.

Based on the WHO criteria for malnutrition Table 1 shows that 23 (15.75%) were SAM and 8 (5.47%) were MAM. Majority of MAM children 4 (2.72%), SAM children 14 (9.58%) belonged to age group of 0 to 1 years.

As per the WHO classification of BMI, 13 (8.90%) were obese and 8 (5.47%) were overweight 21 (14.38%) were wasted and 8 (5.47%) were severely wasted.

There were 29 (19.86%) children who were underweight and 17 (11.64%) were severely underweight based on weight for age WHO criteria. Majority of children who were underweight 14 (9.58%) and severely underweight 6 (4.11%) belonged to age of 0 to 1 years (Table 2).

Table 3 shows that 16 (10.95%) children were stunted and 42 (28.76%) were severely stunted based on height for age criteria of WHO. Maximum 6 (4.10%) stunted children belonged to 1 to 2 years and 44 (30.13%) severely stunted belonged to 0 to 1 years.

Presently, there were 18 (12.32%) infants who were on exclusive breastfeeding and 128 (87.68%) were started on complementary feeding. Regarding feeding practices, 71 (48.63%) participants received exclusive breast feed during first 6 months of life and 76 (52.05%) participants

received timely initiation of complementary feeding. There were 24 participants (16.43%) in whom there was late initiation of complementary feeding and 28 (19.17%) in whom it was initiated early. Out of 128 participants, who had started complementary feeding, the cleanliness habits related to hand hygiene and food preparation was appropriately followed in 132 (90.41%) mothers. Mothers of 118 (80.82%) participants preferred feeding with hand over spoon and there were 109 (74.65%) participants who received more than 4 food groups and 37 (25.34%) received less than 4 food groups. Regarding preference of food for complementary feeding, 127 (86.98%) participants responded that they preferred homemade food over junk foods. There were 8 (5.47%) participants food who received junk foods (i.e., milk+biscuits, milk+bread, milk+toast, chaha pav) and 11 (7.53%) preferred canned food (i.e., readymade food for complementary feeding available in market) (Figure 1).

statistically significant. There was also significant statistical association between malnutrition with the time of initiation of complementary feeding.

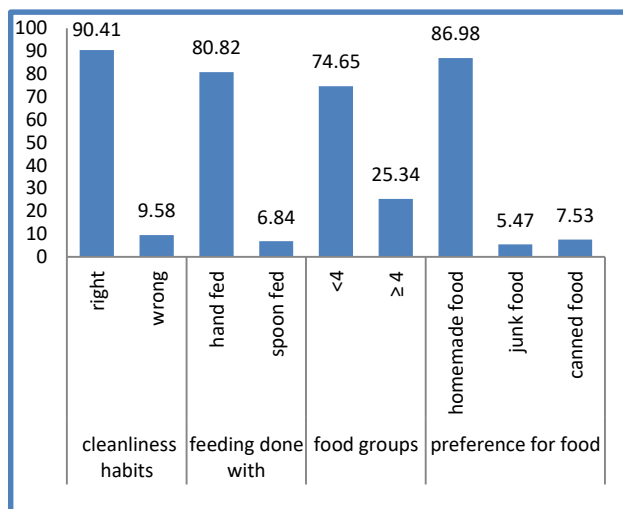


Figure 1: Complementary feeding practices in children.

Table 4 shows that malnutrition was not statistically associated with sex, religion, mothers' education and socioeconomic status but association between malnutrition with advice received by mothers on breast feeding and complementary feeding was found

Table 1: Distribution of malnutrition amongst children according to their age, (n=146).

Age (years)	MAM, N (%)	SAM, N (%)	Normal, N (%)	Total, N (%)	
0 to 1	<6 months	2 (1.36)	8 (5.47)	19 (13.01)	29 (19.86)
	6 months to 1	2 (1.36)	6 (4.10)	07 (4.79)	15 (10.27)
	Total	4 (2.72)	14 (9.58)	26 (17.80)	44 (30.13)
1 to 2	1 (0.68)	2 (1.36)	25 (17.12)	28 (19.17)	
2 to 3	1 (0.68)	2 (1.36)	17 (11.64)	20 (13.16)	
3 to 4	1 (0.68)	1 (0.68)	19 (13.01)	21 (14.38)	
4 to 5	1 (0.68)	4 (2.73)	28 (19.17)	33 (22.60)	
Total	8 (5.47)	23 (15.75)	115 (78.76)	146 (100)	

Table 2: Distribution of underweight amongst children according to their age.

Age (years)	Normal, N (%)	Underweight, N (%)	Severely underweight, N (%)	Total, N (%)	
0 to 1	<6 months	23 (15.75)	3 (2.05)	3 (2.05)	29 (19.86)
	6 months to 1	6 (4.10)	4 (2.73)	5 (3.42)	15 (10.27)
	Total	29 (19.86)	7 (4.79)	8 (5.47)	44 (30.13)
1 to 2	20 (13.69)	6 (4.10)	2 (1.36)	28 (19.17)	
2 to 3	14 (9.58)	4 (2.73)	2 (1.36)	20 (13.69)	
3 to 4	12 (8.21)	6 (4.10)	3 (2.05)	21 (14.38)	
4 to 5	25 (17.12)	6 (4.10)	2 (1.36)	33 (22.60)	
Total	100 (68.49)	29 (19.86)	17 (11.64)	146 (100)	

Table 3: Distribution of stunting amongst children according to their age.

Age (years)	Normal, N (%)	Stunted, N (%)	Severely stunted, N (%)	Total, N (%)	
0 to 1	<6 months	17 (11.64)	1 (0.68)	11 (7.53)	29 (19.86)
	6 months to 1	10 (6.84)	2 (1.36)	03 (2.05)	15 (10.27)
	Total	27 (18.49)	3 (2.05)	14 (9.58)	44 (30.13)
1 to 2	18 (12.32)	6 (4.10)	4 (2.73)	28 (19.17)	
2 to 3	13 (8.97)	3 (2.05)	4 (2.73)	20 (13.69)	
3 to 4	7 (4.79)	0 (0)	14 (9.58)	21 (14.38)	
4 to 5	23 (15.75)	4 (2.73)	6 (4.10)	33 (22.60)	
Total	88 (60.27)	16 (10.95)	42 (28.76)	146 (100)	

**Table 4: Association of wasting with some of the socio-demographic factors.**

Variables		Normal, N (%)	Wasted and severely wasted based of weight for height, N (%)	Total, N (%)	Chi square value
<b>Sex</b>	Male	52 (35.61)	14 (9.58)	66 (45.20)	0.00, df=1, p>0.05
	Female	63 (43.14)	17 (11.64)	80 (54.79)	
	Total	115 (78.76)	31 (21.23)	146 (100)	
<b>Religion</b>	Hindu	63 (43.14)	21 (14.38)	84 (57.53)	1.6784, df=1, p>0.05
	Muslim	52 (35.61)	10 (6.84)	62 (42.46)	
	Total	115 (78.76)	31 (21.23)	146 (100)	
<b>Mothers education</b>	Literate	108 (73.97)	30 (20.45)	138 (94.52)	0.3859, df=1, p>0.05
	Illiterate	07 (4.79)	01 (0.68)	08 (5.47)	
	Total	115 (78.76)	31 (21.23)	146 (100)	
<b>SES</b>	I	05 (3.42)	00	05 (3.42)	0.5639, df=4, p>0.05
	II	15 (10.27)	04 (2.73)	19 (13.01)	
	III	14 (9.58)	05 (3.42)	19 (13.01)	
	IV	54 (36.98)	14 (9.58)	68 (46.57)	
	V	27 (18.49)	08 (5.47)	35 (23.97)	
	Total	115 (78.76)	31 (21.23)	146 (100)	
<b>Advice of breast feeding and complementary feeding</b>	Yes	90 (61.64)	16 (10.95)	110 (75.34)	8.7172, df=1, p<0.05
	No	25 (17.12)	15 (10.27)	36 (24.65)	
	Total	115 (78.76)	31 (21.23)	146 (100)	
<b>Initiation of complementary feeding</b>	On time	67 (45.89)	9 (6.16)	76 (52.05)	8.2923, df=1, p<0.05
	Late/early	35 (23.97)	17 (11.64)	52 (35.61)	
	Only breastfeeding*	13 (8.90)	05 (3.42)	18 (12.32)	
	Total	115 (78.76)	31 (21.23)	146 (100)	

\*Excluded while calculating chi square value.

## DISCUSSION

In the present study, predominance of female participants was seen with male female ratio of 1:1.21. In this study Spectrum of malnourishment i.e., wasted (2.72%), severely wasted (9.58%), underweight 14 (9.58%), severely underweight 6 (4.11%) and also severely stunted (9.58%) was observed in the age group of 0 to 1 years whereas stunted children (4.10%) were observed in 1 to 2 years of age group. It is observed that majority of participants had malnutrition in the age group of 0 to 1 years and so the feeding habits should be improved in this age group to avoid long term manifestations. Malnutrition during the first 2 years in male causes stunting, impaired intellectual performance and can also have reduced capacity for physical work. In women malnutrition in early years will affect their reproducing capacity causing low birth weight baby and complicated delivery. More the number of malnourished children less is the national development.<sup>9</sup>

In our study, 39.72% children were stunted which is comparable to Ninama et al study findings (39.5%) and NFHS V Maharashtra survey findings (35.2 %).<sup>8,10</sup> But there were studies by Solanki et al showing higher (50%) and Islam et al which reported lesser value (30.4 %).<sup>11,12</sup>

Underweight children were 31.50% in our study similar to NFHS 5 (36.1%) and Ninama et al (37.2%) findings.<sup>8,10</sup>

The proportion was higher in Solanki et al (42.7%) and lesser in Islam et al study (29%).<sup>11,12</sup>

In our study, exclusive breast-fed children 48.63% which is less compared to (71%) of NFHS 5 survey of Maharashtra, Patil et al reported (72%). But our study finding was greater to findings of Arifeen et al (5%), Ashwinee et al (34%).<sup>8,13-15</sup> Variations can be due various sociocultural differences in different geographical areas.

Complementary feeding was initiated on time in 52.05 % participants which is comparable to (48%) in Khokhar et al. But it was higher in Ashwinee et al (84%); Islam et al (68.1%) and (72%) in Patil et al studies.<sup>12,13,15,16</sup>

In this study, good complementary feeding practices related to use of fingers while feeding over spoon feeding, use of homemade food items over readymade products and hygienic practices was observed in majority mothers except for inclusion of adequate food groups in their diet. The 80.82% of children fed with hand, over 6.84% who fed with spoon. Feeding with fingers avoids gag reflex and checks temperature of food and therefore increases acceptance of food by children. Townsend et al in their study states that, there is impact of weaning style on food preferences.<sup>17</sup> They stated, finger fed children increased liking for carbohydrates which building blocks of healthy nutrition causing reduced obesity where spoon fed children tend to like sweet food causing obesity.



Mothers of 90.41% children followed hygienic practices while feeding which is a good sign compared to mothers of 9.58% with improper hygienic practices like not washing hand before preparation and feeding of food. Such unhygienic practices can trigger infection malnutrition cycle. Demmelash et al in their study stated that unhygienic practices during complementary feeding can be highly contaminated with pathogens and are major cause of diarrhoea and associated malnutrition.<sup>18</sup> It was estimated that 50% of child undernutrition may be attributable to poor WASH practices

In this study, 86.98% children were given homemade food during complementary feeding which is a desirable practice whereas 13% received food items other than homemade. The junk food like milk and biscuits, toast, bread, pav was given to 5.47% participants and readymade canned food was given to 7.53% participants as complementary food. Takeaway foods like biscuits, cake is considered extras to children diet and should be eaten occasionally in small amount. Vakili et al in their study mentioned that 11.3% of families used junk foods and also stated that children whom haven't had junk food, have grown more favourable than the other kids.<sup>19</sup>

Eating a well-balanced diet means eating from each of 7 food groups, in recommended amount. Eating variety of healthy food helps in maintaining good health and prevents from chronic diseases. Khamis et al in their study used minimum dietary diversity of 4 food groups out of 7 to assess the diversity of diet in children.<sup>20</sup> They also found that it was associated with a reduction of stunting wasting and being underweight in children. Stunting wasting and underweight was found to decrease as the number of food groups consumed increased.

In our study, only 25.34% children were eating food from 4 and more than 4 food groups and 74.65% children received less than 4 food groups. Efforts need to be taken to educate the families related to significance of food groups and motivate them to consume all 7 food groups.

## CONCLUSIONS

In spite of long-term planning and various programmes on nutrition, malnutrition is still the most prevalent non communicable disease in children. Infant feeding is the most crucial phase which determines the prevalence of malnutrition in children. Therefore, these children should be closely monitored for exclusive breast feeding and complementary feeding practices with growth monitoring. Family counselling on infant feeding and timely initiation of complementary feeding will help to improve the nutritional status in children.

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