

## ASSESSMENT OF NUTRITIONAL STATUS AND FEEDING PRACTICES OF UNDER-FIVE CHILDREN IN AN URBAN AREA OF KANCHEEPURAM DISTRICT, TAMILNADU

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### ABSTRACT

The main aim of the present study is to assess the nutritional status and feeding practices of under- five children in an urban area of Kancheepuram district in Tamil Nadu. To assess the nutritional status of under - five children and its influencing factors. Further study the feeding practices of under -five children and its influencing factors. Children whose mother was not willing to participate in the study; children who were not able to be contacted even after 2 visits and children with severe illnesses were excluded from the study. A positive association was found between history of acute diarrhea disease in the children in the past one year and development of stunting. It is interesting to note that, in the present study, lower socio - economic status and early initiation of breastfeeding were associated with exclusive breastfeeding.

### Keywords

low birth weight, worm infestation, inappropriate initiation and disability.

### Introduction

Pandit Jawaharlal Nehru, the First Prime Minister of India once said, and the children of today will make the India of tomorrow. The way we bring them up will determine the future of the country. The nutritional status of the children of a country has a direct bearing on its development. Giving a child a solid nutritional start has a positive impact on his/her physical, mental and social development. A child's nutritional future begins before its conception itself. It begins with the mother's nutritional status prior to pregnancy. A chronically- undernourished mother is likely to give birth to an underweight baby, who may be stunted as a child and in turn give birth to a malnourished baby. 1 Therefore it is important to concentrate on the nutritional status of the mother in order to break this vicious cycle of malnutrition. Eliminating malnutrition in mothers can reduce disabilities in their infants by almost one third.1,2

Stunting is the devastating result of poor nutrition in -utero and early childhood. Children suffering from stunting may never attain their full possible height and their brains may never develop to their full cognitive potential. Globally, approximately 151 million children under 5 suffer from stunting. These children begin their lives at a marked disadvantage: they face learning difficulties in school, earn less as adults, and face barriers to participation in their communities. 3-6

There are now nearly 38 million overweight children globally, an increase of 8 million since 2000. The emergence of overweight and obesity has been shaped, at least in part, by industry marketing and greater access to processed foods, along with lower levels of physical activity. Malnutrition makes a child susceptible to infections leading to development of diseases which in turn aggravates malnutrition in the child. This continues as a vicious cycle adversely affecting the health of the child. Malnutrition may manifest itself in different ways ranging from growth failure to Kwashiorkor. While malnutrition can manifest in multiple ways, the path to prevention is virtually identical: adequate maternal nutrition before and during pregnancy and lactation; optimal breastfeeding in the first two years of life; nutritious, diverse and safe foods in early

childhood; and a healthy environment, including access to basic health, water, hygiene and sanitation services and opportunities for safe physical activity. These key ingredients can deliver a world where children are free from all forms of malnutrition. 7

According to NFHS-4 data, the prevalence of underweight among children under 5 years of age in India was 38.3% in rural areas and 29.1% in urban areas 3 while the prevalence of underweight among children under 5 years of age in Tamil Nadu was 25.7% in rural areas and 21.5% in urban areas. 8,9 There is a need to assess the nutritional status of children in Tamil Nadu along with their feeding practices so that data regarding various factors that determine malnutrition could be obtained. Based on the results obtained from this study various measures could be formulated for preventing malnutrition in children as well as improving their health status.

## MATERIALS AND METHOD

### Study Period

The study was carried out from August 2017 to March 2018.

### Inclusion Criteria

Children belonging to the age group below 5 years of age residing permanently with their families in Anakaputhur area whose mother consented for the study were included.

### Exclusion Criteria

Children whose mother was not willing to participate in the study; children who were not able to be contacted even after 2 visits and children with severe illnesses were excluded from the study.

### Ethical approval :

The study was approved by Institutional Ethical Committee of SreeBalaji Medical College and Hospital, Ref. No. 002/SBMC/ IHEC/2017/964.

### Statistical analysis :

Data entry was done in Microsoft Office Excel 2007. Data analysis was done using Statistical Package for Social Sciences (SPSS), version 22. Results were presented using descriptive and analytical statistics. The descriptive statistics were presented as frequency distribution and percentage. The analytical statistics used were Chi-square test and Odds ratio. P value < 0.05 was considered as statistically significant value.

## 1. RESULTS

The present cross-sectional study was carried out in the field practice area of Urban Health Training Centre (UHTC) of SreeBalaji Medical College and Hospital, located in Anakaputhur area of Kancheepuram district. The results of the study are shown below using tables and figures.

**Table no.1 : Background information of mother and children.**

S. no.	Socio-demographic variable	Frequency (N=600)	Percentage (%)
1.	<b>Age of the child</b>		
	0 – 6 months	140	23.3
	7 – 12 months	85	14.2
	13 – 60 months	375	62.5
2.	<b>Gender</b>		
	Male	324	54

	Female	276	46
3.	<b>Religion</b>		
	Hindu	558	93
	Muslim	26	4.3
	Christian	16	2.7
4.	<b>Educational status of mother</b>		
	Equal to or below higher secondary school	389	64.8
	Above higher secondary school	211	35.2
5.	<b>Occupation of mother</b>		
	Home- maker	516	86
	Working woman	84	14
6.	<b>Socio- economic status according to modified Kuppuswamy socio- economic status scale 2017</b>		
	Upper class	66	11
	Upper middle class	55	9.2
	Lower middle class	82	13.7
	Upper lower class	397	66.2
	Lower class	0	0
7.	<b>Type of family</b>		
	Nuclear family	330	55
	Joint family	270	45
8.	<b>Size of family</b>		
	Less than or equal to four	284	47.3
	Above four	316	52.7

As per table no.1, total number of children who participated in this cross-sectional study was 600 out of which 23.3% of children belonged to the age group 0 to 6 months , 14.2% of children belonged to the age group 7 to 12 months and 62. 5% of children belonged to age group 13 to 60 months.Among the children who participated in this study , 54% of them were males and 46% of them were females. In this study, majority of children (93%) belonged to Hindu religion, followed by Muslims (4. 3%) and Christians ( 2.7 %).

**Table no.2 : Frequency distribution of the birth order of the study population**

S.no.	Birth order	Frecyency( N=600)	Percentage (%)
1.	First child	312	52
2.	Second child	254	42.3
3.	Third child and above	34	5.7
	Total	600	100

As per table no. 2 , about half of the examined children (52%) were born first, 42. 3% of children were born second and only 5. 7% of the children were born of birth order three and above .

**Table 3 : Frequency distribution of the birth weight of the study population.**

S.no.	Birth weight	Frequency( N=600)	Percentage (%)
1.	Low birth weight(<2. 5Kg)	85	14.2
2.	Normal birth weight(>2. 5Kg)	515	85.8
	Total	600	100

Table.3 shows, majority of children ( 85. 8%) were born with normal birth weight while 14. 2% of children were born with low birth weight (<2. 5Kg).

**Table 4: Frequency distribution of the type of delivery of the study population.**

S.no.	Type of delivery	Frequency (N=600)	Percentage (%)
1.	Normal delivery	325	54.2
2.	Caesarean section	275	45.8
	Total	600	100

As per table no.4, about half of the children (54.2%) were born through normal delivery while 45. 8% of children were delivered through caesarean section.

**Information on feeding practices:**

**Table 5 : Time of initiation of breastfeeding in the study population.**

S.no.	Time of initiation of breastfeeding	Frequency( N=600)	Percentage (%)
1.	Within one hour	389	64.8
2.	After one hour	211	35.2
	Total	600	100

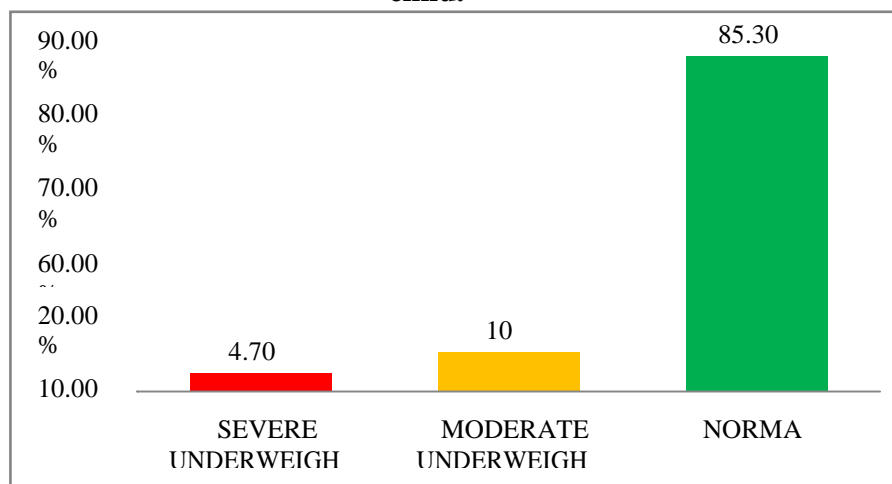
As per table no. 5, in majority of children (64.8%) breastfeeding was initiated within one hour of delivery, while in 35.2% of children breastfeeding was initiated after one hour of delivery.

**Table 6: Exclusive breastfeeding rate in the study population above six months of age.**

S.no.	Is exclusive breastfeeding given for first six months?	Frequency(n= 460)	Percentage (%)
1.	Yes	380	82.6
2.	No	80	17.4
	Total	460	100

As per table no.6, in children above six months of age (n=460), majority of them (82.6%) were given exclusive breastfeeding for first six months of life while only 17.4% of children were not exclusively breastfed for the first six months of life.

**Figure 1 : WHO classification of underweight in children based on weight-for-age of the child.**



**Table 7: Proportion of study population who received prelacteal feeds.**

S.no.	Were prelacteal feeds given?	Frequency (N=600)	Percentage (%)
1.	Yes	150	25
2.	No	450	75
	Total	600	100

As per table no. 7, one fourth of the children (25%) received prelacteal feeds while three fourth of the children (75%) did not receive prelacteal feeds.

Figure no. 1 shows, the prevalence of underweight among the children who participated in this study was 14.7% out of which 4.7% of children were severely underweight while 10% of children were moderately underweight. Majority of children (85.3%) were having a normal body weight.

**Figure no. 2: WHO classification of stunting in children based on height-for-age of the child.**

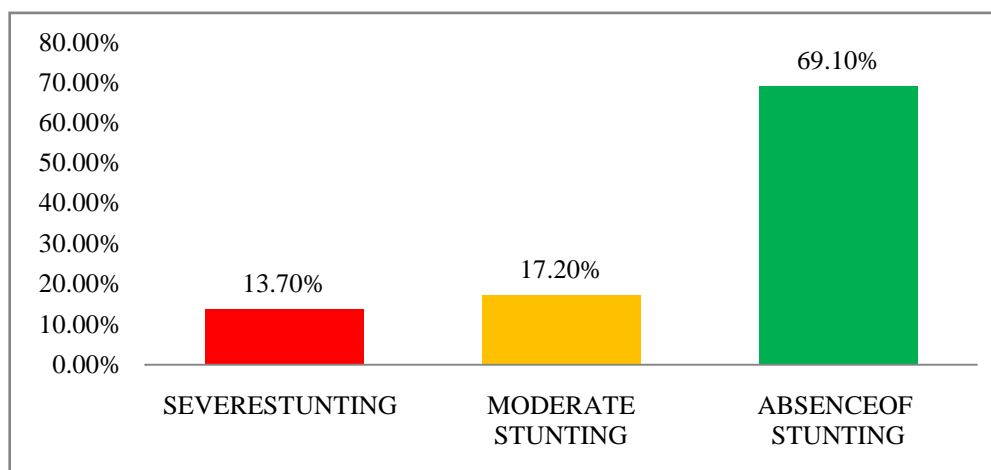


Figure no.2 shows, the prevalence of stunting among the children who participated in this study was 30.9% out of which 13.7% were severely stunted while 17.2% were moderately stunted. About 69.1% of children did not have stunting.

**Figure no. 3: WHO classification of nutritional status in children based on weight-for-height of the child.**

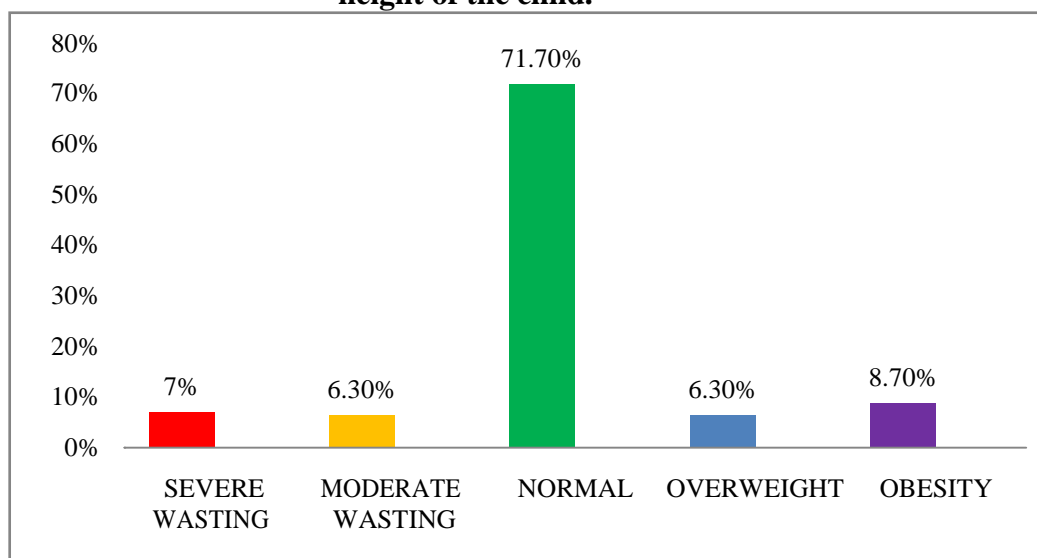


Figure no.3 shows, the prevalence of wasting among children who participated in this study was 13.3% out of which 7% of children were severely wasted while 6.3% of children were moderately wasted. About 6.3% of children were having overweight while 8.7% of children were having obesity. About 71.7% of children were having a normal weight-for-age.

**Table 8 : Proportion of children above one year of age, who had an history of acute respiratory tract infection (ARI) in the past one year.**

S.no.	Had any history of ARI in the past one year?	Frequency(n= 375)	Percentage (%)
1.	Yes	329	87.7
2.	No	46	12.3
	Total	375	100

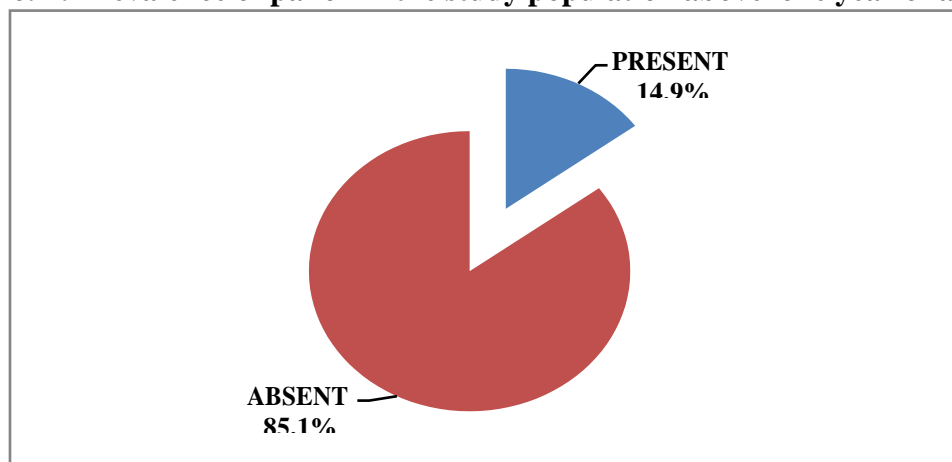
As per table no.8, in children above one year of age (n=375), majority of them ( 87.7 %) had an history of acute respiratory tract infection in the past one year. Only 12.3% of children did not have any history of acute respiratory tract infection in the past one year.

**Table 9 : Number of episodes of ADD in the past one year among those children who had history of ADD.**

S.no.	Number of episodes of ADD in the past one year	Frequency(n= 122)	Percentage (%)
1.	Equal to or less than two episodes of ADD	114	93.4
2.	More than two episodes of ADD	8	6.6
	Total	122	100

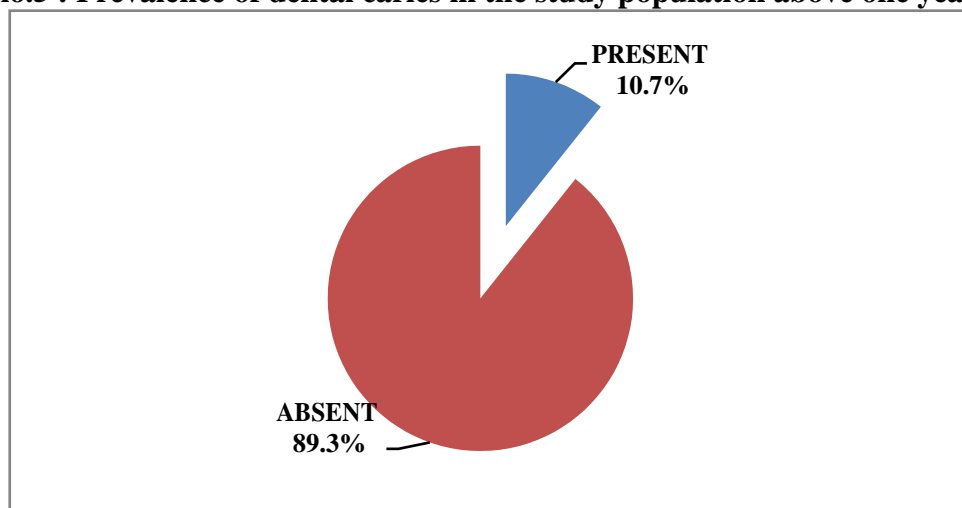
As per table no.9 , among those children who had an history of acute diarrhoeal disease in the past one year( n=122), majority of them (93 .4 %) had equal to or less than two episodes of acute diarrhoeal disease in the past one year while 6.6% of them had above two episodes of acute diarrhoeal disease in the past one year.

**Figure no.4 : Prevalence of pallor in the study population above one year of age.**



As per figure no. 4, in children above one year of age (n=375), 14.9 % of them had pallor, which is a sign of anaemia, while 85.1% of them did not have pallor.

**Figure no.5 : Prevalence of dental caries in the study population above one year of age.**



As per figure no. 5, in children above one year of age (n=375), 10.7 % of them had dental caries while 89.3% of them did not have dental caries.

**Table 10 : Association between acute diarrhoeal disease and stunting .**

History of acute diarrhoeal disease in past one year	Stunting		Total	Chi square test	P value	Odds ratio (95% CI)
	Present	Absent				
Yes	48 (39.7 %)	74 (29.1 %)	122	4.145	0.042*	1.600 (1.016 - 2.518)
No	73 (60.3 %)	180 (70.9 %)	253			
Total	121 (100%)	254 (100%)	375			

\* P value < 0.05 significant at 95% CI

As per table no. 10, in children above one year of age, about 39.7% of children who were stunted had an history of acute diarrhoeal disease in the past one year whereas among children who were not stunted 29.1% of them had an history of acute diarrhoeal disease in the past one year. Therefore there is an association between acute diarrhoeal disease and stunting and this association was found to be statistically significant (Chi-square test : p value – 0.042). Children who were stunted have 1.6 times more chance of having an history of acute diarrhoeal disease in the past one year than the children who were not stunted ( Odds ratio – 1.599; 95% CI : 1.016 - 2.518). Therefore there is a positive association between acute diarrhoeal disease and stunting .



**Table 11: Association between gender and moderate stunting.**

Gender	Presence of moderate stunting		Total	Chi square test	P value	Odds ratio (95% CI)
	Present	Absent				
Female	58 (56.3%)	218 (43.9%)	276	5.322	0.021*	1.650 (1.075 - 2.530)
Male	45 (43.7%)	279 (56.1%)	324			
Total	103 (100%)	497 (100%)	600			

\* P value < 0.05 significant at 95% CI

As per table 11, about 56.3% of children who were moderately stunted were females whereas among children who were not moderately stunted 43.9% of them were females. Therefore there is an association between female gender and moderate stunting and this association was found to be statistically significant (Chi-square test: p value = 0.021). Children who were moderately stunted have 1.65 times more chance of being females than the children who were not moderately stunted (Odds ratio = 1.650; 95% CI: 1.075 - 2.530). Therefore there is a positive association between female gender and moderate stunting.

**Table 12: Association between worm infestation and wasting.**

History of worm infestation	Wasting		Total	Chi square test	P value	OR (95% CI)
	Present	Absent				
Yes	18 (42.9%)	77 (23.1%)	95	7.678	0.006*	2.494 (1.286 - 4.835)
No	24 (57.1%)	256 (76.9%)	280			
Total	42 (100%)	333 (100%)	375			

\* P value < 0.05 significant at 95% CI; OR-Odds Ratio

As per table no.12, in children above one year of age, about 42.9% of children who were wasted had an history of worm infestation whereas among children who were not wasted 23.1% of them had an history of worm infestation. Therefore there is an association between worm infestation and wasting and this association was found to be statistically significant (Chi-square test: p value = 0.006). Children who were wasted have 2.5 times more chance of having an history of worm infestation than the children who were not wasted (Odds ratio = 2.494; 95% CI: 1.286 - 4.835). Therefore there is a positive association between worm infestation and wasting.

**Table 13 : Association between time of initiation of breast - feeding and exclusive breastfeeding.**

Time of initiation of breastfeeding	Is exclusive breastfeeding given for first six months?		Total	Chi square test	P value	OR (95% CI)
	Yes	No				
Within one hour	253 (66.5 %)	40 (50%)	293	7.855	0.005*	1.992 (1.224 - 3.243)
After one hour	127 (33.5 %)	40 (50%)	167			
Total	380 (100%)	80( 100%)	460			

\* P value < 0.05 significant at 95% CI; OR-Odds Ratio

As per table 13, about 66.5% of exclusively breastfed children were initiated breastfeeding within one hour of delivery whereas among children who were not exclusively breastfed 50% of them were initiated breastfeeding within one hour of delivery. Therefore there is an association between time of initiation of breastfeeding and exclusive breastfeeding and this association was found to be statistically significant ( Chi- square test : 0.005). Children who were exclusively breastfed have 2 times more chance of having initiated their breastfeeding within one hour of delivery than the children who were not exclusively breastfed ( Odds ratio – 1.992 ; 95% CI : 1.224 -3. 243). Therefore there is a positive association between time of initiation of breastfeeding and exclusive breastfeeding .

## DISCUSSIONS

The results obtained from the current cross-sectional study are compared with other similar studies done in India and abroad and the resultant findings are discussed below. In the present study, the prevalence of Caesarean section deliveries was 45.8 % which is comparable to the finding of the study done by RinaV.Patel et al titled, “Indications and trends of caesarean birth delivery in the current practice scenario”, in Gujarat , which showed a Caesarean section rate of 41.99% for the year 2013. 37 among children under 5 years of age in this study was 4.7% which was comparable to the findings of the study done by Dinesh P.V. which showed the prevalence of severe underweight to be 4.5%. 18 In the study done by Arvind Sharma et al, the prevalence of severe underweight among children under 5 years of age was 3.6% which was slightly lower than the present study. 10 Other studies that were done in India showed a higher prevalence of severe underweight when compared to the present study namely, the study done by VenkateshivaB.Reddy et al which showed the prevalence of severe underweight to be 9.3 % 11,12 and the study done by Sachin Singh Yadav et al which showed the prevalence of severe underweight to be 10%. 13

The prevalence of anaemia among children above one year of age in the present study was 14.9% which is lower when compared to the findings of the study done by Gretchen A Stevens et al in the year 2011 which showed the prevalence of anaemia among children under five years of age in South Asia to be 58%. 14 The higher prevalence of anaemia found in the study done by

Gretchen A Stevens et al when compared to the present study could be due to the following reason: Anaemia was diagnosed by blood test (estimation of Haemoglobin) whereas in our study anaemia was diagnosed clinically by the presence of pallor in the child.<sup>15</sup> The prevalence of anaemia in the present study is lower when compared to the findings of the study done by V. G.Rao et al in Madhya Pradesh, in the year 2001, which showed the prevalence of anaemia among children under five years of age to be 86.7%.<sup>16</sup> The higher prevalence of anaemia found in the study done by V. G. Rao et al when compared to the present study could be due to the following reasons: study setting -the present study was conducted in an urban area while the study done by V. G. Rao et al was conducted in a tribal area ; study period- the study done by V. G.Rao et al was conducted seventeen years earlier than the present study, that is, during 2001; and method used for diagnosis of anaemia- in the study conducted by V.G.Rao et al anaemia was diagnosed by blood test (estimation of Haemoglobin) whereas in our study anaemia was diagnosed clinically by the presence of pallor in the child. Diagnosing a child as anaemic based on the clinical presence of pallor has got a lower sensitivity and specificity than the biochemical test.<sup>17</sup>

In the present study, a positive association was found between history of acute diarrhoeal disease in the children in the past one year and development of stunting and a similar finding was seen in the study done by Priyanka.R.in Kerala , which showed a positive association between history of acute diarrhoeal disease in the past one year and development of stunting in children.<sup>17-19</sup> Repeated attacks of acute diarrhoeal diseases in the children would deprive them of valuable micro and macronutrients from their body which would in turn lead to development of chronic malnutrition and stunting.

In the present study, a positive association was found between educational status of mother and development of wasting in children which is similar to the finding of the study done by Arvind Sharma et al in Rajasthan in the year 2015, which showed a positive association between educational status of mother and development of wasting in children.<sup>20</sup> This could be due to the fact that mothers who are poorly educated have lower awareness about proper child feeding practices , have lower awareness about early recognition of signs and symptoms of disease in children and have poor treatment seeking behaviour.<sup>21</sup>

A positive association was found between worm infestation and development of wasting in children in the present study, which is similar to the finding of the study done by Naglaa M Shalaby titled, “ Impact of parasitic infections on nutritional status and micronutrients in Saudi children”, in the year 2015, which showed a positive association between worm infestation and wasting in children.<sup>43</sup> Worm infestation would lead to development of anaemia which in turn would lead to lowering of immunity and subsequent development of wasting in children.<sup>22</sup>

In the present study, a positive association was found between early initiation of breastfeeding ( within the first hour of birth) and exclusive breastfeeding ( for first six months of life) which is similar to the finding of the study done by Melisa Yenti titled, “ Past Experience of Exclusive Breastfeeding, Early Initiation of Breastfeeding, and Family Support are Important Factors of Exclusive Breastfeeding Practice in Padang Panjang City, Indonesia”, which showed a positive association between early initiation of breastfeeding and exclusive breastfeeding in the children.<sup>23</sup> Mothers who are well aware of the importance of early initiation of breastfeeding and exclusive breastfeeding, tend to initiate breastfeeding within one hour of birth and are more likely to continue breastfeeding exclusively for the first six months of life.<sup>24</sup>

## CONCLUSIONS

The present cross-sectional study assessed the nutritional status and feeding practices of under-five children along with its influencing factors in Anakaputhur area of Kancheepuram district, Tamil Nadu. The findings in the present study were encouraging. Most of the mothers were literates (98.7%). Even though the maternal literacy rate in the present study was higher (98.7%) than other studies done in India, it is interesting to note that only 35.2% of mothers had an educational qualification of above higher secondary level and the remaining 64.8% of mothers in the present study had an educational qualification of equal to or below higher secondary level. In the present study, more than two third of the study participants (66.2%) belonged to a lower socio-economic status. Majority of children (94.3%) were fully immunized. The prevalence of low birth weight was very less (14.2%). The caesarean section rate in the present study was 45.8%. Most of the mothers (96%) had at least four antenatal visits during the course of their pregnancy. Among the children assessed in the present study, children with underweight and wasting were nearly 15%. Children with stunting were more (30.9%) and with overweight were less (6.3%). The prevalence of underweight and wasting in the current study was lower than that of NFHS-4 National data while the prevalence of stunting in the current study was similar to that of the NFHS -4 National data.

The prevalence of severe underweight, severe stunting and severe wasting among children under five years of age was 4.7%, 13.7% and 7% respectively. The prevalence of exclusive breastfeeding for the first six months of life among the study participants was 82.6%. The proportion of children who had breastfeeding initiated within one hour of birth was 64.8%. One fourth of the children had received prelacteal feeds. Nearly 25% of children were initiated weaning foods below six months of age. Risk factors that were associated with underweight in children included the following: low birth weight, worm infestation, inappropriate initiation of weaning foods and mothers who had less than four antenatal care visits. Female gender, low birth weight and acute diarrhoeal disease were found to be risk factors associated with development of stunting in children. Risk factors that were associated with development of wasting in children included the following: age of the child being less than one year, educational status of mother being equal to or less than higher secondary level, worm infestation, inappropriate initiation of weaning foods and mothers who had less than four antenatal care visits. It is interesting to note that, in the present study, lower socio-economic status and early initiation of breastfeeding were associated with exclusive breastfeeding.

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**Ethical approval:** The study was approved by the Institutional Ethics Committee

## CONFLICT OF INTEREST

The authors declare no conflict of interest.

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