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ORIGINAL ARTICLE

FEEDING PRACTICES, NUTRITIONAL STATUS AND ANEMIA IN YOUNG CHILDREN

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ABSTRACT: BACKGROUND: WHO RECOMMENDS: Initiation of breastfeeding within the first hour of life, exclusive breast feeding on demand for six months, followed by sequential addition of semi-solid and solid foods to complement breast milk and breast feeding to be continued for 2 years. Most of the time, these recommendations are not followed, due to false beliefs or cultural factors. This has resulted in malnutrition and increasing health hazards in children.[1] This study is being done to know about the feeding practices, nutritional status, anaemia prevalence in children residing in rural areas of Puducherry. **OBJECTIVES:** 1. To study feeding practices, nutritional status, prevalence of anemia in children from 1 month to 2 years of age. 2. Influence of feeding practices on nutritional status and hemoglobin levels. **METHODS:** This is a hospital based prospective study done for a period of 1yr. The study included 200 children from 1 month to 2 years of age. Patients from rural areas of Puducherry nearing Tamil Nadu border and people from adjoining rural areas of Tamil Nadu come to our hospital. A questionnaire is provided to parents/guardians of children asking about feeding practices. Participants weight in kilograms and length in centimeters are measured. Blood samples are drawn from participants for the estimation of hemoglobin levels. Peripheral smear study will be done if hemoglobin level is less than 11 gram/dl. Observations are tabulated. **RESULTS:** 85% children under study were initiated feed according to guidelines and 15% were not initiated. 54% children were exclusively breastfed for 6 months and 46% children were not exclusively breast fed. 54% children were given complementary feeds after the age of 6 months. 70% had normal weight for length, 12% were moderately wasted, 18% children were severely wasted, 86% children were anemic and 14% children were not anemic. **CONCLUSION:** 1. The study shows the effect of feeding practices on the nutritional status and hemoglobin levels in the young children of rural area. 2. Malnutrition and anemia have higher prevalence, there is a need for health education to the mothers, especially antenatal mothers.

KEYWORDS: Feeding practice, Nutritional status, Anaemia.

INTRODUCTION: Breast milk is the natural first food for babies. The first breast milk (Colostrum) is highly nutritious and has antibodies that protect the newborn from disease.

WHO RECOMMENDS: Initiation of breastfeeding within the first hour of life, exclusive breast feeding on demand for six months, followed by sequential addition of semi-solid and solid foods to complement (Not replace) breast milk and breast feeding to be continued for 2 years or longer. Most of the time, these recommendations are not followed, due to false beliefs or cultural factors or socio-economic reasons. This has resulted in malnutrition and increasing health hazards in children.[2-3]

It is well recognized that the period from birth to two years of age is a critical window for the promotion of optimal growth, health and behavioral development. The health and nutritional status

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of infants which influence their subsequent growth and development throughout childhood is determined by the pattern of feeding practices during infancy.[4,5] After a child reaches 2 years of age, it is very difficult to reverse stunting that has occurred earlier. Abandonment of breast-feeding is a significant factor in the death of around 3000-4000 infant's every day from diarrhoea and respiratory infections.[6-7]

Previous studies in India have brought out the practice of introduction of prelacteal feeds (That is, something other than breast milk) like glucose water, honey, ghutti, animal milk,[7] or powdered milk and also the early introduction of top milk like cow's milk and late introduction of semisolid and solid foods to be prevalent in various parts. India has one of the highest incidences of malnutrition in the developing world today, caused by a combination of lack of information and awareness, poverty as well as absence of adequate and balanced diet.[8] Nationwide studies have also brought out increasing prevalence of anemia among young children. The immediate consequences of poor nutrition during these formative years include significant morbidity and mortality and delayed mental and motor development. In the long-term, early nutritional deficits are linked to impairments in intellectual performance, work capacity, reproductive outcomes and overall health during adolescence and adulthood.[9]

This study is carried out to know about the feeding practices, nutritional status, anemia prevalence in children residing in rural areas of Puducherry and adjoining areas.

OBJECTIVES:

Primary Objective: To study feeding practices, nutritional status, prevalence of anemia in children from 1 month to 2 years of age.

Secondary Objective: Influence of feeding practices on nutritional status and hemoglobin levels in the study group.

MATERIAL AND METHODS: This is a hospital based prospective study done for a period of 1yr (2010-2011). The study included 200 children from 1 month to 2 years of age. Patients from rural areas of Puducherry nearing Tamilnadu border and people from adjoining rural areas of Tamilnadu come to our hospital (SMVMCH). Informed written consent is taken from parents / guardians of the children.

Inclusion Criteria:

- All the children from 1 month to 2 years of age in the department of paediatrics.
- Children who were born at term with a birth weight more than 2.5 kg.

Exclusion Criteria:

- Seriously ill children.
- Children whose parents refuse to consent.
- Children who were born preterm or with a birth weight less than 2.5 kg.

A questionnaire is provided to parents/guardians of children asking about feeding practices. Participant's weight in kilograms and length in centimeters are measured. Blood samples are drawn from participants for the estimation of hemoglobin levels. Peripheral smear study is done if haemoglobin level is less than 11 gram/dl. Observations are tabulated.

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FROM THE OBSERVATIONS:

Percentage of children who were given exclusive breast feeding:

- Percentage of children who were initiated breast feeding within one hour (for c-section within 4 hours).
- Percentage of children who were given prelacteal feeds
- Average age of introduction of complementary feeds
- Types of complementary feeds
- Average age of discontinuation of breast feeding
- Percentage of parents/guardians implementing proper hygienic methods of food handling
- Percentage of wasted/ stunted/ underweight children
- Percentage of children who are anaemic (Haemoglobin < 11 gram/dl) and
- Type of anaemia (normocytic/microcytic hypochromic/ macrocytic) which is prevalent is noted.

Terminology	Growth parameter	SD (Z) scores	Classification
Wasting	Weight for length	-2 to -3	Moderate wasting
Wasting	Weight for length	< -3	Severe wasting
Stunting	Length for age	-2 to -3	Moderate stunting
Stunting	Length for age	< -3	Severe stunting
Underweight	Weight for age	-2 to -3	Moderate underweight
Underweight	Weight for age	< -3	Severe underweight

Children are divided into two groups:

1. Those fed as per recommendations.
2. Those who were subjected to faulty feeding.

The following parameters are compared between the two groups:

- Weight for age.
- Length for age.
- Weight for height.
- Hemoglobin levels.

Parameters compared between two groups	Statistical method used
Weight for age	Unpaired student t- test
Length for age	Unpaired student t –test
Weight for Length	Unpaired student t –test
Hemoglobin levels	Unpaired student t –test

From the above, influence of feeding practices on nutritional status and hemoglobin levels in children from 1 month to 2 years of age will be determined.

OBSERVATIONS & RESULTS: Two hundred children were included in the study and were divided into 3 age groups – less than 6 months, six months to one year, one to two years.

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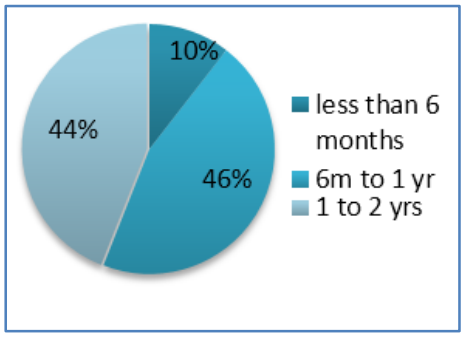
Age	Number of children
Less than 6 months	21
6 m to 1yr	91
1 to 2yrs	88

Table 1: Age-wise distribution

There were 21 children in the age category of less than 6 months, 91 in 6 months to 1 year and 88 in the category of 1 to 2 years.

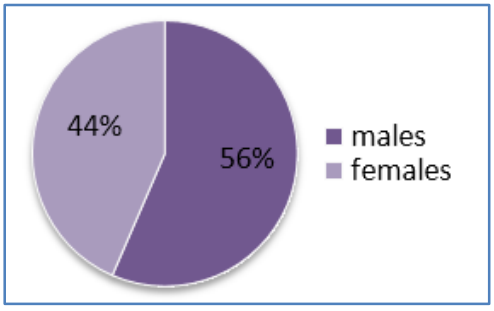


Pie Chart 1: Age-wise Distribution

Sex	Number of children	Percentage
Male	113	56%
Female	87	44%

Table 2: Sex wise distribution

There were 113 male children and 87 female children.



Pie Chart 2: Sex wise Distribution

	Number of children	Percentage
Yes	170	85%
No	30	15%

Table 3: Children initiated breast feeding within one hour of vaginal delivery/within 4 hours of C-section

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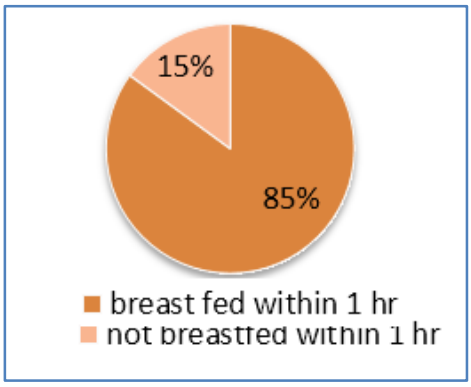
- WHO recommends initiation of breast feeding within one hour of vaginal delivery/within 4 hours of C- section.
- 170 (85%) children under study were initiated feed according to guidelines and 30(15%) were not initiated.

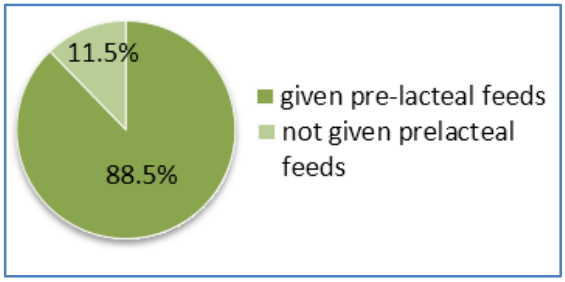


Pie chart 3: showing initiation of breast

	Number of children	Percentage
Yes	23	11.5%
No	177	88.5%

Table 4: Children given prelacteal feeds

- WHO recommends not giving prelacteal feeds.
- 177(88.5%) children were not given prelacteal and 23(11.5 %) were given prelacteal.



Pie chart 4: Children given prelacteal feeds feeding

	Number of children	Percentage
Exclusive breastfeeding for 6 months	97	54%
Not Exclusive breastfeeding for 6 months	83	46%

Table 5: Percentage of children who were given exclusive breast feeding

97(54%) children were exclusively breastfed for 6 months and 83(46%) children were not exclusively breast fed.

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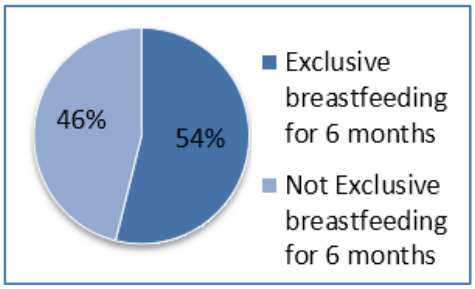
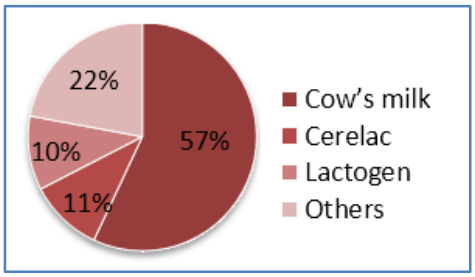


Pie chart 5: Percentage of children who were given exclusive breast feeding

	Number of children	Percentage
Cow's milk	49	57%
Cerelac	10	11%
Lactogen	9	10%
Others	19	22%

Table 6: Types of complementary feeds

The complementary feeds given were, cow's milk to 49(57%) children, Cerelac to 10(11%) children, Lactogen to 9(10%) children. Others were given feeds like biscuits, rice, etc.



Pie chart 6: Types of complementary feeds

Average age of introduction of complementary feeds:

- WHO recommends introduction of complementary feeds after 6 months of age.
- 97 (54%) children were given complementary feeds after the age of 6 months.
- 83(46%) children were given complementary feeds before the age of 6 months.

Average age of discontinuation of breast feeding:

- WHO recommends discontinuation of breast feeding after 2 years of age.
- 2 (1%) children were breastfed for 2 years.
- For 99 (49.5%) children breastfeeding was discontinued before 2 years.
- The rest were continuing breastfeeding.

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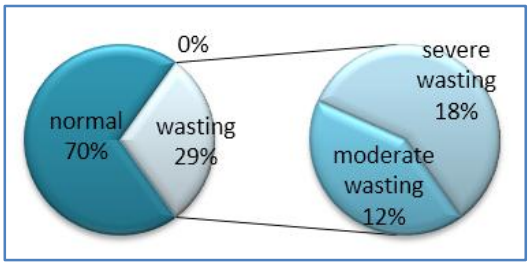
Percentage of parents/guardians implementing proper hygienic methods of food handling:

- 85 % the parents/ guardians implement proper hygienic methods of food handling like washing hands before feeding the child.

Weight for length	Number of children	Percentage
Normal	140	70%
Moderate wasting	25	12%
Severe wasting	35	18%

Table 7: Showing percentage of wasting

- Out of 200 children, 140 (70%) had normal weight for length, 25 (12%) were moderately wasted (-2 to -3 SD according to WHO growth chart), 35 (18%) children were severely wasted (less than -3 SD).

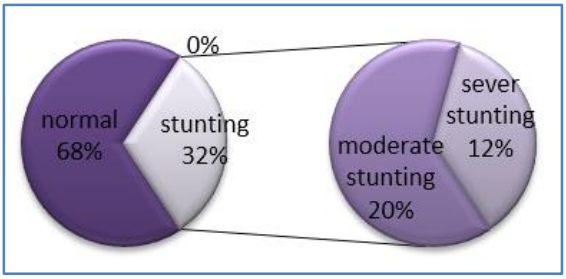


Pie chart 7: Showing percentage of wasting

Length for age	Number of children	Percentage
Normal	137	68%
Moderate stunting	40	12%
Severe stunting	23	20%

Table 8: Percentage of stunted children

- Out of 200 children, 137(68%) had normal length for age, 40(12%) were moderately stunted (-2 to -3 SD according to WHO growth chart) and 23(20%) were severely stunted (less than -3 SD).



Pie chart 8: Percentage of stunted children

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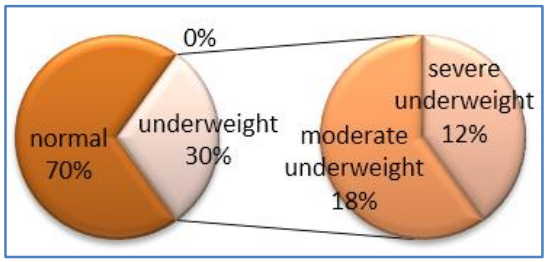
Weight for age	Number of children	Percentage
Normal	140	70%
Moderate underweight	36	18%
Severe underweight	24	12%

Table 9: Percentage of underweight children

- Out of 200 children, 140(70%) had normal weight for age, 36(18%) had moderate underweight (-2 to -3 SD according to WHO growth chart) and 24 (12%) had sever underweight (less than -3 SD).

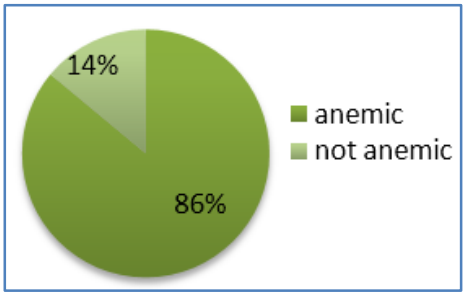


Pie chart 9: Percentage of underweight children

	Number of children	Percentage
Anaemic	172	86%
Not anaemic	28	14%

Table 10: Percentage of children who are anemic

- According to WHO guidelines, children with hemoglobin of less than 11 g% are anemic.
- 172 (86%) were anemic and 28 (14%) children were not anemic.



Pie chart 10: Percentage of children who are anemic

	Number of children	Percentage
Normocytic	78	45%
Microcytic hypochromic	92	54%
Macrocytic	2	1%

Table 11: Type of anemia

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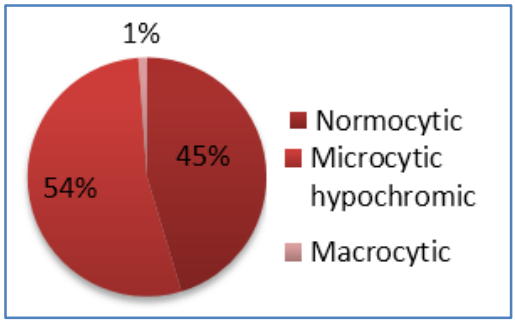
- 78 (45%) children had normocytic anemia, 92 (54%) had microcytic hypochromic and 2 (1%) had macrocytic anemia.



Pie chart 11: Type of anemia

The Children were divided into two groups:

1. Those fed as per recommendation.
2. Those who were subjected to faulty feeding.

The following parameters were compared between the two groups:

- Weight for age.
- Length for age.
- Weight for height.
- Hemoglobin levels.

Of these, the parameters which were statistically significant are:

- Length for age.
- Anemia.

Weight for age and weight for length were not significant between the two groups.

The children were also divided as:

1. Those who were breastfed exclusively for 6 months.
2. Those who were not breastfed exclusively for 6 months.

And the parameters were compared.

The statistically significant parameters were:

- Length for age.
- Weight for age.

DISCUSSION:

- Commonest age distribution was in 6 months to 1 year.
- Commonest sex distribution was males, which constitutes 56%.

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DISCUSSION ON FEEDING PRACTICES:

- 170 (85 %) children under study were initiated feed according to guidelines (breast feeding within one hour of vaginal delivery / within 4 hours of C-section.) and 30 (15 %) were not initiated.
- 177 (88.5%) children were not given prelacteal and 23 (11.5 %) were given prelacteal feeds like sugar water and honey.
- In the study group, 97 (54%) children were exclusively breastfed for 6 months and 83 (46%) children were not exclusively breast fed.
- 97 (54%) children were given complementary feeds after the age of 6 months.
- Commonest complementary feed given was cow's milk, which constitutes 57%, followed by cerelac, which constitutes 11% and miscellaneous feeds constitute 22% and the most common container used was bottle.
- 2 (1%) children were breastfed for 2 years. For 99 (49.5%) children breastfeeding was discontinued before 2 years and the rest were continuing breastfeeding.

WHO's recommendation for feeding are:[1-4]

- Initiation of breastfeeding within the first hour of life.
- No prelacteal feeds should be given.
- Exclusive breast feeding on demand for six months.
- Breast feeding to be continued for 2 years.

In our study group, not even a single person was following all the guidelines provided by WHO in feeding the child.

DISCUSSION ON NUTRITION:

- 140 (70%) had normal weight for length, 25 (12%) were moderately wasted (-2 to -3 SD according to WHO growth chart), 35 (18%) children were severely wasted (less than -3 SD).[10]
- According to a nation-wide study conducted by NFHS-3 (National Family Health Survey) on malnutrition among children under 5, 20% of the children were wasted.[11,12]
- In comparison to the study by NFHS-3, which shows 20% wasting, our study shows 29% wasting. This implies that acute malnutrition is common in our study group, as weight for age is significantly affected by acute malnutrition.[11]
- In the study group, out of 200 children, 137(68%) had normal length for age, 40(12%) were moderately stunted (-2 to -3 SD according to WHO growth chart) and 23(20%) were severely stunted (less than -3 SD).
- According to the previously mentioned nation-wide study conducted by NFHS-3 (National Family Health Survey) on malnutrition among children under 5, 48 % were stunted.[11]
- In comparison to the study by NFHS-3[11], which shows 48% stunting, our study shows 32% stunting. The lower percentage of stunting when compared to the national averages may be because NFHS-3 study was conducted for under 5 children, whereas our study was on children less than 2 years. This shows that stunting manifests at a later age. Stunting, being an indicator of chronic malnutrition is quite uncommon among children less than 2 years.

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- Among the 200 children in study group, 140(70%) had normal weight for age, 36(18%) had moderate underweight (-2 to -3 SD according to WHO growth chart) and 24 (12%) had sever underweight (less than -3 SD).
- According to the previously mentioned nation-wide study conducted by NFHS-3[11] (National Family Health Survey) on malnutrition among children under 5, 43% of the children were underweight.
- In comparison to the study by NFHS-3[11], which shows 43% underweight, our study shows 39% underweight. This difference may also be due to the difference in the age groups under the two studies. Underweight status is a composite index of acute or chronic malnutrition.
- Our study shows a higher percentage of stunting and lower percentage of wasting and underweight as compared to the national averages. This gives the inference that acute malnutrition is more common in younger children. Due to acute malnutrition over a period of time or due to repeated episodes of acute malnutrition, the child becomes chronically malnourished, as evidenced by the higher percentages of stunting and underweight in the NFHS-3[11] study, which also included older children (under 5 years of age). Also that children who acutely malnourished due to illnesses, develop physiological anorexia, due to which they fail to feed adequately, which may also lead on to chronic malnutrition.[13]

DISCUSSION ON ANEMIA:

- In the study group, 172 (86%) children were anemic (hemoglobin of less than 11g %) and 28 (14%) children were not anemic.
- According to a nation-wide study conducted by NFHS-3[11] (National Family Health Survey) on trends in anemia among children in age 6-35 months, 79% were found to be anemic.[14,15,16]
- According to our study, prevalence of anemia is higher (86%) when compared to NFHS-3 study which shows 79%.[14,15,16] This difference may be because, in NFHS-3 study hemoglobin level of less than 10 g% was taken as anemia, whereas in our study, less than 11 g% hemoglobin was taken as anemia, which is according to WHO guidelines.
- Commonest type of anemia was microcytic hypochromic, which constitutes 92(54%) children, followed by normocytic normochromic anemia, which constitutes 78(45%).
- Children who were fed according to guidelines had a p value of < 0.001, which shows statistical significance for both length for age and anemia.
- Children who were breast fed exclusively for 6 months had a p value of < 0.001 and 0.009, which shows statistical significance for length for age and weight for age respectively.
- In spite of exclusive breast feeding for 6 months, many children had anemia probably due to the following reasons:
    - Employing improper feedings methods.
    - As the study was hospital based, the children under the study were already ill, which might have contributed to their anemia.

LIMITATIONS OF STUDY:

1. It was not a multicenter study, so the results might not apply to other populations.
2. The availability of a larger sample would have allowed us to analyze test performance levels in different age groups.

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CONCLUSION:

1. The study shows the effect of feeding practices on the nutritional status and hemoglobin levels in the young children of rural area.
2. Nutritional status affects the health and the normal life of the child. As malnutrition and anemia have higher prevalence, there is a need for health education to the mothers, especially antenatal mothers, as anemia can even affect the intellectual performance of the child.
3. This also implies that the health programs in India have not sufficiently reached the rural population.

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