ABSTRACT

Introduction
The level of child under-nutrition remains unacceptable throughout the world. Today more than 195 million children in developing countries are stunted. Suboptimal infant and young child feeding practices and micronutrient deficiencies are major contributors to under-nutrition, morbidity and mortality in children.

Improving infant and young child feeding practices will help South Asian countries achieve the Millennium Development Goal of reducing child mortality.

Objectives
To assess the knowledge, attitude and practices of complementary feeding and the source of information among mothers of children from 6 months to 24 months of age.
To correlate the complementary feeding practices, with various factors affecting like education, occupation, parity of the mother, sex of the child, socioeconomic status, and the type of the family.

Methods
It is a cross-sectional study, including 300 mothers with children aged 6 - 24 months, attending Pediatric Out-patient Department of Sri Venkateswara Ramnarayana Ruia government General Hospital Tirupati from February 2014 to January 2015. Data was collected using a self-administered, semi-structured questionnaire.

Statistical Analysis
Mean, Frequencies, Percentages, Chi-Square test and Pearson’s correlation test.

Results
Mean age of knowledge of the mothers regarding complementary feeding was 4.25 months. About 40% of the mothers had knowledge that complementary feeding should be started at 6 months and 71 mothers (24%) had no knowledge. The reason quoted by most of the mothers for starting complementary feeding in this study was, not enough milk along with traditional beliefs and advices from the elderly females in the family (34%). In the present study majority of the mothers (76.3%) started complementary feeding with homemade foods.

Conclusion
Overall there is a predominant prevalence of early complementary feeding practices as evidenced by the results of the study.

Key words: Under-nutrition, complimentary feeding, breast feeding, child health, socioeconomic status, parity
INTRODUCTION

The importance of nutrition as a foundation for healthy development is underestimated. The prevalence of child under-nutrition in India is among the highest in the world, where approximately 60 million children are underweight with adverse outcomes. Under-nutrition contributes to more than one-third of under-five mortality.\(^1\)

Complementary feeding is defined as the process starting when breast milk alone is no longer sufficient to meet the nutritional requirements of infants, and therefore other foods and liquids are needed, along with breast milk. 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 behavioural development.\(^2\) Longitudinal studies have consistently shown that this is the peak age for growth faltering, deficiencies of certain micronutrients, and common childhood illnesses such as diarrhea.\(^3\)

After a child reaches 2 years of age, it is very difficult to reverse stunting that has occurred earlier. Poor breastfeeding and complementary feeding practices, coupled with high rates of infectious diseases, are the principal proximate causes of malnutrition during the first two years of life.\(^4\)

Successful breastfeeding depends not only on mother’s education but also on support and motivation from family members and health care professionals. In India, breastfeeding is almost universal.\(^5\) However, the rates of early initiation, exclusive breastfeeding and timing of complementary feeds are far from desirable. There have been very few studies on knowledge, attitude and practices towards complementary feeding in rural India.\(^6\)

In India, child malnutrition is mostly the result of high levels of exposure to infection and inappropriate Infant and Young Child Feeding (IYCF) and caring practices and it sets in mostly during the first 2–3 y of life.\(^7\)

IYCF guidelines exist, that set the norms for feeding the infant and young children where adequate stress is given on initiation of breastfeeding within an hour of birth, exclusive breast-feeding for the first 6 months of life and adequate and timely complementary feeding at 6 months while continuing to breastfeed.\(^7\) These guidelines are critical for proper growth and prevention of malnourishment among children up to the age of 2 y.\(^8\)

AIMS AND OBJECTIVES

1. To assess the knowledge, attitude and practices of complementary feeding among mothers of children from 6 months to 24 months of age.

2. To correlate the complementary feeding practices, with various factors affecting like education, occupation, parity of the mother, sex of the child, socioeconomic status, and the type of the family.

MATERIALS AND METHODS

Source of Data

All mothers with children aged between 6 to 24 months who attended the Paediatric Out-Patient Department of Paediatrics, S.V.R.R.G.G.H Attached to S.V. Medical college were included in this study.

Study period

From February 2014 to January 2015.

Study Design

It is a cross-sectional, questionnaire based study done in the setting of a medical college hospital predominantly.

Method of Collection of Data

Informed consent was taken from the mothers of children aged between 6 to 24 months visiting Paediatric Out-Patient Department of Paediatrics, S.V.R.R.G.G.H. Attached to S.V. Medical College. A face-to-face interview using a self-administered questionnaire was conducted.

Sample size calculation

Sample size was calculated based on the prevalence of the reception of complementary
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foods in breastfed children between 6 and 9 months in India which was 56.7% according to the data given by World Breastfeeding Trends Initiative (WBTi). The State of Breastfeeding in 33 countries 2010: Tracking Infant and Young Child Feeding Policies and Programmes Worldwide and an error of 3% was taken. A sample size of 276 is required with a confidence level of 95% confidence interval of 5% was taken. We administered questionnaires to 300 mothers.

Inclusion criteria
All Mothers with children from 6 months to 24 months.

Exclusion criteria
Mothers with children less than 6 months and more than 24 months and top fed babies since birth and babies with congenital anomalies.

Statistical Methods
The data was analyzed using SPSS for Windows (Version 19). Descriptive statistics like frequencies, percentages, range of the various parameters was calculated. Chi-square test was used to deduce association between maternal age, literacy, parity, occupation, socio-economic status, sex of the child, religion and complementary feeding practices. The p value of <0.05 will be considered as significant and <0.01 was considered as highly significant.

OBSERVATION AND RESULTS
300 mothers of children between 6-24 months of age attending the Out-Patient Department of Paediatrics, S.V.R.R.G.G.H Attached to S.V. Medical College were interviewed using a self-administered, semi-structured questionnaire. The following were the demographic data and results of the study.

Table 1: Association between gender of the child and age of complementary feeding

<table>
<thead>
<tr>
<th>AOCF</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;4</td>
<td>30</td>
<td>25</td>
</tr>
<tr>
<td>4to6</td>
<td>116</td>
<td>85</td>
</tr>
<tr>
<td>7to9</td>
<td>20</td>
<td>13</td>
</tr>
<tr>
<td>10to12</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>Total</td>
<td>172</td>
<td>128</td>
</tr>
<tr>
<td>Mean ± S.E</td>
<td>5.16 ± 0.14</td>
<td>5.33 ± 0.16</td>
</tr>
</tbody>
</table>

The above table shows that the mean age of complementary feeding in male children (5.16 ± 0.14) is less than that in females (5.33 ± 0.16). There was a significant association between the gender of the children and the age of initiation of complementary feeding with p < 0.05.

Table 2: Association between parity of mother and age of complementary feeding

<table>
<thead>
<tr>
<th>AOCF</th>
<th>Primi</th>
<th>Multi</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;4</td>
<td>31</td>
<td>24</td>
</tr>
<tr>
<td>4to6</td>
<td>124</td>
<td>77</td>
</tr>
<tr>
<td>7to9</td>
<td>22</td>
<td>11</td>
</tr>
<tr>
<td>10to12</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>188</td>
<td>112</td>
</tr>
<tr>
<td>Mean ± S.E</td>
<td>5.37 ± 0.15</td>
<td>5.00 ± 0.14</td>
</tr>
</tbody>
</table>

The above table shows that the mean age of complementary feeding in primi children (5.37 ± 0.15) is less than that in multi children (5.00 ± 0.14). There was a significant association between the parity of the mother and the age of initiation of complementary feeding with p < 0.05.
Above table shows that most of the mothers both primipara (124) and multipara (77) initiated complementary feeds between 4-6 months of age, followed by <4 months (31,24), 7-9months (22,11) and then between 10-12 months (11,0). The mean age of complementary feeding was 5.37 months and 5 months respectively in primipara and multipara. There was no significant association between the two parameters with a $p$ value of > 0.05.

Table 3: Association between educational status of mother and age of complementary feeding

<table>
<thead>
<tr>
<th>AOCF</th>
<th>Illiterate</th>
<th>Primary school</th>
<th>Middle school</th>
<th>High school</th>
<th>P.H Diploma</th>
<th>Graduation</th>
<th>PG</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;4</td>
<td>6</td>
<td>21</td>
<td>14</td>
<td>10</td>
<td>3</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>4to6</td>
<td>3</td>
<td>17</td>
<td>55</td>
<td>65</td>
<td>41</td>
<td>14</td>
<td>3</td>
</tr>
<tr>
<td>7to9</td>
<td>14</td>
<td>11</td>
<td>6</td>
<td>1</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10to12</td>
<td>10</td>
<td>0</td>
<td>5</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>49</td>
<td>80</td>
<td>76</td>
<td>44</td>
<td>15</td>
<td>3</td>
</tr>
</tbody>
</table>

Mean ± S.E = 7.61±0.50, 4.6 ± 0.29, 4.78±0.16, 4.900±0.14, 5.26±0.15, 5.40±0.25, 6.00±0

$\chi^2$ -223.6 $p$ - < 0.01

Above table shows that the age of starting complementary feeds was delayed in illiterate mothers with a mean of 7.6 months. The mean age of complementary feeding was 4.68 months, 4.78 months, 4.9 months, 5.26 months, 5.4 months, 6.2 months respectively in mothers educated up to primary school, middle school, secondary school, post high school diploma, graduation, post graduation respectively, which was a highly significant association with a $p$-value of < 0.01.

Table 4: Association between occupation of mother and age of complementary feeding

<table>
<thead>
<tr>
<th>AOCF</th>
<th>Working</th>
<th>Homemaker</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;4</td>
<td>22</td>
<td>33</td>
</tr>
<tr>
<td>4to6</td>
<td>59</td>
<td>142</td>
</tr>
<tr>
<td>7to9</td>
<td>2</td>
<td>31</td>
</tr>
<tr>
<td>10to12</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>86</td>
<td>214</td>
</tr>
</tbody>
</table>

Mean ± S.E = 4.65 ± 0.19, 5.43 ± 0.12

$\chi^2$ - 13.8 $p$ - > 0.05

Above table shows that majority of the mothers started complementary feeding between 4-6 months of age. Though the mean age of complementary feeding was less among working mothers (4.65 months) than homemakers (5.4 months), there was no statistically significant association ($p$> 0.005)

Table 5: Association between socioeconomic status and age of complementary feeding

<table>
<thead>
<tr>
<th>AOCF</th>
<th>One</th>
<th>Two</th>
<th>Three</th>
<th>Four</th>
<th>Five</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;4</td>
<td>1</td>
<td>10</td>
<td>25</td>
<td>16</td>
<td>3</td>
</tr>
<tr>
<td>4to6</td>
<td>22</td>
<td>94</td>
<td>73</td>
<td>9</td>
<td>3</td>
</tr>
<tr>
<td>7to9</td>
<td>0</td>
<td>0</td>
<td>8</td>
<td>23</td>
<td>2</td>
</tr>
<tr>
<td>10to12</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>7</td>
<td>4</td>
</tr>
<tr>
<td>total</td>
<td>23</td>
<td>104</td>
<td>106</td>
<td>55</td>
<td>12</td>
</tr>
</tbody>
</table>

Mean ± S.E = 5.6±0.16, 5.1±0.10, 4.57±0.14, 6.27±0.38, 6.66±1.00

$\chi^2$ - 198.04 $p$ - <0.01
Above table shows that there was a delay in complementary feeding by mothers from low socioeconomic status decreased. The mean age of complementary feeding was 5.6 months in class I, 5.1 months in class II, 4.57 months in class III, 6.6 months in class IV, and 6.9 months in class V. There was a highly significant statistical association between the socioeconomic status and age of starting complementary feeds ($p < 0.01$).

Table 6: Association between type of family and age of complementary feeding

<table>
<thead>
<tr>
<th>AOCF</th>
<th>Nuclear</th>
<th>Joint</th>
<th>Extended</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;4</td>
<td>7</td>
<td>31</td>
<td>17</td>
</tr>
<tr>
<td>4to6</td>
<td>85</td>
<td>59</td>
<td>55</td>
</tr>
<tr>
<td>7to9</td>
<td>6</td>
<td>15</td>
<td>13</td>
</tr>
<tr>
<td>10to12</td>
<td>1</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
<td>107</td>
<td>93</td>
</tr>
</tbody>
</table>

$\chi^2 = 58.03$  \hspace{1cm} $p < 0.05$

From the above table it is evident that complementary feeding was started early in joint families with a mean age of 4.8 months compared to extended (5.2 months) and nuclear (5.4 months). There was a significant statistical association between the type of family and the age of complementary feeding with a $p$-value of $< 0.05$ in chi-square test.

**DISCUSSION**

The present study was a prospective questionnaire based study done in the setting of a Medical college and hospital. Knowledge of the mothers and patterns of the complementary feeding practices assessed showed that, the mean age of knowledge of the mothers regarding complementary feeding was 4.25 months, which is less compared to the recommendation according to Agarwal et al.\textsuperscript{10} Similar results were found in the NFHS-III data 2005-2006.\textsuperscript{11}

While assessing the knowledge regarding the type of the complementary foods to be started, 182 mothers (61\%) opined that homemade foods should be started, 47 mothers (16\%) opined that commercial foods should be started and 71 mothers (24\%) had no idea in contrast to the study done by Pant and Chothia.\textsuperscript{12}

The source of information regarding the appropriate age and the type of the complementary foods to be started was obtained in majority (101, 35\%) of the mothers from the elderly females in the family mostly the mothers-in-law who were the primary caregivers for both the mother and the child. This is comparable to the study done by Engle PL et al\textsuperscript{13} and NFHS-III data 2005-2006\textsuperscript{11}.

Though 40\% of the mothers had appropriate knowledge of starting complementary feeds, only 100 mothers (33\%) started complementary feeding at 6 months, majority of them initiated below 6 months (52\%) and 44 mothers (15\%) delayed complementary feeding to 7-12 months. This was in comparison to the results obtained in the study done by Mahmood SE\textsuperscript{14} and Chandra sekaretal\textsuperscript{15} and Banapurmath et al\textsuperscript{18} in contrast with the study done by Singh et al\textsuperscript{16} in Rajasthan (8.7 months) and study done by Khan ME\textsuperscript{17} Dakshayani et al\textsuperscript{19} in West Bengal (7.7 months).

The reason quoted by most of the mothers for starting complementary feeding in this study was, not enough milk along with traditional beliefs and advices from the elderly females in the family (34\%), which was same as in the study conducted by Engle PL\textsuperscript{13} and Kuryan R
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and Kurpad AV showing the significance of grandmothers in decision making. The most common reason for delaying complementary feeding was the lack of knowledge in the mothers regarding appropriate complementary feeding recommendations similar to the study done by Aggarwal et al. 

The most common reason for early complementary feeding was traditional beliefs and advices from elderly females in the family similar to the NFHS-III 2005-2006 data. and Banapurmuth et al. Regarding the gender of the child, there was a significant association with age of complementary feeding (p > 0.05), with complementary feeding being started earlier in male children than females. This is in contrast to the study done by Betoko A and Charles Engel et al showing significant association between the parity of the mothers and the complementary feeding practices.

There was a highly significant association between the educational status of the mother and the age of complementary feeding with more prevalence of delayed complementary feeding in illiterate mothers compared to literate mothers (p < 0.01) this is similar to the NFHS-III data in India, 2005-2006 and the study done by Engel et al.

In the present study there was no significant association between the occupational status of the mother and the age of complementary feeding (p > 0.05), but it showed a significant influence on the complementary feeding practices by the socioeconomic status of the family with women from low socioeconomic status delaying the initiation of complementary foods due to lack of knowledge. Similar association was found in the NFHS-III and Shroff et al.

Current study also showed significant association between the complementary feeding age and type family (p < 0.05). Mothers from joint and extended families tend to start complementary feeds early due to the influence of elderly female family member’s advices and traditional beliefs.

CONCLUSIONS
The present study revealed that the knowledge of the mothers regarding the appropriate time of complementary feeding was inadequate. Only 41% of the mothers were aware of the appropriate age of complementary feeding according to WHO guidelines. (24%) in the present study had no knowledge of the recommended guidelines.

The mean age of complementary feeding in the present study (5.23 months) was due to traditional beliefs, customs, advices from elderly females in the family and lack of knowledge of the mothers regarding the disadvantages of early complementary feeding, in majority of the mothers. Almost all mothers in the present study practiced gradual complementary feeding with breastfeeding being continued even after starting complementary feeds. The reason quoted by most of the mothers for starting complementary was, “not enough milk along with traditional beliefs and advices from the elderly females in the family”.

The most consistent factors affecting the patterns of complementary feeding were the educational and the socioeconomic status of the mother, with mothers having lower educational and socioeconomic status delaying the complementary feeding. Parity, occupation had no influence on the complementary feeding patterns. Mothers from joint and extended families tend to start complementary feeding earlier than mothers from nuclear families due to the advices from the elderly females mostly mothers-in-law. The gender of the child also had a significant influence on the age of complementary feeding with complementary feeding being started early in male than female children. Overall there is a predominant prevalence of early complementary feeding.
practices as evidenced by the results of the study. Training of health workers and volunteers should focus on counseling rather than just giving messages. Myths and misconceptions should be addressed in a culturally sensitive manner.

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