CHAPTER III

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3.1. Theoretical and conceptual framework of the study

The review of literature, highlighted the fact that feeding practices, either breastfeeding or complementary feeding are a result of the response by the mother to the demand set by the infant. This in turn is influenced by several variables that could be broadly divided into maternal, infant and environmental variables. The sum total of breastfeeding and complementary feeding practices in the normal state as well as during episodes of illnesses, predominantly determine the infants’ nutritional outcome. Figure 3.1 presents a theoretical and conceptual framework of the study.

3.2 Variables selected for the study

The study had three objectives. One was the study of variables that determine the feeding practices of mothers. These could be broadly divided into three groups, namely, maternal, infant and environmental.

- The maternal variables could be divided into biological and social variables. The biological variables were, age, parity, birth spacing and nutritional status of the mothers. The social variables were years of schooling, literacy, knowledge, type and composition of families to which mothers belonged, their multiple work roles, support received and socio economic status. Under multiple work roles domestic work, care of an older child if any and paid work were included. Support included help from professionals such as health functionaries, help from the family and State support by way of nutritious supplement to pregnant, lactating mothers and infants above six months as well as cash support of Rs.500 by way of maternity aid. Since the study was
Fig. 3.1 Determinants of Infants’ Nutritional Status and their Linkages
delimited to mothers in slums who are from a similar socio-economic background, the class variable was not considered.

- The three infant variables studied were age, sex and birth weight.

- The environmental variables consisted of culture, media and the home environment. Many of the practices are cultural in origin, for example going to the natal home for delivery and giving prelacteal feeds. Utilization of mass media such as radio, television and newspapers/journals by mothers was studied. For the purpose of this study utilization of mass media by mothers was considered along with maternal social variables described earlier. The variable home environment was not considered since it was assumed that all mother infant dyads would have more or less a similar home environment.

A second objective was to study the role of the above mentioned variables in influencing feeding practices of mothers. While these variables formed the independent variables, the feeding practices themselves formed the dependent variables. The feeding practices were categorized into breastfeeding and complementary feeding practices. With regard to the third objective, namely the role of feeding practices on the anthropometric status of infants, the feeding practices were considered as independent variables while the nutritional status as assessed through anthropometry formed the dependent variable.

3.3 Definition of the study subjects

The study subjects were defined as apparently normal mothers and their infants (from twenty-one days of birth to twelve months and fifteen days) from Chennai slums, which were within the corporation limit. The midpoint cutoff was used to determine the age of the infants (Gopujkar, 1984). The date of birth of the infants was ascertained from
the birth certificate. Infants below twenty-one days of age were not included since the practice of breastfeeding involves a time dimension. It takes about three days for the milk to ‘come in’ (Anand, 2002). The newborn has to adjust to the new environment and in the period soon after birth, the mother infant dyad try to understand each other and establish a relationship. Further a feeding practice has to be in vogue for ‘some time’ before it could cause an impact. It was felt that a period of at least twenty days was necessary for this process. Thus three infants who were below twenty-one days of age were excluded from the study. In addition a motherless infant, a pair of twins, one special infant and one with congenital malformation were also excluded.

3.4 Design of the study

The study was cross sectional in design with ex post facto analysis of data collected through individual interviews with a representative sample of mothers and infants (twenty-one days to twelve months and fifteen days old). Data was collected at a single point of time and within one and the same season. Since the study intended to net the diversity of situations in which mothers were placed and the practices of mothers, across twelve months of age of infants, it was felt that a cross sectional design was appropriate. Once primary data collection of quantitative information with the individual respondents was over, a focus group discussion with mothers was held in each slum to obtain qualitative data. The purpose of this exercise was to obtain additional information on the management of and reasons behind the observed practices.

3.5 Distribution of slums in Chennai

The official list of slums in Chennai was obtained from the Madras Metropolitan Development Authority (MMDA, 1987). The slums of Chennai city have been classified into four zones. Three zones namely
1, 3 and 4 were within the corporation city limits and they formed the sampling unit. The total population in each zone was divided by the total number of slums to arrive at the approximate size of each slum in the three zones (Table 3.1)

**Table 3.1. Size of population in slums of Chennai City in 1987**

<table>
<thead>
<tr>
<th>Zones</th>
<th>Area</th>
<th>Population</th>
<th>Slums</th>
<th>Population per slum</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Extended areas</td>
<td>77790</td>
<td>68</td>
<td>1143</td>
</tr>
<tr>
<td>3</td>
<td>South Madras</td>
<td>246828</td>
<td>437</td>
<td>564</td>
</tr>
<tr>
<td>4</td>
<td>North Madras</td>
<td>326242</td>
<td>491</td>
<td>664</td>
</tr>
</tbody>
</table>

As seen in the table the slums in zone 1 were the most thickly populated.

**3.6 Sample size**

Since the objective of the study was to understand the relationship between the various variables and did not involve any estimation, the size of the sample was decided based on the minimum number needed for statistical validity and the time frame available for investigation. Since data was proposed to be analysed according to the month of age of infants a minimum of 25-30 mother infant dyads for each month of age (from 1 to 12 months) was decided to be included. A minimum number of 360 mother infant dyads were considered necessary. The final sample consisted of 362 mother infant dyads.

**3.7 Sampling technique**

Once the sample size was decided, the next step was to ascertain the number of slums that needed to be selected in order to arrive
at the number. Based on the ICDS reports provided by the Directorate of Social Welfare at Chennai, the proportion of children in the entire population under one year of age was estimated to be 2%. Since the size of population per slum ranged from 564 at the lowest to 1143 at the highest (table 3.1) the number of infants in each slum was calculated as approximately ranging between 10 at the least to 30 at the maximum. Thus a minimum of twelve slums were needed to be selected in order to arrive at the sample size of about 360.

The preliminary selection of Chennai city as the urban area was a non random selection. The three zones, namely zones 1, 3 and 4 formed the sampling unit since these three zones came under the purview of the Corporation. The selection of the twelve slums within the three zones was done by the stratified random sampling method. Since zone 1 was the most thickly populated with chances of greater diversity of practices if any, six slums were decided to be chosen from zone 1 and three each from the other two zones. The selection of individual slums from each zone was done in the following manner. Since six slums were to be chosen from zone one, the sixty-eight slums listed in that zone were divided into six, which gave a figure of approximately eleven. The first two digit number within sixtyeight was chosen from the random table and the slum listed against this number was chosen as the first sample. The rest five were chosen at the eleventh interval from this number.

A similar procedure was followed for the other two zones. Ultimately thirteen slums instead of twelve were covered, since one slum was officially separated into two at the time of data collection. In each slum all the mother infant dyads were enumerated and covered. Only seven dyads in the course of the entire enumeration process were excluded and the criteria for exclusion have already been discussed earlier. Totally 362 dyads could be covered. The size of population in each zone, the number of families and the number of infants are given in Annexure 1.
3.8 Tools and techniques used for data collection

Both numeric and nominal data were collected. Prior to data collection, basic details about each slum such as population, number of families, caste pattern, available basic facilities such as water, toilet, presence of an NGO or any other community organization were collected.

3.8.1 Questionnaire – A questionnaire was administered to mothers to collect data on the maternal and infant variables as well as practices. (Annexure 2).

3.8.2. The questionnaire was developed in three stages. In the first stage all the variables to be studied were listed. With regard to the maternal variable knowledge, since it encompassed a wide range of issues, two paediatritians were requested to identify the most important aspects. These were found to be age at complementary feeding, diseases controlled by the programme of immunization and the domiciliary control and management of diarrhoea. All questions were divided and organized into ten appropriate sections. Care was taken to put the questions on practices first followed by those on knowledge. Since an interview can be held for a maximum period of 40 minutes after which the subjects are likely to become tired and restless, care was taken to refine and shorten the questionnaire to get all the needed information within forty minutes.

In the second stage the questionnaire was given to a team of experts consisting of paediatritians, nutritionists and social scientists for content validity and the changes suggested by them were carried out. In the third stage the questionnaire was field tested in five slums for reliability, feasibility and ease of administration by the investigator and eight others. Suitable modifications were made. This was again tested. With the co-operation of thirty mothers in one test slum the investigator and two others administered the questionnaire thrice to each
mothers and compared the results to see whether for each question the same answers were obtained by all the three. Necessary alterations were then carried out. The investigator completed data collection within three months.

3.8.3 Maternal nutritional status, was assessed using weight as the criterion. Weights were taken with a solar powered electronic weighing scale supplied by UNICEF. This scale simply designed and easy to carry is of lightweight and more importantly is accurate and sensitive up to one decimal point. Since the actual weight is flashed numerically parallax is avoided. Mothers were requested to stand in the middle of the electronic weighing scale, with hands at sides, feet together and the head held straight and eyes looking straight ahead. The readings were taken.

3.8.4 The parameters chosen for measuring the dependent variable, namely infants’ nutritional status, were length, weight, mid-arm circumference and skinfold thickness. Weights were measured using the solar scale already mentioned above.

The length of infants was measured with the help of a standardized infantometer supplied by the Clinical Nutrition Department of Sri Ramachandra Medical College. The infant was laid on the flat surface of the board and the head positioned firmly against the fixed headboard, with the eyes looking vertically. The knees were extended by applying firm pressure and the feet were flexed at right angles to the lower legs. The upright sliding foot-piece was moved to obtain firm contact with the heels and the length read to the nearest 0.1 cm.

The mid arm circumference, which helps in assessing localized muscle mass, with which poor muscle development or muscle wasting indicative of protein–calorie malnutrition can be identified was measured by means of a narrow non-stretch plastic tape. Mothers were
requested to hold the infants against their shoulders, and the left arm, hanging freely was measured at mid-point to the nearest 0.1 cm without compression of the soft tissues.

Another measure was triceps skin fold thickness useful in identifying poor calorie stores as well as obesity. The lengthwise skin fold was firmly grasped and slightly lifted up between finger and thumb of the left hand, without including the underlying muscle. The site selected was halfway down the arm with the arm hanging relaxed at the side. The calipers, supplied by the Ramachandra Medical College, were applied about 1 cm below the investigator’s fingers with the fold held throughout the measurement. The calipers had a standard contact surface area or ‘pinch’ surface of 20-40mm and read to 0.1-mm accuracy and exerted a constant pressure of about 10 gm/mm).

3.8.5 The age of the infant was ascertained with the help of the birth certificate. The birth weight was obtained from the maternal health records with the mothers, which had been given to them at the time of discharge from the hospital.

3.9 Focus Group Discussions

Focus groups are basically group interviews that collect data through group interaction on a topic determined by the researcher (Morgan, 1997). It is the researcher’s interest that provides the focus, whereas the data themselves come from the group interaction. The hallmark of focus groups is their explicit use of group interviews to produce data and insights that would be less accessible without the interaction found in the group. In every slum, once data collection was completed, a focus group discussion was organized and mothers were motivated to attend the discussion. The purpose of this exercise was to obtain additional information on observed practices and to provide a feedback to mothers about the results of the survey and suggestions for
improved methods of feeding and hygiene. The survey data were quickly analysed prior to the meetings and questions based on these were loosely framed. Except for one slum, in which a discussion could not be organized, in all the twelve slums about one third of the sample participated. The ‘funnel’ approach was used in the discussion (Morgan, ibid) in which mothers were at first encouraged to discuss issues of their own concern, to enable maximum interaction, after which the specific questions based on the survey were asked.

3.10 Use of reference standards

The mothers in the study were classified into three groups based on their body weight. A criterion of less than 38 kilograms body weight was used to identify ‘at risk’ mothers (NFI, 1988). The ‘less than 38 kilograms body weight’ criterion, which identifies malnutrition, implies that people falling below this level would in all probability be functionally impaired. Those weighing between 38 and 49 kilograms were considered as underweight and those with a body weight of 50 kilograms and above were considered as having adequate body weight (NFI, ibid).

With regard to infants’ anthropometric status, they were compared with the U.S. National Center for Health Statistics/World Health Organization (NCHS/WHO, 1983). The three anthropometric indices used to describe the nutritional status were stunting, wasting and underweight (Sachdev and Choudhury, 1995). Stunting which indicates chronic undernutrition is defined as the height for age indice, with a less than 2 Standard Deviation (SD) score from the reference median. Wasting which indicates acute undernutrition is defined as the weight for height indice with a less than 2 SD score from the reference median. Underweight, which reflects both chronic and acute malnutrition, is defined as the weight-for-age indice with a score of less than 2 SD, from the reference median. These three indices were applied to all the age
groups above one month of age. For one-month-old infants, the birthweights were compared with the weights taken at the time of the study, to find the weight gain since birth. A mid arm circumference of less than 12.5cms, reported to be an age independent parameter in assessing undernutrition in infants between six and twelve months of age (Bhatia et al.1999) was also used to assess undernutrition in infants above six months of age.

3.11 Data Analysis

The SPSS (Statistical package for social sciences) software, version eight was used in generating tables and figures and in analyzing data. Descriptive statistics such as mean, median and standard deviation were used to analyse the biological and social variables of the mothers and their infants. Correlations were used to analyze the relationship between variables, such as mothers’ bodyweight and infants’ birthweight. They were also used to explore the relationship between the various anthropometric measurements of the infants. The independent sample ‘t’ test was used to test the significance of differences between the means of two groups. Chi square test was used to find if differences in proportions between groups were significant.

The qualitative observations arising out of the focus group discussion were also quantified. A profile of the mothers who participated in the discussion, issues covered and the questions put forth are presented in Annexure 3. The responses of the mothers from all the slums were pooled and the data analysed on a percentage basis. The results are interwoven alongwith the quantitative findings in the text.