CHAPTER IV

MATERIALS AND METHODS
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For the present study, necessary data have been collected from a total of 774 Meitei newborns, delivered at the Maternity ward of Jawaharlal Nehru Hospital, Porompat, Imphal East, during the period of June 1999 to July 2000. During this period a total of 2838 mothers, belonging to different communities such as - Meiteis, Meitei Muslims, Meitei Brahmins, Nagas, Kukis and other Non-Manipuris were admitted for delivering 2844 life births (1418 males and 1426 females), inclusive of 6 twins.

Characteristics of the sample

The data comprised of two broad sets of parameters, viz

A. General information and socio-economic background of the Mother and the Father, and

B. Baby’s information.

A. General information and socio-economic background of the

Mother and the Father

1. Mother’s information

Mother’s information may be divided into two broad sets as follows:

(a) General information and socio-economic background has included the data on

(i) the place of residence,  
(ii) birth place,  
(iii) age,  
(iv) religion,  
(v) educational qualification,  
(vi) occupation,  
(vii) family type,  
(viii) family size,  
(ix) income and

(b) Obstetric factors consist of

(i) birth order,  
(ii) nutritional intervention,
(ii) birth- interval,  
(iii) gestation,  
(iv) last menstruation period,  
(v) lactation during pregnancy,  
(vi) antenatal check up,  
(viii) miscarriages or abortions,  
(ix) smoking habit,  
(x) family planning and  
(xi) health and nutritional education.

2. Fathers' information embodies only

(i) age,  
(ii) religion,  
(iii) caste,  
(iv) educational qualification,  
(v) income,  
(vi) place of birth and  
(vii) present residence.

B. Baby's information

It is further sub-divided into three main-sections, viz.

(a) General information

(i) sex,  
(ii) delivery date,  
(iii) time of delivery,  
(iv) type of delivery and  
(v) mode of delivery.

(b) Somatometric measurements consist of the following eleven measurements such as

(i) Birth weight (B.W),  
(ii) Birth Length (B.L),  
(iii) Head Circumference (Hd.C),  
(iv) Chest Girth (Ch.C.),  
(v) Mid-Upper Arm Circumference (M.U.A.C),  
(vi) Thigh Girth (Th. G.),  
(vii) Calf Girth (C.G),  
(viii) Waist Girth (W.G),  
(ix) Hip Girth (H.G),  
(x) Foot length (F.L.) and  
(xi) Foot Breath (F.B).

Abbreviations used for each measurement are given in the parenthesis.

(c) Morpho-genetical data include the following

(i) Hair whorl (quantity and direction),  
(ii) Earlobe attachment,  
(iii) Head hair (quantity),  
(iv) Body hair (quantity),
Plate No.1: The researcher observing a newborn along with the doctor.

Plate No.2: Baby on the Weighing Scale

Plate No.3: Measuring the Birth Length
Plate No.4: Measuring the Mid Upper Arm Circumference

Plate No.5: Measuring the Waist Girth

Plate No.6: Measuring the Thigh Girth
(v) Finger nails (growth length and presence of lunulae).
(vi) Toe nails (growth length and presence of lunulae).
(vii) Eyebrow ridges (quantity, form and separation) and
(viii) Colour spot.

Methods and Techniques Followed

The present study has been based on cross-sectional method. All data have been obtained through systematic random sampling. The details of both mother’s and father’s information were recorded using a well-preplanned performa. All information collected were also checked and verified by comparing with the doctor’s prescription slips of antenatal check ups.

Only the termed (37 – 41 weeks) singleton liveborns were considered for the present study. All the necessary data and the anthropometric measurements were taken within 24 hours after delivery, following standard techniques of Weiner and Lourie (1969). Much effort was made to reduce the instrumental and personal error. All the instruments were checked every now and then.

Birth weight was taken by using beam balance scale.

Birth length is carried out accurately with a plastic measuring board (infantometer) with a fixed head piece on which the infant lies supine with its legs fully extended. For this measurement, help for either a nurse or an attendant was taken for holding the baby in correct position. When the sliding board is moved firmly against the feet, the measurement is recorded to the nearest 0.1cm.

All the girth measurements were taken with a linen soft tape marked in cm.

Foot length and foot breadth were measured by using sliding caliper.

The Morpho-genetical traits were taken through keen visual observation.
The quantity of hair whorl for each neonates was recorded as single and double and its direction type as clockwise or anticlockwise.

The quantity of head hair was also recorded as thin, medium and thick.
The earlobe attachment was divided only into two types – free and attached.
Similarly, body hair quantity was assessed as - thin, medium and thick.
The growth length for both finger and toe nails were recorded by classifying into normal, medium and long.
Plate No.7: Measuring the Foot Length

Plate No.8: Measuring the Foot Breadth

Plate No.9: Showing colour spot on the arm
Moreover, the presence of lunulae on the nails of each digit of the fingers and toes were also recorded as present and absent.

Hair growth quantity on eyebrow ridges was also observed by dividing into thin, medium and thick as in the cases of head hair growth and body hair growth.

The eyebrow ridge form was observed as straight and oblique and their connection type is also recorded as separated or connected.

In case of colour spots, observations have been made on the backside mainly at any part of the hip area.

Analysis and Statistical Methods

All the raw data were fitted in computer for statistical analysis. Frequency distribution and percentages were prepared with appropriate class intervals for all the general information of the mother, father and the newborns, and also for the morphogenetical traits of the newborns. The three statistical constants such as Mean ($\bar{x}$), Standard Deviation (S.D), Co-efficient of variation (C.V.) and their respective Standard Errors (S.E.) have also been calculated.

For statistical comparisons $\chi^2$ test has been applied for the qualitative traits while e-value (Kapur, J.N. and H.C. Saxena 1984) have been calculated for the quantitative traits. Correlation is also calculated to see the relationship between the birth weight and other somatometric measurements.

**e-value** is the standard error of difference between the means. It is used for testing the significance of the difference between the means of two large samples. It is calculated as follows:-

$$e^2 = e_1^2 + e_2^2$$

where, $e_1$ and $e_2$ are the standard errors of the means of the two samples. If the difference between the two means exceeds $2e$, it is regarded as significant at the 5% level of probability.
Moreover, percentile distribution of birth weight have been calculated by using the following formula,

\[ P_k = l_k + \frac{\left( k \frac{N}{100} - c \right) h}{f_k} \]

where, \( P_k \) is the \( k^{th} \) percentile;
\( l_k \) is the lower limit of the class interval where \( k \) percentile falls,
\( c \) is the cumulative frequency up to the class interval where the \( k^{th} \) percentile occurs; and
\( h \) is the width of the class interval (Visweswara Rao, K. 1996).

**Nutritional indices**

Different measures for the assessment of nutritional status of the newborns have been made following the indices given below:

1) **Absolute growth** = \( \bar{x}_2 - \bar{x}_1 \)

where, \( \bar{x}_1 \) = Mean value of the lower age group and
\( \bar{x}_2 \) = Mean value of next higher age group

2) **Maturity Gradients** = \( \frac{\bar{x}_1 \text{or } \bar{x}_2 \text{or } \bar{x}_3 \text{or } \bar{x}_4 \text{or } \bar{x}_5}{\bar{x}_5} \times 100 \)

where, \( \bar{x}_1 \) or \( \bar{x}_2 \), ....... stands for mean of first or second age groups and so on.

\( \bar{x}_5 \) stands for the mean of the last gestational age groups.

It is calculated to indicate the level of maturity of a variable at any given age as compared to its mature size. For the present study, the last gestational age group i.e. 41 (\( G_{41} \)) stands as the level of maturity for calculating the maturity gradients of various body dimensions.

3) **Body Mass Index (BMI)** = \( \frac{\text{B.W. (gm)}}{\text{B.L.}^2 \text{ (cm)}} \times 100 \)

It is calculated to show the nutritional status of the newborns regarding gestational ages.
4) Relative chest circumference index = \( \frac{\text{Ch.C (cm)}}{\text{B.L.(cm)}} \times 100 \)

It is used to know the type of chest of the newborns in relation to their birthlength.

5) Robusticity Index = B.L. (cm.) – Ch.C. (cm.) + B.W. (kg.)

6) Pignet – Vervaek Index = \( \frac{\text{B.W. (kg)} + \text{Ch.C. (cm)}}{\text{B.L.(cm)}} \times 100 \)

**Assessment for the socio-economic status of the Parents**

(a) Working and Non-working Mother

Working mother are classified broadly as government or private employees, social workers, politicians and training persons, whereas the Non-working ones are those housewives, pensioners, rent receivers, beggars, land owners, money lenders etc. (Census of India-1991).

(b) Social class

The social class of the mothers and the fathers has been classified according to Prosad’s (1970) method as given below:

<table>
<thead>
<tr>
<th>Family Occupation (1999)</th>
<th>Per Capita Monthly income (updated)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Social Class I</td>
<td>- 27778.96 +</td>
</tr>
<tr>
<td>Social Class II</td>
<td>- 13883.11 – 27677.07</td>
</tr>
<tr>
<td>Social Class III</td>
<td>- 6470.29 – 13793.95</td>
</tr>
<tr>
<td>Social Class IV</td>
<td>- 2776.62 – 6381.14</td>
</tr>
<tr>
<td>Social Class V</td>
<td>- Below 2776.00</td>
</tr>
</tbody>
</table>

**Assessment of Gestation**

It is assessed by counting the days from the first day of last menstruation period to the delivery day. For term babies, it ranges from 259 to 293 days, (Singh, M. 1991). For getting the accurate days, it is verified by using the doctor’s prescription slip for first antenatal check-up and by observing the role of the newborns in the following manner (Milner, R.D.G. and S.M. Herber, 1984):

i) The role of 30 week newborn baby’s foot is smooth.
ii) By 34 weeks, creases have started to appear in the one-third anterior part of the planter surface.

iii) At 40 weeks, the entire planter area is noticeably creased.

iv) At 43 weeks of gestational age, the entire planter surface is excessively creased together with dry peeling skin.

Any doubtful cases have been discarded.

Graphic and photographic representations have also been made wherever found necessary.

The findings of the present study are shown in the next chapter.