CHAPTER VI
SUMMARY AND CONCLUSION
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Newborn, the earliest stage of post natal life, which is usually defined as the first month of life by having its duration from birth to 28 days, has been taken as the vulnerable period and is of greatest danger as regards survival and freedom from handicaps. During this period, many threats exist, including congenital malformations, low birth weight and birth damage (Hughes, J.G. and J.F. Griffith, 1984).

The period of gestation that is the time during which the fetus grows and develops inside the uterus usually lasts about nine months. Children are born with immunity to only a few diseases, and because they lack immunity, they contract more of their diseases than older people do. It has been suggested that the health of the newborn must be guarded from the conception. Moreover, maternal health before conception, the genetic endowments, maternal milieu and maternal infections have profound influence on the outcome of pregnancy (Singh, M. 1991).

Low birth weight without prematurity is the result of growth retardation during fetal life. However, most low birth weight with or without prematurity is associated with socio-economic conditions. Bogin (1998) pointed out that the incidence of low birth weight in the developed nations is 5.9% of all live births, while in the poorer developing nations the incidence is 23.6%.

Since the first systematic study of birth weight of newborns in Brussels by Quetelet (1871), large number of studies has shown the variables affecting the birth weight of diverse population groups of different parts of the world (Wark and Malcom 1969, Meredith 1970, Ascroft et al. 1966, etc. to mention a few). Comas (1960) remarked that major social or ethnic groups have a characteristic distribution of birth weight and its uniqueness is undoubtedly due to both genetic and environmental factors. Some specific genetics and other influences such as parity and
gestation are also known to affect birth weight. It has also been known that mothers of the children with low birth weight were themselves small at birth (Young, 1979).

When so much of emphasis has been given for the study of newborns and considering large population groups of the world specially of the developing countries, yet, programmes for such studies appear to be very few and reports are still very scanty.

The present thesis has therefore, been envisaged to take up a systematic study programme for the Meitei population of Manipur, one of the seven states of North-East India.

For the present study, different sets of parameters which include eleven somatometric measurements, eight morpho-genetical traits and general information and socio-economic background of the delivery mothers have been collected from 774 Meitei newborns, who were delivered at the Maternity ward of the Jawaharlal Nehru Hospital, Porompat, Imphal East.

The state of Manipur, which is the homeland of the Meitei newborns of the present study is an isolated hill-girt and geographically distinct unit located on the north-eastern border of India. The region falls under the zone of the sub-tropical monsoon climate and it is covered with rich flora and fauna. Many wild and seasonal vegetables are grown on the hill slopes and on the plain and swampy lands. The Loktak lake is a source of plenty of fishes which supplement the protein requirements for the people of the state. Rice is the staple food for the Meiteis and fish is their delicacy. They claimed themselves as the vegetarian, although they take plenty of fishes and sometimes eggs and different meats specially, among the younger generations. Tea is the most common beverage. Moreover, they also take other stimulants like coffee, tobacco, betel nut etc. Some other special food items of the Meiteis are fermented bamboo shoots (Soibum), fermented small fishes (Ngari), fermented soyabeans (Hawaichar) and various kinds of seasonal mushrooms, which are all highly proteinous.

As a tradition, a Meitei pregnant woman has to observe certain restrictions and taboo by avoiding various types of work and eating habits. They are supposed to avoid certain harmful activities such as quarrelling, fighting, stealing, cheating and killing the animals. Some other rare practices were to avoid even doing the works of
cutting, striking nails and stitching etc. They also have to avoid eating all kinds of 
food which are very hot, very sour and very bitter to taste and even they are to avoid 
certain vegetables peruk (Centelia asiatica), nongmangkha (Adhatoda vasica), laphu 
amra (a kind of banana plant) and some fruits specially papaya and pineapple.

At different stages of the pregnancy, the pregnant woman would perform 
prayers to Sanamahi, the household lord and also to Lord Nityainanda, the Hindu God, by performing a ritual known as Panjamitra. There is a tradition that whatever 
the pregnant mother feels prefer to eat except the forbidden food items, are given at 
any cost by the family members or relatives or even by the neighbours by inviting her 
at a lunch or a dinner.

Even after the delivery, certain restrictions on their dietary habit and physical 
movements are being observed. For five days of post delivery they are given only rice 
with the smoked lata fish (Ngamu) with meitei thum, a local made salt. From the sixth 
day onwards she begins to take simple boiled curry prepared from yendem (Alocasia 
indiaca) with dry fish and with a pinch of salt to taste. She avoids to take fermented 
fish (ngari) during this period. She is taken as polluted and she should not touch 
anyone till the eleventh day on which both the mother and child are cleaned through a 
purification rite known as "Yumsengba". The mother is to take bath on this day. After 
the completion of forty days she can join the common kitchen of the family except 
that she should not be a cook for three months.

Analysis of the data have shown that the delivery mothers were mostly of rural 
born (80.75%) and also of rural residence after marriage (77.26%) and had large 
family size (59.82%). 83.20% of them are Hindus. Literacy rate of the mothers was 
very high with 89.64%, while their husbands also had higher literacy rate (97.03%). 
Occupationally, the maximum of the mothers are non-working (83.85%) and 
belonged to socio-economically in lower classes, that is, 35.79% in class IV and 
51.68% in class V. Age-wise analysis of the delivery mothers have shown that 
maximum number of them (31.65%) belonged to 25 - 29 years and followed by the 
age group 20 - 24 years with 30.10%. The maximum number of the husbands also 
belonged to 25 – 29 years with 28.04% and also to 30 – 34 years with 28.68%.

These mothers had either slim type (48.45%) or thin type (46.77%)of body. 
They did not have smoking habit. It has been recorded that maximum of the pregnant
mothers attended health education (60.98%) and medical care programs such as nutritional intervention (57.49%), medical check up (98.58%), and received tetanus toxoid by 98.45% of them. But a minimum of them (13.31%) adopted family planning. As per report of the delivery mothers, some of them had miscarriages (19.51%) and or abortions (9.50%). It has also been revealed that maximum number of the newborns was delivered after a mean gestation age of 39.12 weeks and the maximum number of them (29.30%) was found to deliver after 41 weeks of gestational age. It has also been observed that 50.77% of the newborns belonged to birth order 1. Maximum of them were delivered through normal system (90.18%), while 7.88% were through caesarian method.

Distribution of somatometric measurements have shown that the Meitei newborns had a mean birth weight of 2.97kg (male – 2.99 kg, female – 2.95 kg). They also have an average birth length of 48.01 cm, but the males are larger in length (48.29 cm) than the females (47.73 cm) as in the birth weight. Following the same trend the male newborns have shown higher mean values in most of the variables. But the female newborns show higher mean values in only two measurements – such as thigh girth (16.97 cm) and waist girth (29.91 cm). However, the variations between the mean values of the two sexes are quite marginal in many of the measurements and as such, statistically significant differences have been observed in only four measurements of birth length (e = 0.12), head circumference (e=0.10), foot length (e=0.03) and foot breadth (e=0.01). At least in birth weight distribution, maximum number of Meitei Newborns (52.33%) belonged to the birth weight range of 2.5 – 3.0 kg. It is significant to have been noted that the birth weight is highly correlated with all the measurements under consideration at least in the context of the Meitei newborns. In the comparison of the newborns of the rural and urban based mothers, it has been observed that the two groups of newborns have shown significant differences in only birth length (e=0.13) and chest circumference (e = 0.15). When again the comparisons have been made based on the small and large family size of the mothers, no significant differences have been observed between the two newborn groups in any of the measurements. In an attempt to compare the newborns of the different educational level of the mothers’, still the significant differences are very few as was observed in only the birth weight in two pairs of comparisons, i.e.,
between that of illiterate and graduate \( e = 0.05 \) and undermatric and graduate \( e = 0.04 \).

In birth length, significant differences have been observed in between only those of the undermatric and undergraduate \( e = 0.02 \). One each of such significant differences have been observed in mid-upper arm circumference between the undermatric and graduate \( e = 0.09 \), in thigh girth in between that of the undermatric and matriculate \( e = 0.14 \), and also in foot length in between that of the undergraduate and graduate \( e = 0.04 \). In foot breadth two such significant differences were observed in the newborns of the undergraduate with that of the undermatric \( e = 0.02 \) and again with those of the matriculate \( e = 0.02 \).

In another comparison of the newborns on the basis of the working and non-working mothers, significant differences have been observed in four measurements which include birth length \( e = 0.17 \), head circumference \( e = 0.15 \), mid upper arm circumference \( e = 0.09 \) and waist girth \( e = 0.20 \).

Again when comparisons have been made between the newborns of different social class groups of mothers, the maximum differences have been observed in between that of the class III and class V categories being in eight measurements (B.W., B.L., Ch.C., M.U.A.C., C.G., H.G., F.L. and F.B), while the minimum number of differences have been observed in between those of the groups of class III and class IV social class mothers. Even the newborns of the class IV and class V mothers have shown significant differences in five measurements (B.W., M.U.A.C, C.G., H.G. and F.B). It may be noted that in birth weight the newborns of every social class mothers have shown significant differences.

It has also been shown very clearly that the newborns of the younger age group mothers say \((15 - 19)\) years always show maximum number of significant differences from the newborns of the higher age group mothers and as such the maximum has been observed with the newborns of the mothers of the age group \((25 - 29)\) years in all the measurements. Even the newborns of the mothers of \(20 - 24\) years, have shown significant differences from those newborns of the subsequent higher age groups.

Strikingly enough significant differences have always been observed between the first-born and later-born practically in all the measurements except in foot length.
In bi-sexual comparisons of the newborns on the basis of the gestational ages, significant differences have been observed in birth length, head circumference and foot length, in the later two gestational ages of 40 (B.L. = 0.21, Hd.C = 0.18, F.L. = 0.05) and 41 (B.L. = 0.21, Hd.C. = 0.18, F.L. = 0.04) weeks. The two sexes have also shown significant differences in chest circumference (e = 0.23) and hip girth (e = 0.31) only in the gestational age of 41 weeks.

Absolute growth pattern of the Meitei newborns have shown that the female newborns have shown earlier growth rates in all the eleven measurements in the gestational age of 38 weeks. Among the male newborns, too, at least in three measurements, i.e., calf girth, hip girth, and foot breadth, such higher absolute growth rates have been recorded. However, in general the male newborns show a trend of higher absolute growth rates at the gestational age of 40 weeks, which is at least two weeks later than the female newborns. From the analysis of the maturity gradients, it has been observed that the female newborns attained maturity at least in waist girth, hip girth and foot breadth, right from the gestational age of 38 weeks and continued to show it in more number of measurements at the gestational age of 39 weeks. But in case of the male newborns, the maximum maturity gradients have been recorded only after reaching the gestational age of 40 weeks and of course at this stage all the female newborns have already attained maturity gradients in all the measurements.

The body mass index (BMI) values for each gestational age have indicated to be ‘Good’ for the Meitei newborns. When compared the body mass index values of the newborns of different gestational ages, significant differences have been observed when the 37 weeks gestational age newborns with those of the 39, 40 and 41 weeks. Another two more significant differences have been observed when the newborns of 40 gestational age group have been compared with those of the 38 (e=0.01) an 39 (e=0.01) gestational ages.

In both the relative chest circumference and pignet-vereek indices, maximum of the Meitei newborns belonged to ‘Broad’ categories and in robusticity index, 81.91% of them have been recorded as belong to ‘Good’ class.

From the distribution of the somatometric variables of the newborns of a few Indian and Non-Indian populations, it has been observed that the Meitei newborns (2.97 Kg) show higher mean birth weights than the Assamese (2.72 kg) and Panjabi
(2.85 Kg) newborns. But the Meitei newborns had lower birth weights from the Filipino (3.01 kg) and Romany (3.95 kg) newborns.

In birth length, the two Non-Indian populations that is, the Filipino (49.2 cm) and the Romany (m - 48.63; f - 48.04) newborns have shown higher mean values than the Meitei newborns (48.01 cm). In chest circumference, mid-upper arm circumference and thigh girth, the Meitei newborns have shown higher mean values from those of the newborn data as compared. Statistically, the Meitei newborns have shown significant differences in birth weight from the Panjabi and the Filipino newborns. In this measurement, the Meitei did not show significant differences from the Assamese and the Romany newborns. Again in birth length, the Meitei newborns have shown significant differences from the Filipino newborns. Such significant differences have been observed between the Meitei and Romany newborns in chest circumference and with the Punjabi newborns in both the mid-upper arm circumference (e = 0.06) and thigh girth (e = 0.09).

Presence of ‘single’ type of hair whorl (94.32%) and of ‘single clockwise’ type (67.57%) have been observed among the newborns in highest frequencies. ‘Free’ type of earlobe has been recorded in 95.86%. In hair growth quantity, the ‘medium’ type has been found in maximum (51.81%) on head but on body, growth of ‘medium’ quantity has been recorded in only 29.33%, while ‘thin’ quantity of hair growth on body has been found to be in maximum (70.67%). Strikingly, long growth of finger nails nail has been recorded in 58.66% among these newborns. But on the toes, normal length has been recorded in maximum (91.99%). Presence of ‘lunulae’ on the finger has been recorded in 24.55% but on the toe nails, it was recorded only in 1.42%. The newborns have ‘medium’ type of eyebrow quantity in 49.61% and these are separated in maximum with 98.71%. ‘Oblique’ type of eyebrows has also been recorded in as much as 98.71%. The frequency incidence of ‘colour spot’ has also been recorded in a very high frequency of 48.06%. 
Conclusion

1. The mean birth weight of 2.97 kg for the Meitei Newborns by having 2.99 kg for the males and 2.95 kg for the females may be graded as high in comparison to the Indian average of 2.80 kg as reported by Gopalan and Raghavan (1969). Even it is quite high from that of the low birth weight (LBW) scale of 2500 gm as defined by WHO (1961) and again confirmed by an International body (Kleigman and Behrman, 1992). Still however, it may be pointed out that at least 13.30% of the Meitei newborns, although lesser than that of the 33% of the Indian newborns (WHO 1990), had found to have the average weight of less than 2.5 kg, which needs special attention.

2. Further, the percentile birth weight with a very high frequency of 88.24%, has indicated that the maximum number of the Meitei newborns having the satisfactory birth weight i.e. appropriate or average for dates (AFD). Having slightly higher frequencies of 89.64% in the females than the males (86.86%), the females had shown to be in more advantage. The Meitei newborns, with a birth length of 48.01 cm, had found to be slightly lower than those of the Filipino and Romany newborns. Although, no comparison could be made with the Indian or more of Non-Indian newborns, it may be inferred that birth length of the present Meitei newborns may be said to be satisfactory as the body mass index (BMI) value which signifies the relative index of the birth weight and birth length, had found to be above 1.20, which is said to be the indicator of the minimum nutritional status of the newborns. Above the BMI value of 1.20 has been classified as good, but otherwise when it is less (Raman L. Vasanthi, Vishweswara Rao et al. 1989). The present BMI value of the Meitei newborn ranges between 1.25 to 1.31 for different gestational ages. It has been pointed out by Vishweswara Rao et al. (1999) that the assessment of the nutritional status will be better with the use of both length and weight at birth, or length and BMI at birth than weight alone.
3. Bi-sexual variation in the growth pattern from fetal life itself has very well been indicated by the present study and that the male newborns had a higher growth rate than the female peers right from the time of birth. Out of the eleven measurements under consideration, the male newborns have shown higher mean values than the female counterparts in nine measurements which includes B.W., B.L. and Hd. C, Ch.C, M.U.A.C., the girth measurements and even the foot length and food breadth. However, exception had been observed at least in two particular measurements i.e. thigh girth (16.97 cm) and waist girth (29.91 cm) in which the female newborns have shown higher mean values than the male newborns (Th.G – 16.79 cm, W.G – 29.70 cm). This phenomena clearly indicates that in some body parts/organs, the female newborns starts developing with faster growth than the males since very early stage of life. Whatever may be the variations have been seen between the two sexes in the measurements, but statistically significant bisexual differences have been found in only four measurements of B.L., Hd.C, F.L. and F.B.

4. Affect of gestational age in the absolute growth pattern in different sexes have also been conspicuously observed in the Meitei newborns, by the fact that the female newborns show higher growth rates than the male newborns in the earlier gestational age of 38 weeks and in majority of the body measurements. Such higher spurts among the males have been observed in the gestational age of 40 weeks. However, in calf girth and hip girth, the males also have shown higher mean values as in the case of females indicating the probable few exceptions in the growth rate of different body parts.

5. Comparisons of the newborns on the basis of rural and urban mothers, family size, educational level of the mothers, working and non-working mothers and also on the basis of the social classes have shown a trend of variations among different categories of the newborns in many measurements.
The newborns of the urban-based mothers have displayed higher mean values than the rural based newborns in many measurements. In one measurement i.e., F.L. the two groups of newborns had equal mean values but even then significant differences have been observed between the two in only two measurements i.e., birth length (e=0.13) and chest circumference (e=0.15).

Again, among the newborns of the small and large family based mothers have shown disparities that the newborns of the small family size have shown higher mean values in as much as in eight measurements than those of the larger families. But even then, no statistical variations have been shown between the compared newborns of the two family sizes. Moreover, the effect of mother's education to the newborns have well been observed. As a trend the mean values of the measurements of the newborns are found to improved as the qualification of the mothers increases. The measurements of the newborns of the illiterate mothers are generally the lowest, while the newborns of the post-graduate and above qualification mothers have shown the highest mean values practically in all the measurements.

In another aspect, the newborns of the working mother or short to say the salaried mothers have also shown higher mean values than the newborns of the non-working mothers in all the measurements. Statistically, however, significant differences have been observed in only four measurements inclusive of birth length. Not only that the newborns of the higher social classes had the advantage of having better growth rates than the newborns of the lower social class mothers.

It may very well be said that the fetal life of a newborn were quite sensitive enough by different environmental factors, specially the socio-economic and the educational levels of the mothers. Because, these are some of the determinants of the overall quality of life of the mothers and even her family.
6. As the mean values of the measurements of the first born babies have invariably smaller than those of the later-born babies and also to a certain extent from the newborns of the older mothers, also suggests that the first-born or the newborns of the younger mothers would normally be small in their body size.

7. In certain morphological observations of the newborns, the findings that the Meitei newborns have been observed to have quite high frequencies of medium hair growth on head, long growth of nail on fingers and also the presence of lunulae in high frequencies, would surely provide important data for the future researchers. Besides, the data on colour spots which have been recorded in high frequencies in the Meitei newborns (48.06%), suggests the importance of the trait as the indicator of Mongoloid element in a population (Comas, 1960).

The findings of the present study have well documented certain important information on different aspects of the newborns, specially for the Meitei population of Manipur. It is believed that such findings of the newborns of the Meiteis, which is the major population of the state, could be a good reference for other populations, specially of the north-east region of India. Moreover, it is also believed that the present study would provide valuable data, which may be useful for the public health planners.