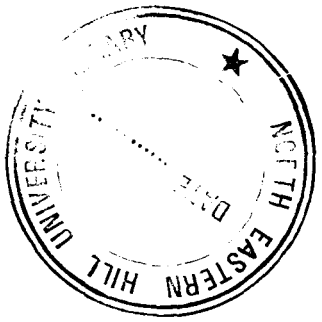
BIO-SOCIAL DETERMINANTS OF FERTILITY AND CHILD MORTALITY AMONG THE KHONGSAI KUKIS OF MANIPUR



ABSTRACT

By

LETMINTHANG KHONGSAI

Department of Anthropology

Supervisor:

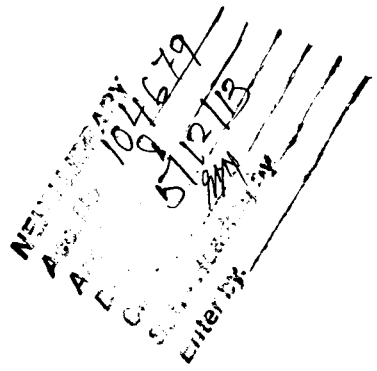
Dr. D.K. LIMBU

Submitted in partial fulfillment of the requirement of the degree of Doctor of Philosophy in Anthropology

North-Eastern Hill University

Shillong

July 2012



TITLE: BIO-SOCIAL DETERMINANTS OF FERTILITY AND CHILD MORTALITY AMONG THE KHONGSAI KUKIS OF MANIPUR

Fertility is the reproductive performance of an individual or a population, measured as the number of viable offspring produced over a period and it is generally expressed as the number of live births per year per thousand of the population (Jones et al, 1995). Child mortality rate, on the other is the probability of dying between the first and fifth birthdays (NFHS-3; WHO, 2008).

The determinants of fertility and mortality in human populations are many and involve biological, behavioural and socio-demographic factors, operating separately as well as in conjunctions with each other. Biosocial study is pertaining to or entailing the interaction or combination of social and biological factors. World Bank (2003) reported that after the decline in mortality rates, there found a corresponding decline in fertility rates with the total fertility rate (TFR) falling from 6 to 3 in India between 1970 and 2000.

It is widely accepted that fertility and mortality are influenced by a large number of biosocial factors such as age at menarche, maternal age, age at marriage, age at first child birth, age at menopause, type of marriage, type of family, education, religion, economic conditions, value of children, health condition and adoption of contraceptive devices and so on (Caldwell, 1979; Lee, 1979; Nag, 2006; Reddy et al, 2006).

This thesis is concerned with the biological and social factors that directly or indirectly influenced the fertility and child mortality among the Khongsai Kuki population of Manipur. Although there are few systematic studies on fertility and mortality patterns undertaken to understand the different bio-cultural problems of the society that may be related to fertility and mortality in Northeast India, no such study has so far been carried out among the Kukis in general and the Khongsai Kukis in particular. An attempt has also been made to compare the rural-urban differences in respect of the various biological and socio-economic determining the fertility and

child mortality. Therefore, we had selected Saikul sub-division in Senapati district to represent the rural area and Imphal town to represent the urban area.

Objectives of the study

The objectives of the present study are as follows:

1. To study the demographic structure of the Khongsai Kukis of Saikul sub-division and Imphal town.
2. To find out the status of fertility and child mortality in the study population.
3. To find out the biosocial determinants responsible for fertility and child mortality in the study population.

MATERIALS AND METHODS

Study area and population

Fieldwork for the present study was conducted among the Khongsai Kukis of Imphal town and Saikul sub-division of Manipur between August 2007 and March 2009. Imphal town is the state capital of Manipur located in Imphal East and Imphal West districts whereas Saikul is a hilly sub-division of Senapati district in Manipur. A total of 4 localities in Imphal town, namely, Khongsai Veng, KCC Campus, Langol and National Game Village were selected to represent the urban population. On the other hand, a total of 7 villages in Saikul sub-division, namely, S. Mongbung, Maoyang, Ng. Phainom, Lhungjang, New Boljang, Old Boljang and Twichamphai were selected to represent the rural population. Information were collected from 127 married women in Imphal town and 335 married women in Saikul sub-division who are aged between 15 and 49 years by adopting deliberate sampling method. A complete enumeration of the households was made for demographic information from the two study areas.

Khongsai Kuki is one among the various sub-tribes of Kuki who inhabit mainly in the hilly areas of the Northeastern states in India. Majority of them are found in the state of Manipur.

It may be noted that the various tribes of Kuki has in common, regarding their culture, tradition, language, food habits, beliefs, etc. Racially they are Mongoloid and linguistically, they belong to Tibeto-Burman language sub-family (Ansari, 1986). They practice Christianity. The staple food of the Khongsai Kuki is rice.

Demographic data: The demographic data were collected through interview schedules for household census and other demographic parameters like fertility and mortality of children from the mother or Head of the family based on those parameters as suggested by World Health Organisation (1967) and Mahadevan (1986). These are:

a) Individual household records like name of informant, date and place at which record was taken, clan, tribe, religion, total number of family members, age, sex, marital status, birth order, place of birth, place of residence, occupation, education, income and expenditure of household, etc.

b) Fertility records which include pregnancy history of each married women, present age of the mother, age at marriage, age at each conception, total number of live births, birth order, name, age, sex and marital status of each offspring.

c) Mortality records like numbers of dead children, sex, date of birth, age at death, causes of death, number of reproductive wastage (spontaneous or induced abortion and still births) etc.

d) Social proximates: These include occupation, education, monthly income of the household, monthly expenditure of the household, age at marriage and religion.

Such data were collected by interviewing the ever-married women aged 15- 49 years from the sample with the help of interview schedule.

Data on biological determinants: Data on all possible biological determinants have been collected from the study population with the help of interview schedule.

(a) ABO Blood Groups: Blood samples were collected from parents, following the standard techniques suggested by Lawler and Lawler (1951), and Mourant (1954). Anti-A, anti-B and anti-D sera were used to identify the blood group and Rh-factor of the subjects.

(b) Other biological factors include age of the mother, age at marriage of the mother, order and interval between births, etc.

Data on socio-economic determinants: Information relating to social determinants of fertility and child mortality like family size, education of parents, income, occupation of parents, child care, sanitation, etc. were collected as suggested by Mahadevan (1986).

(a) Education: Data on educational level of individuals in the present study were arbitrarily classified as follows: **Illiterate** includes those individuals who were not able to read and write. Those individuals who attended school upto standard VIII were grouped as **Primary Level** of Education. Those individuals who attended upto standard IX and X were categorized into **Secondary level** of education. **Higher Secondary level and above** include those individuals who attended standard XI and other higher levels of education.

(b) Income groups: Data on household income were directly collected from the heads of the families and were cross-checked taking into consideration some aspects of socio-economic conditions like housing condition, types of occupation, land holding and monthly expenditure. Monthly household income was classified as follows:

Above 75th percentile (> Rs. 10200)	= High Income Group
50th to 75th percentile (Rs. 7000 to 10200)	= Middle Income Group
Below 50th percentile (< Rs. 7000)	= Low Income Group

Data on Family Planning Method: Information about knowledge, adoption, attitude and source of family planning methods were collected from married women (aged 15 to 49 years) with the help of interview schedules based on those included in the NFHS - 2 (IIPS, 2000).

Data on reproductive history: Data on reproductive history of each mothers were collected from the study population with the help of interview scheduled which consist of age at marriage, age at menarche, number of infant deaths (below 1 year), number of child deaths (1-14 years) and number of abortions, etc.

Data on antenatal and post-natal care: These includes number of ANC visits, stage of pregnancy at first abdominal check up, place of delivery, persons conducting delivery and reasons for no antenatal check up. Besides, data on obstetric morbidity during pregnancy and health problem after delivery were also collected from married women aged 15 - 49 years.

Data on immunization and child care: Data on immunization and child care were collected from mothers having child born in the past five years from the time of survey.

Data on child morbidity: Data on child morbidity include- (i) Cold and/or respiratory disorders, (ii) Diarrhea/dysentery, (iii) Malaria, (iv) Tuberculosis, (v) Fever and (vi) Others (sores/boils, fever alone, chicken pox, typhoid, scabies, jaundice, body pain, headache alone, malnutrition, weakness and other symptoms).

Data on statistical analysis: All data were managed and analyzed using SPSS (PC Software), version 16 in which the level of significance was set at 5%. Some of the data were also calculated manually. The analysis was first carried out to present the basic demographic structure of the Khongsai Kuki population of Saikul sub-division and Imphal town of Manipur in terms of age, sex and marital status, which were based on household census data. The sex ratios for different age groups were calculated with the ideal sex ratio of 1:1. The t-test (2-tailed) was used to determined the statistical significance of the differences between two means like age at menarche,

age at marriage, age at first child birth, etc. The differences between proportions were tested, using chi-square (χ^2) test. One way analysis of variance (ANOVA) was used to test the differences between more than two means by assuming such means as independent. Coefficient of correlation (r) was tested to find out the positive or negative association between two continuous variables. Multiple regression analysis was done to estimate the coefficients of the linear equation, involving one or more independent variables that best predict the value of the dependent variables. For example, we may predict a number of live births (the dependent variable) from independent variables such as age, educational level, income level, etc.

FINDINGS OF THE PRESENT STUDY

The findings of the present study may be briefly summarized as follows:

Demographic characteristics

Age, Sex and Marital Status

1. The overall sex ratio, i.e., the number of males per 100 females is slightly tilted in favour of males in both Saikul sub-division (103.17) and Imphal town (112.77) despite the absence of statistical difference **(Table 4.1)**. Saikul resembles the sex ratio of rural Manipur, whereas Imphal resembles the sex ratio of urban Manipur (Statistical Abstract Manipur, 2008).
2. According to Sundbarg's classification of population, a population is referred to as *progressive* when the proportions of persons relative to the total population are 40.00%, 50.00% and 10.00% in the age groups 0-14 years, 15-49 years and 50+ years respectively. Following this, the Khongsai Kuki population in both the study areas is of *progressive type* **(Table 4.1)**. The population pyramid **(Figure 1&2)** also shows that the base of the pyramid in both the areas are generally broader at the base and becomes narrower as we move up to the higher age groups.

3. The sex ratio in the post-reproductive age group (Saikul: 192.15; Imphal: 266.66) is much higher in the post-reproductive age group than the preceding age groups in both the areas indicating the higher average longevity in males than their female counterparts **(Table 4.1)**.
4. Regarding marital status, the percentage of unmarried, married and widowed/ divorced in Saikul sub-division are 31.23%, 18.82% and 0.73% respectively in males; 29.10%, 18.82% and 1.30% respectively in females. In Imphal town, these are 33.18%, 19.52% and 0.30% respectively in males; 26.13%, 19.67% and 1.20% respectively in females **(Table 4.2).**
5. The mean age at marriage **(Table 4.4)** of both males and females is significantly greater in Imphal town (Male: 26.85 ± 0.31 years; Female: 22.24 ± 0.30 years) than in Saikul sub-division (Male: 25.19 ± 0.22 years; Females: 20.36 ± 0.17 years). The differences between the two study areas are statistically significant (Male: $t = 4.37$, $P < 0.001$; Female: $t = 6.26$, $P < 0.001$) as well. The mean age at marriage among the Khongsai Kuki women in both the study areas is greater than that of the Meitei, Pangal, Nepali and Kabui women of Manipur (Singh, 2006), but, lower than the Lois of Manipur (Chanu, 2007)
6. Similarly, the mean age at first child birth **(Table 4.5)** is found to be greater in Imphal town than in Saikul sub-division among both males ($t = 4.89$, $p < 0.001$) and females ($t = 5.99$, $p < 0.001$). Adjusting the rural-urban and sex differences the mean age at first marriage in the present population is found to be 24.51 ± 0.15 years. So, we have considered 25 years as a generation length of the Khongsai Kuki following the method suggested by Glass (1956).

Fertility and child mortality

1. The fertility rate, i.e., the mean number of live births per mother is found to be higher in Saikul sub-division (3.74 ± 0.11) than that of the Imphal town (3.19 ± 0.13), although it is not statistically significant ($t = 0.93$, $p > 0.05$) **(Table 4.6)**. Pooling data for both the areas, the fertility rate of the present study is higher than those reported by Chanu (2007), NFHS-3

(IIPS, 2007), Dey and Goswami (2009). But, it is more or less similar to the Meiteis of NEI (Das and Mithun, 2010).

2. The infant mortality rate, i.e., the number of infant deaths below 1 year of age is found to be significant higher ($\chi^2 = 4.02$, d.f. =1, $p < 0.05$) in Saikul sub-division (2.39%) compared to their Imphal counterparts (0.99%) **(Table 4.7)**. The infant mortality rate in the present population is lower than those reported by NFHS-3 (IIPS, 2007), Limbu (1996) and Mukherjee (2002). But, the present findings in both rural and urban areas are closely related with the Lois of rural and urban Manipur respectively (Chanu, 2007)
3. The child mortality rate, i.e., the number of child deaths between 1 – 14 years of age is also higher in Saikul sub-division (3.51%) than in Imphal town (2.72%), despite the absence of statistically difference ($\chi^2 = 1.42$, d.f. = 1, $p > 0.05$) **(Table 4.7)**. They are much lower than those reported among the Northeast populations by Khongsdier (1995), Limbu (1996) and Gogoi (2008); and higher than the Lois of rural and urban Manipur (Chanu, 2007).
4. The completed fertility size, i.e., the mean number of live births to mothers who are aged 45 years and above, and lived continuously in wedlock till the attainment of 45 years of age is higher in Saikul sub-division (5.78) than that of the Imphal town (4.82) **(Table 4.8)**.
5. The child-women ratio is found to be higher in Saikul sub-division than in Imphal town **(Table 4.9)**. It is 75.71 and 50.82 respectively.
6. The frequency of the total reproductive wastage is more or less similar in both the study areas (Saikul: 8.87%; Imphal: 8.39%), although it is slightly higher in Saikul **(Table 4.11)**.
7. The average number of surviving children per all married women **(Table 4.12)** is slightly higher in Saikul sub-division (3.51) than in Imphal town (3.06).
8. The age-specific marital fertility rate (ASMFR) reaches its highest peak in the age group 25-29 years in both Saikul sub-division (1.4408) and Imphal town (1.3966) **(Table 4.13 &**

Figure 3). The ASMFR in Saikul sub-division exceeds their Imphal counterparts in all the age groups. Therefore, the total ASMFR is higher in Saikul sub-division (4.8498) than in Imphal town (3.7132).

Biological determinants of fertility and child mortality

Age group of mothers

1. The mean number of live births per mother is corresponding to the age group of mothers in both Saikul sub-division and Imphal town **(Table 5.1)**. The differences are also statistically significant as well (Saikul: $F = 82.338$, $p < 0.001$; Imphal: $F = 28.746$, $p < 0.001$).
2. Although there is a positive correlation between age group of the mothers and infant mortality rates in both the study areas, they are not statistically significant sub (Saikul: $r = 0.07$, $p > 0.05$; Imphal : $r = 0.04$, $p > 0.05$) **(Table 5.1.1)**. Unlike infant mortality, mother's age group has a significant positive relationship with the child mortality rate in both the study areas (Saikul: $r = 0.31$, $p < 0.01$; Imphal: $r = 0.22$, $p < 0.05$). In other words, the child mortality rate tends to increase as the mother's age group increases.

Age at marriage of the mothers

1. The mean number of live births per mother **(Table 5.2)** tends to decrease as the mother's age group at marriage increases in both the study areas, despite the absence of statistical differences in Imphal town (Saikul: $F = 3.967$, $p < 0.05$; Imphal: $F = 2.486$, $p > 0.05$).
2. The relationship between infant as well as child mortality rates and mother's age group at marriage is not clearly perceptible in both the study areas, although there is an inverse relationship between the child mortality rate and mother's age group at marriage in Saikul sub-division ($r = -0.07$, $p > 0.05$) **(Table 5.2.1)**.
3. Of all the socio-economic variables included in the regression model, mother's age at marriage is found to be positively associated with residence, i.e., rural/urban ($B = 0.343 \pm$

0.094, $p < 0.01$) and maternal education ($B = 0.178 \pm 0.049$, $p < 0.01$) **(Table 5.2.2)**. In other words, urban setting and higher level of maternal education is likely to delay mother's age at marriage in the present population.

ABO blood group mating types

1. ABO blood group incompatible mating among the Khongsai Kuki is slightly higher in Saikul sub-division (45.50%) than in Imphal town (43.65%). ABO blood group mating types seem to play no significant role in regulating the fertility rate in both the study areas **(Table 5.3)**.
2. Unlike in Imphal town, the infant mortality rate in Saikul sub-division is found to be significantly higher among ABO blood group incompatible types of mating than compatible types **(Table 5.3.1)**. The coefficient of correlation (r) is 0.14, $p < 0.05$ for Saikul sub-division and 0.11, $p > 0.05$ for Imphal town. However, the child mortality rate is significantly higher (Saikul: $r = 0.14$, $p < 0.05$; Imphal: $r = 0.18$, $p < 0.05$) among ABO incompatible matings than compatible matings in both the study areas **(Table 5.3.1)**.

Birth intervals

1. Greater mean birth intervals seem to play an important role in reducing the mean number of live births **(Table 5.5)**, despite the absence of significant differences in Imphal town (Saikul: $F = 3.12$, $p < 0.05$; Imphal: $= 1.46$, $p > 0.05$).
2. There is a significant negative relationship between the infant mortality rates and mean birth intervals in both Saikul sub-division ($r = - 0.16$, $p < 0.01$) and Imphal town ($r = - 0.21p$, < 0.05) **(Table 5.5.1)** indicating that the infant mortality rate decreases as the mean birth interval increases. In contrary to this, the coefficients of correlation (r) between the child mortality rates and mean birth intervals are not statistically significant in both the study areas (Saikul: $r = - 0.02$, $p > 0.05$; Imphal: $r = 0.06$, $p > 0.05$) **(Table 5.5.1)**.

3. Of the many variables, birth intervals is significantly associated with household income (B = 0.156 ± 0.052, $p < 0.01$) and family size (B = - 0.109 ± 0.052, $p < 0.05$) are significantly associated with birth intervals **(Table 5.5.2)**. In other words, mean birth interval is likely to increase as the household income increases, whereas it tends to decrease as the size of family increases.

Cause of infant and child mortality

1. Unknown/accident is the main cause of infant mortality in both Saikul sub-division (1.21%) and Imphal town (0.74%). In case of the child mortality, 'other health problems' (i.e., malaria, fever, BP stroke, cancer, and congenital disease) are responsible for the highest number of child deaths (1.52%) in both Saikul sub-division and Imphal town (1.48%). However, the differences between the two study areas in respect of the infant as well as child mortality rates according to their causes are not statistically significant **(Table 5.6)**.

Socio-economic determinants of fertility and child mortality

Types of family

1. The mean number of live births per mother is found to be significantly higher (Saikul: $F = 4.850$, $p < 0.05$; Imphal: $F = 7.039$, $p < 0.05$) among nuclear families than that of the joint families in both Saikul sub-division and Imphal town **(Table 5.7)**. It is 3.89 ± 0.13 among nuclear families and 3.36 ± 0.22 among joint families in Saikul sub-division, whereas it is 3.26 ± 0.14 and 2.79 ± 0.36 respectively in Imphal town.
2. The correlation between infant mortality rates and types of family is found to be negative despite the absence of significant correlation in Imphal town (Saikul: $r = - 0.12$, $p < 0.05$; Imphal: $r = - 0.07$, $p > 0.05$) **(Table 5.7.1)**. Unlike infant mortality, the child mortality rate is positively correlated with types of family in both the study areas (Saikul: $r = 0.02$, $p > 0.05$; Imphal: $r = 0.04$, $p > 0.05$), although it is not statistically significant in both the areas.

Size of family

1. The mean number of live births significantly increases from 1.76 ± 0.16 among small size family to 4.76 ± 0.18 among large size family in Saikul sub-division; and 1.68 ± 0.12 to 4.12 ± 0.32 respectively in Imphal town **(Table 5.8)**.The F - ratios are 92.717, $p < 0.001$ for Saikul sub-division and 45.509, $p < 0.001$ for Imphal town.
2. The infant mortality rate is inversely related to the size of families in Saikul sub-division as it varies from 8.96% among small size 1.41% among large size families. In Imphal town, it is recorded among medium (1.45%) and large size families (0.75%) **(Table 5.8.1)**. But, the coefficients of correlation (r) show no significant relationship between the infant as well as child mortality rates and size of family in both the study areas **(Table 5.8.1)**. So, size of family is not an important factor regulating the mortality rate in the present population.

Educational level of the mothers

1. Rural-urban setting seems to have a positive impact on mother's education in the present study as there are 14.33% of illiterate mothers in Saikul sub-division and none in Imphal town **(Table 5.10)**.
2. The mean number of live births **(Table 5.10)** per mother tends to decline significantly as the educational level of mothers increases in both Saikul sub-division ($F = 8.790$, $p < 0.001$) and Imphal town ($F = 4.483$, $p < 0.05$).
3. The infant mortality rate tends to decline as the mother's educational level increases in both the study areas, although it is not significant in Imphal town (Saikul: $r = -0.18$, $p < 0.01$; Imphal: $r = 0.14$, $p > 0.05$) **(Table 5.10.1)**. In the case of child mortality rate, its relationship with maternal education is found to be significant negative in both the study areas (Saikul: $r = -0.25$, $p < 0.01$; Imphal: $r = -0.19$, $p < 0.05$) **(Table 5.10.1)**.

4. Maternal education is found to play an important role in regulating the fertility and mortality rates in the present population, although the influence is more significant in Saikul.

Educational level of the fathers

1. Only 4.27% of fathers in Saikul sub-division are illiterate, whereas there are none in Imphal town indicating that rural-urban setting plays an important role on paternal education like in the case of mothers **(Table 5.11)**.
2. The mean number of live births per father is inversely related to paternal education in Saikul sub-division, although there is no consistent pattern in Imphal town **(Table 5.11)**. The differences in live births among father's educational levels are statistically significant in Saikul ($F = 3.788$, $p < 0.05$), although the same is not in Imphal town ($F = 0.309$, $p > 0.05$).
3. The relationships between the infant as well as child mortality rates and paternal education are negative in both the study areas **(Table 5.11.1)**, despite the absence of statistical relationship in Imphal town. The coefficients of correlation (r) are - 0.14, $p < 0.05$ for infant mortality and - 0.23, $p < 0.01$ for child mortality in Saikul sub-division, whereas these are - 0.14, $p > 0.05$ and - 0.08, $p > 0.05$ respectively in Imphal town).
4. The influence of father's education on the fertility as well as infant and child mortality rates is much more in Saikul sub-division rather than in Imphal town.

Occupation of the mothers

1. In Saikul sub-division, the mean number of live births per mother is highest among service holders (4.85 ± 0.53) followed by cultivators (3.75 ± 0.12) and other type of occupations (2.13 ± 0.32). In Imphal town, it is highest among other type of occupations (3.68 ± 0.23) which is followed by service holders (3.08 ± 0.23) and then housewives (2.98 ± 0.22). The differences in live births among mother's occupational groups are statistically significant in

Saikul sub-division ($F = 14.553$, $p < 0.001$), although the same is not in Imphal town ($F = 0.448$, $p > 0.05$) **(Table 5.12)**.

2. The coefficient of correlation (r) shows that there is no significant relationship between the infant as well as child mortality rates and mother's occupation in both the study areas **(Table 5.12.1)**. However, the highest infant and child mortality rates are recorded among cultivators (Infant: 2.58%; Child: 3.73%) in Saikul sub-division and housewives (Infant: 1.39%; Child: 2.79%) in Imphal town (1.39%).
3. Mothers who are cultivators in Saikul sub-division and mothers who are housewives in Imphal town are expected to be less educated and hence recorded the highest infant and child mortality rates.

Occupation of the fathers

1. The F- statistics shows that father's occupation has no significant influence on the mean number of live births in both the study areas, although it is highest among fathers who are cultivators (3.81 ± 0.13) in Saikul and service holders (3.29 ± 0.14) in Imphal **(Table 5.13)**.
2. Although, father's occupation has a significant negative correlation with the infant mortality rates in Saikul ($r \approx -0.13$, $p < 0.05$), it has no significant impact on the infant mortality rate in Imphal town as well as the child mortality rates in both the study areas **(Table 5.13.1)**.

Household Income

1. The fertility rate tends to increase as the monthly household income increases in both Saikul sub-division and Imphal town **(Table 5.14)**. The mean number of live births ranges between 3.54 among LIG to 4.15 among HIG in Saikul sub-division; and 2.93 to 3.61 respectively in Imphal town. The one way ANOVA shows that the differences in live births among household income groups are statistically significant only in Imphal town (Saikul: $F = 2.569$, $p > 0.05$; Imphal: $F = 3.580$, $p < 0.05$).

2. The infant mortality rates in both the study areas as well as the child mortality rate in Imphal town are inversely related to household income, despite the absence of statistical correlation **(Table 5.14.1)**. But, the child mortality rate in Saikul sub-division is recorded highest among MIG (4.64%) followed by LIG (4.08%) and HIG (1.17%).
3. The influence of household income is significant negative when data for the infant and child mortality rates are pooled together in Saikul sub-division ($r = -0.12$, $p < 0.05$), indicating that household income can play a significant role in reducing the mortality rates in this area rather than in Imphal town. **(Table 5.14.1)**.

Types of house

1. The infant rate is found to be highest among *kaccha* type of house in both the study areas, although it is not statistically significant in Imphal town (Saikul: $r = -0.13$, $p < 0.05$; Imphal: $r = -0.14$, $p > 0.05$) **(Table 5.15.1)**. Similarly, the child mortality rate is found to be higher among *kaccha* types (4.40%) than that of the *semi-pucca* types (2.07%) in Saikul sub-division, although the same is recorded only among *semi-pucca* (4.91%) and *pucca* types (2.08%) in Imphal town.
2. Pooling data for infant and child mortality rates, their relationship with house types is highly significant in Saikul sub-division ($r = -0.16$, $p < 0.01$), although the same is not in Imphal town ($r = -0.14$, $p > 0.05$) **(Table 5.15.1)**.

Main source of drinking water

1. Source of drinking water in Saikul sub-division includes village pipe water and PHE pipe water, whereas in Imphal town, these are PHE pipe water and 'others' (well, water tanker, etc.). Use of PHE pipe water is found to be associated with lower infant and child mortality rates in Saikul sub-division **(Table 5.17)** although there is no consistent pattern in Imphal

town. The coefficient of correlation (r) also shows no significant relationship between the infant as well as child mortality rates and source of drinking water in both the study areas.

2. The coefficient of correlation (r) further shows that use of PHE pipe water can significantly decline the total mortality rates (pooling data for infant and child mortality) in Saikul sub-division ($r = 0.12$, $p < 0.05$) **(Table 5.17)**.

Types of toilet

1. The infant mortality rate is higher among households who used own pit type of toilet (Saikul: 2.62%; Imphal: 2.70%) than septic tank types (Saikul: 1.07%; Imphal: 0.82%) in both the study areas. The child mortality rate as well is higher among households who used own pit type (4.03%) than septic tank type (0.53%) in Saikul sub-division, although it is similar among both own pit type (2.70%) and septic tank type (2.72%) in Imphal town. **(Table 5.18)**. But, the coefficient of correlation (r) between the infant as well as child mortality rates and types of toilet used shows that their relationship is significant negative only in the case of child mortality rates in Saikul sub-division ($r = - 0.13$, $p < 0.05$).
2. Even after pooling data for the infant and child mortality rates, their relationship with types of toilet used is found to be significant only in Saikul sub-division ($r = - 0.13$, $p < 0.05$) **(Table 5.18)**.

Actual and desire number of children

1. The desire number of children among the Khongsai Kuki married women is significantly greater than their actual number of children in both Saikul sub-division and Imphal town **(Table 5.19)**. The mean actual number of children is found to be 3.48 ± 0.12 children in Saikul sub-division and 3.11 ± 0.12 children in Imphal town, whereas the mean desire number of children are 4.23 ± 0.05 and 3.85 ± 0.08 children respectively. It may be

mentioned that there are 9 mothers in Saikul sub-division and a single mother in Imphal town having no desire number of children.

2. The differences between the two areas in respect of actual and desire number of children is statistically significant (Actual: $t = 2.22$, $p < 0.05$; Desire: 4.04, $p < 0.001$) **(Table 5.19)**.

Preference of child's sex

1. With only 0.60% of mothers in Saikul sub-division and 4.72% of mothers in Imphal town preferring female child, we could not find its impact on the fertility rate in this population. There are also 59 (17.62%) mothers in Saikul sub-division and 48 (37.79%) in Imphal town having no preference **(Table 5.20.1)**.

Family planning method

1. Awareness and adoption of family planning method are found to be higher in Imphal town compared to their Saikul counterparts. But, there are only 28.35% and 13.43% of couples respectively who were adopting it. The differences between the two areas in respect of awareness ($\chi^2 = 7.22$, d.f. = 1, $p < 0.01$) and adoption ($\chi^2 = 14.17$, d.f. = 1, $p < 0.005$) of family planning method are statistically significant **(Table 5.21)**. Adoption of family planning in the present population is very low as compared to those reported among Assamese Hindus (61.30%), Muslims (46.10%) and Christians (45.60%) (NFHS-3) (IIPS, 2007); and the Lois (41.76%) of Manipur (Chanu, 2007).
2. The mean number of live births is found to be similar among both adopters and non-adopters of family planning method in both the study areas **(Table 5.21.1)**.
3. The infant mortality as well as the child mortality rates are slightly higher among non-adopters than that of the adopters of family planning in both the study areas, although their relationships are not statistically significant **(Table 5.21.2)**.

Antenatal and post-natal care

ANC Characteristics

1. The frequencies of ANC attendance, number of ANC attendance and stage of pregnancy at first ANC attendance among mothers are all significantly higher in Imphal town compared to their Saikul counterparts **(Table 5.22)**. There are 97.58% of mothers in Imphal town and 86.18% in Saikul sub-division who were attending ANC during their pregnancies. The χ^2 - value between the two study areas in respect of ANC attendance, number of ANC attendance and stage of pregnancy at first ANC attendance are: $\chi^2 = 12.38$, d.f. =1, $p < 0.005$; $\chi^2 = 90.21$, d.f. = 5, $p < 0.005$ and $\chi^2 = 24.29$, d.f. = 2, $p < 0.005$ respectively. So, mothers in Imphal town are far more advanced than their Saikul counterparts in respect of ANC characteristics.
2. The mean number of live births per mother is significantly higher among mothers who were not attending ANC during pregnancy in both Saikul sub-division ($F = 9.679$, $p < 0.01$) and Imphal town ($F = 9.155$, $p < 0.01$) **(Table 5.22.1)**.
3. The infant mortality rate is found to be higher among mothers who were not attending ANC in both the study areas, despite the absence of statistical relationship in Saikul sub-division (Saikul: $r = - 0.05$, $p > 0.05$; Imphal: $r = - 0.27$, $p < 0.01$) **(Table 5.22.2)**. But, the relationship between the child mortality rate and ANC attendance during pregnancy is significant negative in both the study areas (Saikul: $r = - 0.23$, $p < 0.01$: Imphal: $p = - 0.32$, $p < 0.01$).
4. Of all the variables included in the model, the coefficients of regression (B) of ANC attendance is negatively associated with maternal age ($B = - 0.034 \pm 0.016$) and positively associated with paternal education ($B = 0.066 \pm 0.023$) **(Table 5.22.3)**. In other words, mothers of the younger age groups are more likely to attend ANC during pregnancy, whereas higher educational level of the husbands is also related to ANC attendance during pregnancy.

Place of delivery

1. Use of medical facilities at the time of delivery is much higher in Imphal town (58.53%) compared to their Saikul counterparts (10.54%) **(Table 5.25)**.
2. Although place of delivery is not significantly correlated with the infant as well as child mortality rates in both the study areas, these rates are higher among mothers whose delivery took place at home rather than hospital/clinic **(Table 5.25)**.
3. Pooling data for the infant child mortality rates, their relationship with place of delivery is statistically significant in Imphal town ($r = -0.19$, $p < 0.05$), but not in Saikul sub-division ($r = -0.10$, $p > 0.05$) **(Table 5.25)**. So, place of delivery can be an important factor influencing the mortality rate in Imphal town.

Persons conducting delivery

1. Like in the case of place of delivery, use of health personnel during delivery is much higher in Imphal town (81.30%) than in Saikul sub-division (14.37%) **(Table 5.26)**.
2. The relationship between the infant mortality rate and persons conducting delivery is highly significant in Imphal town ($r = -0.27$, $p < 0.01$) which is not so, in Saikul sub-division **(Table 5.26)**. But, the child mortality rate in both the study areas is significantly higher among mothers whose deliveries were conducted by elderly persons than the health personnel (Saikul: $r = -0.14$, $p < 0.05$; Imphal: $r = -0.29$, $p < 0.01$) **(Table 5.26)**.

Immunization and child care

Feeding of colostrums

1. The frequency of mothers feeding colostrums to their children is higher than those who did not fed in both the study areas. But, comparing the two areas, feeding of colostrums is much higher in Imphal (86.57%) as compared to their Saikul counterparts (64.78%) **(Table 5.29)**.

2. The relationship between the infant as well as child mortality rates and feeding of colostrums is not statistically significant in both the study areas **(Table 5.29)**. However, these rates are higher among mothers who did not fed colostrums in both the study areas, excepting the infant mortality rate in Imphal town.

Persons consulted for diarrhoea

1. Although, majority of mothers in both the study areas consulted doctor than that of the medicine man for treatment of diarrhoea, this frequency is slightly higher in Imphal town (83.58%) than in Saikul sub-division (73.04%) **(Table 5.30)**.
2. The infant as well as child mortality rates are found to be higher among mothers who consulted medicine man than that of the doctor in both the study areas, although their relationships are not statistically significant **(Table 5.30)**. However, pooling data for the infant and child mortality rates, their relationship with persons consulted for treatment of diarrhoea is highly significant in Saikul sub-division ($r = 0.16$, $p < 0.01$), although the same is not in Imphal town ($r = 0.23$, $p > 0.05$) **(Table 5.30)**. Therefore, consulting doctor for treatment of diarrhoea can significantly decline the mortality rates in Saikul sub-division.

Persons consulted for Pneumonia

1. Like in the case of diarrhoea, majority of the mothers in both Saikul sub-division (76.52%) and Imphal town (82.08%) consulted doctor than that of the medicine man for treatment of Pneumonia. Comparing the two areas, it is higher in Imphal town **(Table 5.31)**.
2. Although, the infant as well as child mortality rates are found to be higher among mothers who consulted medicine man than to those who consulted doctor in the present population of both areas, its influence is significant only in the case of infant mortality (Saikul: $r = 0.15$, $p < 0.05$; Imphal town: $r = 0.38$, $p < 0.01$). In other words, consulting doctor rather than medicine man can significantly reduce the infant mortality rates in both the study areas.

Immunization of the children

1. The overall percentage of immunization rate (polio, BCG, whooping cough and measles) is higher in Imphal compared to their Saikul counterparts among both males (Saikul: 91.01%; Imphal: 95.92%) and females (Saikul: 92.02%; Imphal: 96.00%). But, the rural and urban differences are not statistically significant among both males ($\chi^2 = 0.05$, d.f. = 1, $p > 0.05$) and females ($\chi^2 = 0.03$, d.f. = 1, $p > 0.05$) **(Table 5.32)**. The overall immunization rate of the present findings in both the areas is similar to the reports of MOHFW in Manipur (2011).
2. In respect of sex differences, the overall percentage of immunization rate is slightly higher among females (Saikul: 92.02%; Imphal: 96.00%) than their male counterparts (Saikul: 91.01%; Imphal: 95.92%) in both the study areas **(Table 5.32)**.
3. Of the many independent factors, the coefficients of regression (B) of immunization of children is significantly associated with maternal education ($B = 0.036 \pm 0.020$, $p < 0.05$) and household income ($B = 0.038 \pm 0.018$, $p < 0.05$). So, the overall immunization rate tends to increase as the maternal educational level and household income increases **(Table 5.32.1)**.

Reported child morbidity

1. The overall prevalence of child morbidity (below 15 years) is slightly higher among females than their male counterparts in both the study areas. It is 34.76% among males 38.37% among females in Saikul sub-division, whereas, it is 33.81% and 36.84% respectively in Imphal town **(Table 5.33)**. It indicates that female children are more vulnerable to illness than their male counterparts in the present population.
2. Comparing the two study areas, the overall prevalence of child morbidity is higher in Saikul sub-division than in Imphal town among both the sexes, although they are not statistically significant (Males: $\chi^2 = 0.02$, d.f. = 1, $p > 0.05$; Females: $\chi^2 = 0.04$, d.f. = 1, $p > 0.05$).

3. Of the many independent factors, the coefficients of regression (B) of the child morbidity is negatively and significantly associated with age of the children ($B = - 0.034 \pm 0.004$, $p < 0.01$) and maternal education ($B = - 0.046 \pm 0.022$, $p < 0.05$). In other words, the prevalence of child morbidity decreases as the age of children and their maternal educational level increases **(Table 5.33.1)**.

CONCLUDING REMARKS

According to Sundbarg's classification of population, the present populations in both the study areas are of *progressive type*. The higher sex ratio in the post-reproductive age group compared to the preceding age groups indicates the higher average longevity in males than their female counterparts in both the study areas. The hypothesis that women who marry at an early age have on average, a longer period of exposure to pregnancy and a greater number of childbirths is confirmed by the present findings (NFHS-3) (IIPS, 2007). As reported in many human populations, the females in the present population get married earlier than their male counterparts (Khongsdier, 2005).

The demographic indicators like fertility as well as infant and child mortality rates in the present population are higher in rural area than their urban counterparts (UN, 1999; IIPS, 2007), although it is not statistically significant in the case of fertility and child mortality rates. The absence of statistical differences between the two study areas in respect of the fertility and child mortality rates including the reproductive wastage may be attributed to the similarities in ABO blood group incompatible mating types and tetanus toxoid injection during pregnancy, other than the various bio-social factors. However, the difference between Saikul sub-division and Imphal town with respect to the fertility and mortality rates may not be neglected especially with respect to the infant mortality rate which is significantly higher in Saikul sub-division. These differences are mainly due to the differences in demographic and bio-social factors such as maternal age and

age at marriage, mean birth interval, access to health care facilities, maternal and paternal education, obstetric morbidity, etc., as presented in Chapter IV and V.

The impact of various bio-social factors on fertility and mortality rates in the present study is found to be more in Saikul sub-division than in Imphal town as seen in chapter V. It is due to the fact that mothers in Imphal town are more advanced than their Saikul counterparts in almost every aspect. For example, all mothers in Imphal town are literate which is not so in the case of Saikul sub-division. Similarly, mothers in Imphal town have a greater score with respect to ANC characteristics than their Saikul counterparts. In contrast to many other findings (Caldwell, 1979; Lee, 1979; Reddy et al, 2006 and others), family planning is not an important factor in influencing the fertility and child mortality rates in the present population of both the study areas, as most of the couples were found to adopt family planning method only after attaining their desired number of children, which incidentally is higher than their actual number of children.

Policy Implications

The Registrar General of India (RGI), 2009 reported that the infant mortality rate in Manipur has been traditionally low; and in many surveys, it has been the lowest in the country recording 1.2%. Although, the infant mortality rate in the overall Manipur is very close to the present finding in Imphal town, it is much lower than the present finding in Saikul sub-division indicating the rural and urban difference in the state. With respect to the fertility rate, the present findings in both the areas are higher than the overall Manipur, i.e., 2.8 (RGI, 2010). So, there is a need to bring down the fertility and mortality rates, especially that of the Saikul sub-division. The people, especially in rural areas should not only be aware, but should also make use of these facilities.

The introduction of NRHM in Northeast India by the year 2005 had increased the total immunization rate of Manipur as much as above 90% (MOHFW, 2011). ANM who are posted in the available sub-centres along with the help of ASHA (Accredited Social Health Activist) under

supervision of NRHM are reported to visit the villages in Saikul sub-division at least once in a month. But, this alone can never be expected to bring down the mortality rate as their duty is only to give immunization to the children, although reduction in child and maternal mortality rates is one among their many objectives. So, the planners and policy makers should improve the facilities like medical, education, transportation, etc. to reduce the fertility and mortality rates in Saikul sub-division in particular and rural areas of Manipur in general. Further, the people joining hands with the government, NGO's and media should improve the condition of the health centres or sub-centres and make sure that doctors and nurses are available. However, a more in-depth study is suggested to find out the other possible factors that can influence the fertility and mortality of the Khongsai Kuki in Manipur, including the reasons for higher reproductive wastages besides having lower infant and child mortality rates than the other neighbouring populations.

REFERENCES

Ansari, A.S. 1986. *Socio-Economic Development in Tribal Area of Manipur.* New Delhi: B.R. Publishing Corporation.

Caldwell, J.C.1979. Education as a factor in mortality decline. An examination of Nigerian data. *Population Studies,* 33(3): 395-413.

Chanu, T. J. 2007. A study of reproductive and child health among the Lois of Imphal Valley. *Unpublished Ph.D. Thesis, Department of Anthropology,* North Eastern Hill University, Shillong.

Das, F.A. and S. Mithun. 2010. Opportunity for natural selection among some selected population groups of Northeast India. *Indian Journal of Human Genetics,* 16(2): 61-66.

Dey, S and S. Goswami. 2009. Fertility patterns and its correlates in North East India. *Journal of Human Ecology,* 26(2):145-152.

Glass, B. 1956. On the evidence of random genetic drift in human populations. *American Journal of Physical Anthropology,* 14: 541-555.

Gogoi, D. 2008. Population Genetics of the Mishmis of Arunachal Pradesh. *Unpublished Ph.D. Thesis, Department of Anthropology,* North Eastern Hill University, Shillong.

International Institute of Population Sciences (IIPS). 2000. *National Family Health Survey* (NFHS-2), 1998-99. Mumbai: IIPS.

International Institute of Population Sciences (IIPS). 2007. Infant and Child Mortality. *National Family Health Survey-3,* 2005-2006. Mumbai: IIPS.

Jones, S. et al. 1995. *Encyclopedia of Human Evolution*, Cambridge: The Cambridge University Press.

Khongsdier, R. 1995. A Study on Nutritional and Health Status in relation to some Bio-social Factors among the War Khasi of Meghalaya. *Unpublished Ph.D. Thesis, Department of Anthropology*, North Eastern Hill University, Shillong.

Khongsdier, R. 2005. *Demographic Genetics of an Indian Population*. Itanagar & New Delhi: Himalayan Publishers.

Lawler, S.D. and L.J. Lawler. 1951. *Human Blood Groups and Inheritance*. London: William Heinemann Ltd.

Lee, R.B. 1979. *The Kung San.!* Cambridge: The Cambridge University Press.

Limbu, D.K. 1996. The Semsa: A Population Genetical Study. *Unpublished Ph.D. Thesis, Department of Anthropology*, North Eastern Hill University, Shillong.

Mahadevan, K. 1986. *Mortality, biology and Society; Analytical framework and conceptual model*. New Delhi: Sage Publication.

Ministry of Health and Family Welfare. 2011. *State Program Implementation Plan 2011-12*. Manipur: Department Health and of Family Welfare, MOHFW.

Mourant, A.E. 1954. *The Distribution of Human Blood Groups*. Oxford: Blackwell Scientific Publication.

Mukherjee, N. 2002. Study on Demography and Growth pattern among the Khasi Children of Shillong. *Unpublished Ph.D. Thesis, Department of Anthropoloogy*, North Eastern Hill University, Shillong.

Nag, G. 2006. *Determinants of fertility in Norway*. Bergen: University of Norway.

Reddy, G. A. et al. 2006. Diet and nutritional status of rural preschool children in the state of Orissa. *Journal of Human Ecology*, 19: 205-214.

Registrar General and Census Commissioner, India (RGI).2009. *Sample Registration System*, New Delhi. Office of the Registrar General.

Registrar General of India. 2010. *Sample Registration System*: Databook for DCH. New Delhi, Office of the Registrar General.

Singh, S. J. 2006. Ethnic Variations in Fertility Patterns among Four Communities of Manipur. *Journal of Human Ecology*, 20(1): 1-9.

Statistical Abstract Manipur. 2008. Imphal: Directorate of Economics and Statistics, Government of Manipur.

United Nations, UN. 1999. *The Demographic Yearbook Historical Supplement 1948-1997. CD-Rom (DB-CD)*. United Nations: New York.

WHO.1967. *International Classification of Diseases*. Geneva: World Health Organization.

WHO. 2008. Under-Five Mortality Rate. *Statistical Information System*.

World Bank. 2003. *Health, Nutrition and Population Statistics (HNP Stats)*. Washington, DC: World Bank Groups.

BIO-SOCIAL DETERMINANTS OF FERTILITY AND CHILD MORTALITY AMONG THE KHONGSAI KUKIS OF MANIPUR

By

LETMINTHANG KHONGSAI

Department of Anthropology

School of Human and Environmental Sciences

Thesis

Submitted in partial fulfillment of the requirement of the degree of Doctor of Philosophy in Anthropology

of

North-Eastern Hill University

Shillong

July 2012

DECLARATION

I, Letminthang Khongsai, hereby declare that the subject matter of this thesis is the record of work done by me, and that the contents of this thesis did not form the basis of the award of any previous degree to me or to the best of my knowledge to anybody else, and that the thesis has not been submitted by me for any other research degree in any University/Institute.

This thesis is submitted to the North-Eastern Hill University, for the award of the **Degree of Doctor of Philosophy in Anthropology**.

27/7/12

(Prof. T.B. Subba)
Head
Deptt. of Anthropology

HEAD
epartment of Anthropology
orth Eastern Hill University
793 022

27.07.2012

(Dr. D.K. Limbu)
Supervisor
Deptt. of Anthropology

(Letminthang Khongsai)
Candidate
Deptt. of Anthropology

NORTH-EASTERN HILL UNIVERSITY
DEPARTMENT OF ANTHROPOLOGY
Umshing: Shillong: 793022

Dr.D.K.Limbu
Associate Professor

Ph. No. +91364-2723107(o),
E-mail: dhruba_limbu@yahoo.co.in

CERTIFICATE

Certified that the thesis entitled "Bio-social determinants of fertility and child mortality among the Khongsai Kukis of Manipur" submitted by Mr. Letminthang Khongsai for the Degree of Doctor of Philosophy in the Department of Anthropology, North-Eastern Hill University, Shillong, embodies the record of original investigation carried out by him under my supervision. He has been duly registered and the thesis presented is worthy of being considered for the award of the Ph.D. Degree. The contents of this thesis did not form a basis of any previous degree to him or to the best of my knowledge to anybody else, and the thesis had not been submitted for any degree of any other University.

27.07.2012

(Dr. D. K. Limbu)

CONTENTS

ACKNOWLEDGEMENT

This thesis would not have seen the light of the day without the generous assistance, cooperation and goodwill received at various stages by many personalities and institutions that I would like to acknowledge.

God has given me the might, wisdom and knowledge which enable me to complete this thesis.

I would like to express my sincere thanks and gratitude to Dr. D.K. Limbu, Reader, Department of Anthropology, North-Eastern Hill University, Shillong under whose supervision this thesis is completed. His valuable guidance, encouragement, support and trust throughout my research work have enabled me to complete this thesis.

My heartfelt thanks to Professor T.B. Subba, Head of the Department, Anthropology, for his valuable suggestions, besides providing me all the necessary requirements for the timely completion of this thesis. I am equally thankful to all my teachers and non-teaching staffs of this department for their guidance and help throughout my research.

I am indebted to the peoples, especially the subjects of S. Mongbung, Maoyang, Ng. Phainom, Lhungjang, New Boljang, Twichamphai and Old Boljang villages in Saikul sub-division; Khongsai Veng, K.C.C. Campus, Langol and National Game village in Imphal town of Manipur for their support and kind cooperation during my field work for data collection. My special thanks to Mr. Seigoulen Khongsai, Ms. Chongboi Changsan,

Mr. Eric P. Khongsai, Mr. Kh. Jangkhomang, Mr. Khuplam Changsan and Mr. Sehkhomang Khongsai for assisting and accompanying me at the time of my field work.

My heartfelt thanks to my beloved parents and family members for their financial and moral support in completion of this thesis. I also thank my wife Mrs. Kimthianbiak Neihsial, Assistant Professor (Education), Ramkrishna Mahavidyalaya, Unokoti District, Tripura for her support and encouragement at all stages of my research.

I am also grateful to the Union Grants Commission (UGC) for their financial assistance by awarding me NEHU Non-NET Fellowship which enables me to bear the financial expenses during my research work; and to the Indian Council of Social Science Research (ICSSR-NERC) by awarding contingency grants for printing and binding this thesis.

I extend my heartfelt thanks to Dr. Zahid Hussian, Department of Geography and Dr. B. Langstieh, Department of Anthropology in this university for their kind and valuable suggestions at the time of my pre-submission of thesis.

My deep sense of gratitude to all my friends, colleagues and well wishers for their kind and valuable assistance at different stages of my research whom I did not mentioned personally.

Shillong, the 26th July, 2012 (LETMINTHANG KHONGSAI)

LIST OF TABLES **Page(s)**

Family planning

Antenatal care

Immunization and child care

Reported child morbidity

LIST OF FIGURES

LIST OF MAPS

CHAPTER - I

INTRODUCTION

In order to understand man's place in nature, the physical anthropologists have attempted to demonstrate human evolution on the phenotype description and phylogenetic classification on the basis of palaeontological findings. In view of its growth and new orientation, physical anthropology continues to be a study of human evolution and biological variation. Physical anthropology, thus, may be viewed as an approach to human biology in its widest context with an emphasis on human populations. Since consideration of a cultural context is always basic to a proper appreciation and understanding of the problems of human evolution, physical anthropology is also concerned with the interaction of socio-cultural and other environmental factors. Therefore, physical anthropologists are directly concerned with different facets of demography. The impact of infant and child mortality on fertility has been closely examined by demographers because of the net effect of mortality and fertility on the rate of population growth (Bongaarts et al, 2001; Lehrar, 1984; Preston, 1978).

Demographers have for a long time been interested in the study of fertility and mortality which is one of the components of population change. Infant and child mortality are among the best indicators of socio-economic development because a society's life expectancy at birth is determined by the survival chances of infants and children. It is, however, unfortunate that people in the past studied animal, bird populations, events leading to wars, peace, marriages among the elite society, etc., but, fail to pay due attention to the important aspects of human life, which so vitally influenced and effected both administrators and planners (Raj, 2010).

Fertility is the reproductive performance of an individual or population, measured as the number of viable offspring produced over a period and it is generally expressed as the number of live births per year per thousand of the population (Jones et al, 1995). According to Thomson and Lewis (Raza and Nangia, 1984), fertility is generally used to indicate the actual reproductive performance of a woman or group of women. Child mortality rate, on the other hand is the number of deaths of children aged 1 to 4 years per 1000 children in the same age group in a given year (Raza and Nangia, 1984). NFHS-3 (IIPS, 2007) defined child mortality as the probability of dying between the first and fifth birthdays. According to WHO (2008), child mortality rate is the probability of a child born in a specific year or period dying before reaching the age of five, if subject to age-specific mortality rates of that period.

In every society, it is essential to find out birth and death rates and the factors which influence these. In fact, birth or death of a child in a family effects and influences the whole family structure on the one hand and the society as a whole on the other. It also effects the health of the parents and also their psychology and attitude towards family life. It is of course always true that the impact is always more on parents than on the society, where entrance and exit is always continuous. In today's scenario, population problems and fertility rate is being studied by the policy makers, both in the government and outside. There is no aspect of human life which is not influenced by fertility and mortality.

The 20th century witnessed dramatic declines in mortality in almost all countries of the world, regardless of initial levels, socio-economic circumstances and development strategies. In the advance economies, the declines were already apparent at the end of the 19th century (Stolnitz, 1965). Now, infant and child mortality enjoy a privileged position among the issues of demography. They lie at the heart of key debates of theoretical interest, and are illuminated by the wide variety of disciplines that have helped explain demographic phenomena. The child mortality rate is an indicator of the social situation in a country. It reflects the adverse environmental health hazards including economic, educational and cultural.

The anthropologists are generally interested in human populations at micro-level. However, it is proved beyond doubt that there are marked variations in mortality patterns and rates between various countries and between various populations, even within one country. Recent researches on mortality have shown that fertility and mortality rates are influenced by various types of biosocial phenomenon. But if one scans through the anthropological literature carefully, one can find that only few detailed researches has so far been carried out at micro-level on Indian populations, particularly among the tribal populations of Northeast India regarding fertility and child mortality and the effects of various bio-social determinants.

This thesis mainly focuses on the fertility and child mortality among the Khongsai Kukis of Saikul sub-division and Imphal town of Manipur. Fort the present study, we have selected Saikul sub-division in Senapati district to represent the rural population and

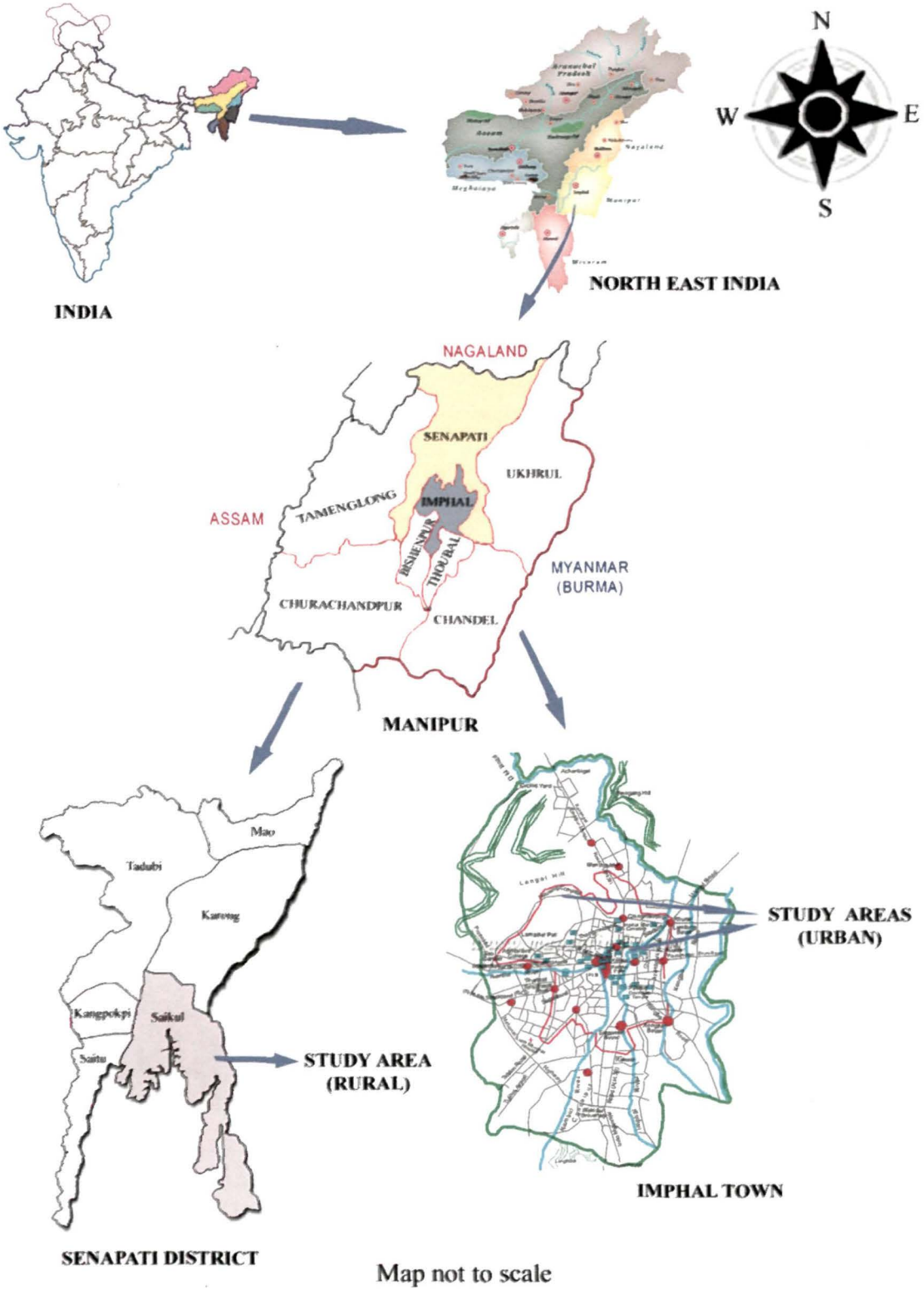
Imphal town to represent the urban population. According to Census of India (2001), Senapati district stands lowest in terms of literacy rate among all districts in Manipur. Besides, Saikul sub-division is one of the remotest areas in Senapati district of Manipur where most of the villages are without health centres or sub-centres and schools with poor transport and communication facilities. Considering these factors, we have selected Saikul sub-division for the present study. We shall find out how various bio-social factors such as age at menarche, maternal age, age at marriage, age at first live birth, type of marriage, type of family, education, economic conditions, son preference, health condition and adoption of family planning are influencing the fertility and child mortality on the study population. We shall also find out how differently these factors are influencing the fertility and child mortality in Saikul sub-division and Imphal town.

With this end in view, we propose to undertake the study on bio-social determinants of fertility and child mortality among the Khongsai Kukis of Saikul sub-division and Imphal town in Manipur, with the idea that those living in the town have been taking much more care for their children than those living in the villages. The objectives of the present study are as follows:

1) To study the demographic structure of the Khongsai Kukis of Saikul sub-division and Imphal town.

2) To find out the status of fertility and child mortality in the study population.

3) To find out the biosocial determinants responsible for fertility and child mortality in the study population.



Map not to scale

The Land

Manipur, one of the Northeastern states of India is a fertile field to study Anthropology for its colourful Naga, Kuki and Mizo Hills-tribes; and the Meiteis, Bishnupriya Manipuris, Brahmins, Pangal Muslims, etc. of Plain-castes people (Das, 1993 and Sen, 1992). Physically, the state may be divided into two distinct regions- Plain Central Valley and the surrounding Hill areas. About 10 percent of the land is flat plain. The Plain Central Valley is almost oval in shape, covering an area of 1,920 sq.km. situated at about 750 meters above sea level. Manipur has a total area of 22,327 sq.km. out of which 20,089 sq.km. are covered by hills. The state lies between latitudes 23° 80′ to 25° 68′ N and longitudes 93° 03′ to 94° 78′ E. According to census of India (2001), Manipur has a total population of 22, 93,896 persons, of which 11, 61,952 are males and 11, 31,944 are females and a total literacy rate of 70.5 percent. The state has 9 (nine) districts, namely Bishnupur, Chandel, Churachandpur, Imphal East, Imphal West, Senapati, Tamenglong, Thoubal and Ukhrul.

Imphal town is the capital of Manipur state having a total area of 1228 sq.km. and a total population of 7, 11, 261 persons (Statistical Abstract Manipur, 2008). Imphal has a literacy rate of 79.7 percent (Census of India, 2001). Majority of the people in Imphal town belong to the Meitei community, who are also known as the plain people. Saikul, on the other hand, is a hilly sub-division of Senapati district (earlier known as Manipur North) in Manipur. The district lies between latitudes 24° 30′ and 25° 45′ N, longitudes 93° 30′ and 94° 30′ E and altitude of 1,061.5 feet above sea level. Saikul sub-division has

a total population of 51,438 persons (Statistical Abstract Manipur, 2008) and a literacy rate of 51.4 percent (Census of India, 2001) which is comparatively lower than the Imphal town and the overall Manipur.

The People

Khongsai is one among the various sub-tribes of the Kuki who inhabit mainly in the hilly areas of the Northeastern states in India. Majority of them lives in the state of Manipur. They are also found in the states of Assam and Nagaland. It may be noted that the various Kuki groups has in common, regarding their culture, tradition, language, food habits, beliefs, etc.

Racially, the Kukis belong to Mongoloid, whose dialects however can be referred to as Kuki-Chin, which is an off-shoot of the Tibeto-Burman group of language (Ansari, 1986). Regarding religion, they practice Christianity. The Kukis are patrilineal who practice monogamy. The eldest son of the family inherits the parent's property and is also responsible for his parents and siblings. Their staple food is rice.

A Kuki village in general, is administered by the Chief called 'Haosa' who is the all-powerful lord of the village. 'Haosa' has the absolute right of ownership over the entire land of the village which he distributes to the villagers for cultivation and for other purposes. In the annual assembly usually held at the residence of "Haosa', he along with his 'Semang' (cabinet) and 'Pachong' (auxiliary of the assembly), and all the house-hold

heads of the village congregate to discuss and resolve matters relating to the village and the community.

Misao (1995) and Sen (1992) reported that the Kukis are physically short, strong and sturdy with a goodly development of muscles. In general, their legs are short in comparision with the length of their bodies, and arms long. The face is nearly as broad as it is long and is generally round or square, cheekbones are high, broad and prominent eyes, small and almond shaped nose which are short and flat with nostrils. The women appear squatter than the man even, but are strong and lusty. The colour of the skin varies between dark yellow-brown, dark olive, copper coloured and yellow olive. Beards and whiskers are almost unknown. The hair is worn by both sexes, in a knot over the nape of the neck, and completely parted in the middle. Similarly, Brown (2001) in his book, "The Statistical Account of Manipur" stated that the legs and arms of the Khongjai (Kuki) are occasionally very muscular, and they are capable of carrying heavy weights. But, he also concluded that the features of the Khongjai are various, and one standard cannot be laid down for all; the stature also varies, and tall men alternate with short; but the middle height is that most frequently met with.

Dress and ornaments

The traditional dress of the Kuki male consists of *boitong sangkhol* (a half-sleeve jacket) and a *pheichawn* (short lungi or dhoti). The women traditionally wore their hair in two plaits braided around the head; they wore a *nih san* (red slip) underneath a *ponve* (a wrap around) which was worn from above the chest. The ornaments included *bilba* (earrings),

hah-le-chao (bracelets and bangles), *khi* (necklace), and occasionally *bilkam* (a type of ring-shaped earring worn to stretch the earlobes).

Marriage

Marriage is universally regarded as natural and necessary. As a social institution marriage is a union regulated by custom or law. This is bound to be so as society is anxious for the preservation and proper upkeep of the race.

Monogamy is the ideal rule among the Kuki though a second wife is usually taken after the dead of the first wife or divorced with her. Marriage between a boy and his father's brother's daughter is highly restricted though marriage with mother's brother's daughter i.e., *neinu* is still preferred by some but many are now against such type of marriage especially the younger generation and educated persons. One simple reason of marriage with *neinu* is that one of the sons must marry mother's brother's daughter in order to perpetuate the ties of bride taking and bride giving. A mother prefers to bring a daughter-in-law from her family or clan with a view to increasing cordial relationship with that family or clan.

However, marriage with father's sister's daughter called *tunu* is strictly prohibited. If this is done, the reciprocal relationship gets disturbed. In other words, any girl from father's side is regarded as taboo. They belong to a man's exogamous groups. Parallel cousin marriages are also disfavoured. It is believed that, if a man marries his mother's sister's daughter ill-health and bad luck and deaths follows (Doungel, 1992).

Forms

Though there are instances of love marriage, arrange marriage is the common practice of the Kukis till the last few decades where the parents of the boy and the girl take the initiative. But, love marriage is more common than arrange marriage in the present day though the later is much preferred by most of the parents. Marriage by negotiation is generally initiated by the boy's side. The parents of the boy first of all approach the parents of the 'neinu' or bride. Or the son who had fallen in love with any other girl and has made up to marry her may give an indication of his desire to his parents. Then the parents of the boy together with their *tuchas* (wife-taking relations) and *bechas* (best friends) will take *jubel* with them and approach the parents of the girls and over the *jubel*, negotiation commence. If the parents of the girls do not approve the proposal, they will give them a *jubel* in return as a mark of disapproval to the proposed marriage. If the proposal is acceptable to the girls' parents, the boy's parents along with their men will go again for the second time to finalize the negotiation. At this time the parents of the girl will kill a pig and the representatives of the boy and the girls' people consisting of *tuchas*, *bechas* and the village Chief or *Haosa* will eat it.

Bride price

The question of the amount of bride price among the Kuki is not definite. In the olden days when cash was unknown to the Kukis, bride price was paid in the form of *mithuns* (*Bos frontalis*) and *gongs*. The number of *mithuns* paid in marriage varies among the tribes. Normally a *selnu* (female *mithun*) is paid as a part of the first installment of the

bride price, the balance is usually paid in due course. If the girl's parents or next - of - kin agrees, any article of small value such as bead, necklace to represent one or more *mithun*s or gongs. But in the present days, with the scarcity or difficulty in finding, they are sometimes being substituted by any kind according to the agreement between the parties (Doungel, 1992).

Activities during childbirth

In Kuki, the term childbirth is called *nau-pen* (*nau* means child and *pen* means birth). As the time of delivery approaches, the women and the village priest are called in. The children and adults of the family except the mother and father are asked to go out of the house. It is the job of the elderly women to give help to the mother during delivery of the baby. The bed for the mother and new born child is made inside the house on the platform floor after delivery.

After cutting the *nau-lai* (navel-cord), an old woman washes the baby with warm water, placing the baby on her legs and strokes the baby gently with her hands. The *nau-lai* is cut with a bamboo blade which is made by sharpening the edge of a piece of bamboo wattle. Sometimes the navel string is buried in the ground below the platform floor of the house just beneath the spot where water pitchers are kept. Right after birth, an old woman closely examines the body of the baby to find out whether every part is normal and without any deformity. She also announces whether the baby is a boy or a girl. One amusing thing is the custom of repeatedly enthusing the mother to make an effort during the process of delivery to give birth to a male child (Goswami, 1985).

Nau min sah dan (method of naming a baby)

The Kukis add the end part of the paternal grandfather's name to the first part of the eldest son. If the grandfather's name is *Seilet*, the name of the eldest son will begin with '*Let*', for eg., *Letkhomang*. Similarly, the last part of the maternal grandfather's name is given to the second son. The same is done to the first and second daughters whom a part of the paternal and maternal grandmother's name is added to their names. The eldest daughter takes a part of her paternal grandmother's name and the second daughter takes a part of her maternal grandmother's name. The other children are named after any of other relatives and friends according to their choice.

It is essential to give a name to the newborn baby immediately. It may be a temporary name or a permanent one, but naming of the baby whether a boy or a girl soon after birth is obligatory. This is because of the traditional belief that if a name is not given to the newborn, evil spirits may do harm to the baby (Goswami, 1985).

Naudop-ju leh naudop-an

Naudop-ju is the name of the wine prepared for the birthday celebration and is taken by all who participate in the ceremony. But, this type of ceremony is not practice in the present days. *Naudop-an* is the food prepared for the same occasion and is served only to the old men and women especially who attended the delivery. During the time when *naudop-ju* was performed, the old men and women eat rice and meat and also drink the offered wine. But, the others only drink wine. The wine is offered in an earthen pitcher

with a wine-sipping pipe of bamboo placed inside the pitcher. The priest will remain present in the ceremony and also partakes of the food and wine (Goswami, 1985).

Disposal of death

The Kukis bury their dead. But their customs and methods vary in accordance to the nature of the death. The nature of death may be classified into two broad categories, such as: (i) ***Thipha/ In Thi*** (i.e., natural death or death due to sickness and old ages) and (ii) ***Thise/ Gam Thi*** (i.e., unnatural death which includes death caused by accident of any kind, suicide, murder and incurable diseases). But, due their conversion into Christianity, there is hardly any such differentiation between the two. After performing all the necessary rites, the priest (Pastor) prays to ***Pathen*** (God) for granting direct route for the soul to the *Mithikho* (village of the death) or *Vangam* (heaven). The corpse is then, put on a bier and is carried out for burial which is detained for a moment near the grave for the people to bid their last farewell by throwing a piece of stone or earth to the grave. Finally, the body is lowered into the grave. The Priest sings *Lhan-Khuh La* (i.e., funeral song) and performs a rite to prevent the spirits/souls of the living people being entombed. Following that, the grave is fully filled up with earth (Doungel, 1992).

Kosa

It is a funeral feast provided by the next-of-kin of the deceased in expression of grief and love. Except the prescribed portions of the meat for distribution, the rest is cooked for all the people who attended the funeral. Just before partaking the feast the *Lhalho* rite and *Sakau Lhai* rite is performed by the village *Thempu*. The Kukis also practice a custom of

presenting shawl called *Pondum* to the dead person by covering the coffin with it. The eldest daughter and the son(s)-in-law are obliged by the above mentioned custom, and on their failure a fine of ***mithun*** is claimable from them by the next-of-kin man of the dead person. This custom is known as *Tomse/Tom man* (Doungel, 1992).

Economy

Like most of the tribal people in North East India, the Khongsai Kuki, for their livelihood, mostly depend on land and forest resources, excepting to those who are living in Imphal town and working in government or private offices. Wet rice cultivation is practiced in the hills with wooden plough yoked to a pair of bullock or to a single buffalo. Although, agriculture depends mainly on rain water, irrigation of rain water is, however, very poor. Ploughing work usually starts in the months of May and June. There are two methods in which moistened seeds grow to their full stature without transplanting the seedling. The other method is by transplanting the seedling. For the first method, they first moisten their seeds with water and keep in a covered basket till it shoots. Thereafter, they cast these seeds. For second method, the seeds are sown in a prepared small plot of land. After few days, they carefully and gently pull up the seedling with roots by hand and then transplant them by hand in the wet field where these grow to their full stature.

Shifting (jhum) cultivation is the most common forms of economy in the hill areas. They select a virgin or near virgin forest land, cut down the trees and burn them. The burnt ashes serve as fertilizer. Thereafter, they grow their crops. After a year or so, they leave that jhum site for a considerable period so as to allow growing new jungle on

them. They select another forest land and repeat the same process. As this process is not much gainful for future, the government is trying to bring more and more areas under permanent terrace cultivation. Shifting cultivation known as jhuming is also the predominant form of agriculture among the hill tribes of North East India.

They grow food grains, pulses, vegetables, root crops, etc. to meet their need of food and cloth. Their economy continues to be subsistence oriented than market oriented. Women play a large part in building up the economy of the family. They are engaged in planting and weeding the fields, harvesting the crops and household duties, the women also work at the looms. Like the other tribal women, the Khongsai Kuki women are expert in weaving. To provide clothing to the family members is the responsibility of the housewife. Men are equally expert in handicraft. Bamboo and cane works, basket making, mat making and woodwork art are the work of men.

Flora

Blessed with an amazing variety of flora and fauna, 67% of the geographical area of Manipur is hill tract covered by forests. *Siroi Lily* which is one of the most popular flora in Manipur is the only terrestrial lily grown on the hill tops of Siroi hill in Ukhrul district. Rhododendron, cotton, cane, bamboo, cactus, wild flowering plant, famous orchids, lotus, water lilies, etc grow here. Rice, cotton maize, wheat, millet, mustard, potato, sesame, black gram, etc. are grown in the plains. Pineapple, jack fruit, sugarcane, mango, orange, banana, plantains, peas, apples, guava, chillies, cabbage, pumpkin, sweat potato, potato,

betel leaves, are also grown in abundance. Tobacco is also cultivated as common garden crop.

Fauna

The Hoolock gibbon, the Slow loris, the Clauded leopard, the Spotted linshang, Mrs. Hume's Barbacked Pheasant, Blyths Tragopan, Burmese Pea-Fowl, four different species of Hornbills etc. form only a part of the rich natural fauna of Manipur. However, the most unique is the Sangai, the dancing deer. Other mentionable fauna is Salamander known as *Lengwa* found at the foothill of Siroi in Ukhrul. *Mithun* (*Bos frontalis*) which is semi-domesticated animal is found in the north western part of the State. Besides, barking deer, spotted deer, sambar, goral (*Manipuri Sabeng*), monkey, jackal, wild pig, wild dog, wild cat, rat, snake, lizard, toad, vulture, eagle, jungle cow, bulbul, maina, wild goose, duck, etc. are also found here.

CHAPTER - II

REVIEW OF LITERATURE

In this chapter, we shall make a brief review on the previous studies conducted by different scholars or researchers relating to bio-social determinants of fertility and child mortality among different populations of India and outside India.

Biological as well as social factors such as women's age, age at marriage, educational level, economic status and religious attitudes have an effect on fertility and mortality (RGI, 1971 and Elamin and Bhuyan, 1999). The infant and child mortality in the Eastern Africa are influenced by age, sex and socio-economic characteristics of the parents (Stephen, 1988). Khongsdier (2005) reported that demographic structure such as fertility and mortality are very important to understand the genetic and social structure of human population.

It is widely accepted that fertility and mortality are influenced by a large number of biosocial factors such as age at menarche, maternal age, age at marriage, age at first child birth, age at menopause, type of marriage, type of family, education, religion, economic conditions, value of children, health condition and adoption of contraceptive devices and so on (Caldwell, 1979; Lee, 1979; Reddy and Reddy, 2006; and others).

Many studies have reported the differences between rural and urban areas in respect of the fertility rate (Ahmed, 1985; UN, 1999; Findley, 2005; Kullu, 2006 and Chanu, 2007) as well as infant and child mortality rates (Macassa et al, 2003; Chattopadhyay and Goswami, 2005; Andoh et al, 2007 and Chanu 2007). NFHS-2 has reported that the fertility rate in all the Northeastern states of India is higher in rural areas than that of the urban areas (IIPS, 2000). Similarly, NFHS-3 reported that the infant and

child mortality rates are higher in rural populations compared to the urban populations in India (IIPS, 2007). Similar finding was reported by Mace (2008) suggesting that reproducing in cities has always been costly and this in turn leads to lower fertility in urban than in rural areas.

NFHS-3 (IIPS, 2007) reported that the fertility rate in the state of Manipur is 2.8. According to the Registrar General and Census Commissioner, India (2009), Manipur has the lowest infant mortality rate recording 12 per 1000 live births among all the states of India.

Though study on bio-social determinants of fertility and child mortality is not very old, yet, several studies on it have been published by many scholars in India and abroad. In Northeast India, very few systematic studies on fertility and mortality patterns have so far been undertaken to understand the different bio-cultural problems of the society that may be related to fertility and mortality.

Biological determinants

According to the statistics given by UNICEF in 1973, out of 114 infants per thousand live births die under one year of age in rural areas of India against 78 in urban areas in a year. Three out of four among the babies under one month die due to the causes arising either before or during birth; the most common causes are prematurity, congenital debility, injury at birth, malformation, diarrhoea, influenza, pneumonia, oxygen deficiency, etc.

Stephen (1988) reported that infection, malnutrition and diarrhea were the major causes of infant and child mortality in the Eastern Africa.

Chen et al, (1980) conducted a study on anthropometric assessment of energy-protein malnutrition and subsequent risk in mortality among pre-school children. They estimated that four diseases namely neonatal tetanus, pertussis, measles and acute lower respiratory tract infections cause one third of child deaths under 5 years of age in the developing world. The WHO estimates that 1.5 million children die annually of measles and its complications and those are pneumonia, diarrhoea, under nutrition and systematic infection (Assad, 1983).

Adlakha and Suchindran (1985) examined the determinants of infant and child mortality variations in Jordan, Yemen, Egypt and Tunisia. They concluded that the higher mortality risk is found among infants born to very young and very old mothers, with short previous birth intervals of higher birth orders, and where the previous infant had died.

Gualtieri et al, (1985) compared the perinatal mortality rate to ABO blood type and parity using data from the British Perinatal Study. The findings reveal that within each maternal blood group, the perinatal mortality rate increases with parity. Maternal-fetal ABO incompatibility also increases fetal wastage. Parity effects on perinatal mortality are most strongly felt by O type blood group mothers, who are also most prone to develop an immune reaction to fetal blood group antigens.

Friede et al, (1987) reported that there is a strong association between young maternal age and high infant mortality. They also reported that there is a high prevalence of low birth weight with young maternal age.

Majumder (1991) observed that preceding birth interval, subsequent pregnancy and breast-feeding duration, each have an independent influence on early mortality risk in Bangladesh. Within a specific interval, the risk of dying decreases with increase in duration of breast-feeding and also with an increase in the time between the index birth and the next pregnancy.

The dramatic rise in infant mortality that occurred in the Soviet Union between 1970 and 1990 was accounted for in large part by an increase in death rates from causes which predominate after the first month of life, most notably respiratory, infectious, and diarrhoeal diseases (Velkoff and Miller, 1995).

Fitaw et al, (2004) determined the impact of child mortality and fertility preference on fertility status in Ethiopia and found that high fertility status is strongly associated with child death and hence measures that curb child mortality are believed to decrease fertility status besides promoting child survival. The study also observed that later age at first marriage and first birth showed lower number of children ever born alive.

Thong et al, (2005), based on their study of birth defect in Malaysia concluded that the leading causes of paediatric disability and mortality are birth defects in develop and developing countries. The babies with major defects were associated with lower birth

rates, premature deliveries, higher caesarean section rates, long hospitalization and increase specialist care.

Haque et al, (2010) conducted a study on the women empowerment and its impact on fertility in Bangladesh and concluded that mother's age and age at marriage, besides some other socio-economic factors are the most important factors determining the fertility rate.

In India, a number of studies have so far been conducted on the biological factors determining the fertility and mortality by many scholars and researchers. Vaidyanathan (1972) in his study on mortality in India found that the rate of infant mortality continues to be high mainly due to some persistent exogenic causes arising from environmental and nutritional conditions. The disorder of the respiratory system appears to be a very important cause of infant mortality. Congenital malformations and diseases in early infancy account for about 50% of all infant deaths in urban areas of India.

Office of the Registrar General, India (1981) reported that India deviates largely from other countries in its mortality patterns and it is characterised by very high levels of infant mortality. The estimate of the census actuaries indicates that the male infant mortality rate has been consistently higher than the female infant mortality rate from 1871-1971.

A retrospective survey carried out by Suleman (1982) in three environmental zones in Punjab shows significantly higher neonatal mortality rates due to tetanus. A

study on child development conducted by Devdas and Jaya (1984) also reported that there are many types of intrauterine distribution that may cause an infant to be born with severe injuries and then be subject to miserable life.

Singhi et al, (1989) revealed that an increased risk of infant and child mortality was associated with maternal age less than 20 and more than 30 years, birth order 4th or higher and previous infant or child death(s) in the family in a rural Haryana.

A study on identifying children with high mortality risk by Choe et al, (1998) revealed that children born less than 24 months after previous birth, children in families where an older sibling has died and children born to mothers less than 20 years old have higher risk of dying in their early age.

Masset and White (2003) examined the infant and child mortality in Andhra Pradesh and found that mother's age and birth order are the most important biological factors influencing the infant mortality rate.

The patterns of mortality of two isolates of Bhoksa tribesman settled in different eco-systems of the state of Uttaranchal i.e., tarai and foothill areas were studied by Singh (2003). The study indicated that Bhoksas of tarai region have lower mortality than the Bhoksas of foothill area which may be due to their greater degree of adaptation to the environment. The study also reported that infant and pre-reproductive mortality are higher as compared to that of the other ages similarly in both the groups. Further, heavy toll of mortality is caused either by delivery infection or by communicable diseases.

A study on the demography and ethnography of fertility behaviour among the non - industrial population in India shows that longer perceived ideal birth interval has been consistently associated with lower fertility (Nanda, 2005).

Bhasin and Nag (2007) in their study on the demography of the tribal groups of Rajasthan reported that child mortality is a very important variable in determining the level of fertility, i.e., the higher the child mortality rate, the higher is the fertility rate. NFHS - 3 (IIPS, 2007) also reported that mother's age at birth, birth order and the interval between births have a strong influence on the infant and child mortality.

Soni and Mukherjee (2009) who conducted a study on foetal wastage and ABO blood groups incompatibility among the Gonds of Garriyaband, Chhattisgarh found that the couple combinations having O type wives and A or B type husbands showed maximum foetal loss. The study also shows that as far as abortion is considered it is higher in A type husband and O type wife while still births is higher in couple combination of A type husband and B type wife.

Reddy and Sudha (2010) made an attempt to find out the influence of bio-social factors on fertility and mortality among Setti Balija of Southern Andhra Pradesh. They found that, age at menarche is correlated strongly with the age at marriage and the net survivorship is high among women of middle range age (14-15 years) at menarche followed by women of late age (16+ years) at menarche and early age (< 12 years) at menarche. The same trend is observed for age at marriage also. The study also found that, women of early menarche and marriage will have higher rates of prenatal as well as

postnatal mortality and the net survivorship of offspring is also related to the onset of menarche as well as age at marriage.

In Northeast India, Barua (1982) undertook a study on bio-demographic factors associated with offspring mortality among the Hajongs of Meghalaya and found that multiple births are associated with higher death risk among the offspring. His study indicates that offspring mortality gradually decreases with increasing birth order.

Khongsdier (2002) reported that the number of live births and surviving children among the Christians and non-Christians War Khasi of Meghalaya tends to increase with the increasing age of the mothers. He also found that that the mean number of live births decreases with the rise in age at marriage in both the religious groups. The same author in 2005 reported that the mean number of live births tends to decline with the increase in age at marriage of the mothers.

A study on the ethnic variation in fertility patterns among four communities of Manipur by Singh (2006) reveal that mothers of youngest age group (15-19 years) delivered the least number of children as compared to the mothers of higher age group. This tendency of increasing number of live births with the increasing chronological age of mother in all the four populations is because of exposure to longer period of married life.

Social determinants

Some of the socio-cultural factors that are responsible for differential fertility and mortality are age at marriage, absence of spouse, widowhood or widow-remarriage, polygamy and postpartum sexual abstinence during certain seasons or ceremonies, etc. (Reddy, 2005).

Caldwell (1979) reported that women's education in societies like that of the Yoruba in Nigeria can produce profound changes in family structure and relationships, which in their turn may influence both mortality and fertility levels. A major theory at the linkage between increased maternal education and reduced child mortality is that education gives women the power and confidence to take decisions into their own hands.

A study on fertility and child mortality, level and differentials among Yoruba of Western Nigeria was undertaken by Sembajawe (1977). The study observed the influence of urbanization in the reduction of child mortality for some African countries e.g. South Africa, Senegal, Ghana, Zaire and Kenya.

Rosenzweig and Schultz (1982) reported that education of a mother is strongly and positively correlated with the survival rate of her children in Columbia. The least educated mothers are the most affected, in terms of their reduced fertility and increased child survival rates.

Merrick (1983) conducted a study on access to piped water and early childhood mortality in Urban Brazil. The study shows that when the effects of household contextual

variables are controlled, access to piped water in the house was found to be associated with a reduction in child mortality by approximately 20 percent.

Martin et al, (1983) analyzed the co-variates of child mortality in the Philippines, Indonesia and Pakistan. They concluded that irrespective of the socio-economic condition of the family, better household sanitation and electricity play an important role in reducing child mortality.

A study on the effect of infant mortality on subsequent fertility of women in Jordan indicated that child survival seems to have only minimal influence on fertility among women at low birth orders and less educated women (Suchindran and Adlakha, 1984). It also indicates that the fertility of women with low education is consistently high; consequently, there is little room for fertility to be decreased by the death of an infant. On the other hand, the fertility of women in the highest educational category is relatively low. The same authors in 1985 examined the determinants of infant and child mortality variations in Jordan, Yemen, Egypt and Tunisia. They reported that the education of mother and rural-urban residence are found to affect infant survival. The study also shows the beneficial effect of breastfeeding on the infant's survival, especially during the early months of life.

A study on household income and child survival in Egypt reveals that the supply of piped water to the dwelling was associated with higher survival probability during early childhood (Casterlin et al, 1989).

Mengistu (1989) estimates the fertility and child mortality for agricultural households of the Gondar and Hararge regions in rural Ethiopia. The study shows that fertility and child mortality are quite high in both regions as in the rest of the country. However, Hararge has significantly higher mean parity and child mortality than Gondar.

A study on cultural and social factors influencing mortality levels in developing countries revealed the surprising fact that social characteristics, such as the level of schooling or fertility control, or cultural characteristics, such as ethnic group, are usually more influential in determining mortality levels than is access to medical services, income, or nutritional levels (Caldwell, 1990).

Gubhaju et al, (1991) in their study on the socio-economic, demographic and environmental determinants of infant mortality in Nepal reported that the availability of toilet facilities as well as drinking water was observed to be important determinants of infant mortality.

O'Toole and Wright (1991) reported that maternal and paternal educations have independently negative effects on child mortality in Burundi. The maternal education is important in reducing the risk of child mortality. However, the household income and father's occupation is also an important factor in reducing child mortality.

The effect of education without resources might not be important as a factor of lowering infant and child mortality. Both the education and the resources could be

complementary to each other, and access to both of these may improve child survival (Pant, 1991).

Benefo and Schultz (1994) analysed the determinants of fertility and child mortality in two neighboring West African countries: Côte d'Ivoire and Ghana. They found that women's education beyond the primary level is associated with substantially lower fertility in both the countries. Women's education has a smaller effect on child mortality in Côte d'Ivoire, where relatively fewer women are educated, than in Ghana. They concluded that further development of women's education in both the countries is likely to play a significant role in bringing child mortality under control and slowing population growth.

Forste (1994), in his study on the effects of breast-feeding and birth spacing in infant and child mortality in Bolivia shows that birth spacing, lactation, antenatal care and mother's education improved chances of the survival of infant and child.

Adetunji (1994) examined the effects of a child's place of birth, mother's education, region of residence and rural and urban residence on infant mortality in Nigeria between 1965 and 1979. It showed that children born in modern health facilities, irrespective of their mothers' place of residence, experienced significantly lower rates of infant mortality than those born elsewhere.

The decline in infant mortality in Bangladesh is attributed to the introduction of improved public health measures and access to maternal and child health care services (Kabir et al, 1995).

Wahab et al, (1996) reveal that the most frequent type of marriage was between first cousins, in both rural and urban Pakistan where first cousin marriages, those with father's brother's daughter were predominant. They also reported that the incidence of premature mortality was significantly higher only in the offspring of first cousin marriages, while morbidity is significantly higher to the offspring of consanguineous marriages.

Stockwell and Goza (1996) analysed the relationship between infant mortality and economic status by race in metropolitan Ohio in U.S.A. and reported a pronounced inverse association between income status and infant mortality for whites, but not for non-whites. They also reveal that low income whites and non-whites at all income levels have infant mortality rates that are substantially higher than the overall rate for the population.

A study on the contributions of the proximate determinants to fertility change in Botswana shows that breast-feeding is the most important proximate determinant of fertility, followed by contraceptive use, and finally non-marriage (Letamo, 1996). The study also reveals the decline in fertility rate with an increasing contraceptive use. Marriage is also reported to be the least important proximate determinant of fertility, probably due to the high prevalence of premarital childbearing.

Varea et al, (1996) analysed the determinants of modern contraceptive use in the province of Marrakech (Morocco). They reported that women who have never used contraception have smaller family sizes than those who do and the number of live births is the variable with maximum predictive power on contraceptive use, while child mortality is the main inhibiting factor. The paper also evaluates the hypothesis that traditional populations in the initial phase of their demographic transition resort to modern contraception in order to stop childbearing, when they have reached a desired number of children, rather than to space births or reduce their fertility.

Udjo (1996) observed that the fertility decline in Zimbabwe is modest and that the decline is concentrated among high order births. Multivariate analysis did not show a statistically significant effect of contraception on fertility, partly because a high proportion of Zimbabwean women in the reproductive age group never use contraception due to prevailing pronatalist attitudes in the country.

Abortion has played a major role in the fertility decline in Cuba and the Federal Republic of Korea (Noble and Potts, 1996). The study further concluded that access to contraception, voluntary sterilisation, and safe abortion has a direct impact on fertility and has been associated with a rapid fall in family size in these very different countries.

A study on the fertility transition in Bangladesh reveals that the small change in overall fertility may be attributed partly to the change in age at first marriage and partly to the increased use of contraception (Kabir and Uddin, 1997).

Chaudhury et al, (2000) reported that lower infant mortality rates in Bangladesh are found in the urban areas compared to the rural areas, which attributed to the greater availability of health care services, higher income and educational levels in urban areas. They also observed that the risk of dying decreases with increasing breast feed in the early childhood period.

A study on differential child mortality by fertility in north eastern Libya was conducted by Bhuyan (2000). The study shows that education of mother has significant declining effect in different degrees on child loss to mothers of different parity. Similar differential impacts due to different parity levels are observed in case of age at marriage of mother, number of earning members in the family and socio-economic conditions of parents. Apart from social, economic and environmental conditions, parity is one of the important factors responsible infant and child mortality.

Pedersen (2000) reported that infant and child mortality has steadily reduced in West Bank and Gaza Strip since 1967, even though fertility has remained extremely high. The determinations of infant and child mortality are discussed with particular emphasis on the role of consanguineous marriages, short birth spacing and maternal education. The study also showed that birth spacing and types of marriage are more important determinants of infant mortality than maternal education.

A study on women's education and fertility rates in developing countries, with special reference to Bangladesh was conducted by Akmam in 2002. The study revealed that education has a major impact on fertility and even after controlling for other relevant

factors, the education of women stands out as a significant factor in determining fertility. It also shows that education has been found to increase women's levels of autonomy in decision-making, in acquiring knowledge, in gaining access to economic resources, and in interacting with a wider social circle. It is through this autonomy that education exerts an impact on fertility.

Iyer and Monteiro, (2004) conducted a systematic study on the risk of child and adolescent mortality among vulnerable populations in Rio De Janeiro, Brazil. The study revealed that socio-economic factors such as education, income, religion, family structure and residence have high risk of mortality, and among all, lack of education was found to be a major determinant of mortality at young ages.

A study on the impact of education on fertility and child mortality in Indonesia shows that female education is a stronger determinant of age at marriage and early fertility than male education (Breierova and Duflo, 2004). The study however, stated that female and male education seems equally important factors in reducing child mortality. Similarly, Nag (2006) concluded that female's education is a significant determinant of fertility in Norway.

Goni and Ramtullah (2005) conducted a comparative study on the decline in fertility among SAARC countries and reported that for reduction in IMR (Infant Mortality Rate) among the SAARC countries, it is necessary to improve sanitation, drinking water and medicine facilities.

A study on the contraceptive use in China suggested that adoption of family planning methods is higher in urban areas than in rural areas due to the differences in the socio-economic factors such as education, occupations, family size, religion, availability and accessibility of contraceptive methods (Cao, 2007). Dodoo (2001) also reported that the high fertility rate in Africa is mainly because of low level in the use of contraceptive methods.

A study on education as correlates of fertility rate in Southern Nigeria conducted by Akpotu (2008) reported that education and fertility rate are inversely related, both in urban and rural societies. However, education was found to be more inversely related to fertility among women and urban dwellers. The Nigerian's love for children, their polygamous nature, irrespective of their educational attainment and the need for a particular sex of children, among others were identified factors responsible for enlarged family size.

Mondal et al, (2009) observed the influencing factors on infant and child mortality of suburban and rural areas of Rajshahi District, Bangladesh. The study reveals that several socioeconomic, demographic and health related variables affected infant and child mortality. Parents' education, toilet facilities, treatment places, immunization and ever breastfeeding are significant predictors during neonatal and childhood period but father's occupation is significant at post-neonatal periods. The study also shows the risk of child mortality decreased with increased female education and wider access to safe treatment places.

Adhikari (2010) analysed the demographic, socio-economic, and cultural factors affecting fertility differentials in Nepal. The study shows that socio-economic factors such as age at first marriage, perceived ideal number of children, literacy status, mass media exposure, wealth status, and child-death experience by mothers were found to have influenced the fertility in Nepal.

Khan and Khan (2010) found that the higher total fertility rate in Pakistan is the result of low contraceptive prevalence rate. Their findings also revealed that, husband's education, income of the husband, husband's age at marriage, number of living children, number of sons, household income and urbanity of the household are major determinants of contraceptive prevalence of women.

Haque et al, (2010) reported education, household decision making participation, husband's education, number of children death, religion, media exposure and discussion on family planning are the most important factors determining the fertility rate in Bangladesh.

Chowdhury et al, (2010) reported that neonatal mortality rates, post-neonatal mortality rates and infant mortality rates are higher among illiterate reproductive mothers and of whom houses have unhygienic latrine in Natore district of Bangladesh. Mother's education, types of latrine and electricity have significant association with neonatal, post-neonatal, infant and child mortality. They further reported that mother's education and occupation have significant impact on post-neonatal mortality, whereas parents'

education and occupation, types of latrine and electricity have significant effects on infant and child mortality.

Driver (1963) who studied the differential fertility in Central India observed that fertility declines drastically with the increasing level of mother's education. A study on educational status and differential fertility in India reported that parents with higher educational status are likely to limit the family size as they are more aware of the socio-economic and well-being of their children (Hussain, 1970).

A study on the measures of mortality from Indian Sample Registration System by Rambhadran and Swami (1982) shows that the death rate in urban area is significantly lower than that of the rural area.

Singhi et al, (1989) in their study on the determinants of infant and child mortality in rural Haryana found that increased risk of infant and child mortality was associated with unclean cord care at the time of child birth, failure of breast feeding during the first 3 months of age and lack of immunizations.

A study on fertility and mortality in Bison Horn Madias of Dantewara Tehsil of Bastar District, Madhya Pradesh was undertaken by Kshetriya et al, in 1993. They found that the prevailing socio-economic, cultural and health-care practices are the significant factors of high fertility and high mortality rate.

After conducting a study on the effects of consanguinity and inbreeding on fertility and mortality among the Malas of Chittoor District, Andhra Pradesh, Reddy et al,

(1993) found that the increase in consanguinity leads to the increase in prenatal and postnatal deaths with the decrease in fertility, live births and survival of offspring when compared with non-consanguinity.

A study on the consanguinity and its relationship to differential fertility and mortality among the Kotia of Andhra Pradesh shows that women in consanguineous marriages had a lower mean number of total live births and living children than women in non-consanguineous marriages (Yasmin et al, 1996).

Yadav and Badari (1997) analysed the age at effective marriage and fertility in India. They found that age at marriage can still play an important role in the reduction of fertility in some states in India such as Uttar Pradesh, Bihar and Rajasthan.

Arnold et al, (1998) found that India is a country with a pervasive preference for sons and one of the highest levels of excess child mortality for girls in the world. Son preference fundamentally affects demographic behavior in India. They also reported that family composition affects fertility behaviour in every state examined and son preference is the predominant influence in all but one of this states.

An analysis on accelerating India's fertility decline by Pathak et al, (1998) indicate that no fertility decline can be expected as a result of lengthening birth intervals. However, the increased use of temporary methods by Indian women to stop childbearing may lower total fertility significantly, whereas increased use of temporary methods holds promise of accelerating it.

Kishore and Parasuraman (1998) in their study on mother's employment and infant and child mortality in India found that mothers who are employed have a 10 percent higher infant mortality rate and a 36 percent higher child mortality rate than mother who are not employed. The study further reveals that employment of mothers in urban areas has more detrimental effects on infant and child survival than employment of mothers in rural areas.

Luther (1998) who conducted a study on mother's tetanus immunization in India reported that two doses of tetanus toxoid vaccine given one month apart during pregnancy prevent nearly all tetanus infections in both mothers and their newborn children. The study further reported that mother's tetanus immunization is also associated not only with reduced neonatal mortality, but also with substantial reduced early-childhood mortality.

Choe et al, (1998) in their study on identifying children with high mortality risk concluded that illiterate mothers, very poor households and without access to a flush or pit toilet are most vulnerable to infant and child mortality.

According to Verma (2002), who conducted a study on the socio-cultural correlates of infant mortality among the Baigas of Mandala District of Madhya Pradesh shows that illiteracy of parents, parents engaged in agriculture related practices and persons married in blood relations had experienced high infant mortality which may be attributed to the belief in indigenous unhygienic method of delivery, primitive method of cutting the cord, discarding the colostrums, etc.

Masset and White (2003) suggested that the infant mortality is found to depend on health service provision such as tetanus injection and use of antenatal services in Andhra Pradesh. They also found that, although economic well-being is a significant determinant of child mortality, other factors such as maternal education and knowledge of health practices (ORS) and access to safe water are more important in influencing the child mortality rate.

A demographic study of Gujjars by Dabral and Malik, (2005) shows that women's age has the most significant effect on fertility and family planning acceptance. They also observed that women's education is also an important determinant of these variables as fertility increases with higher infant mortality.

Reddy (2005) conducted a study on fertility and mortality among the Scheduled Caste Madigas of Andhra Pradesh. He observed that the pregnancy wastage is slightly higher in consanguineous than in non-consanguineous matings.

Sharma and Jain (2006) conducted a study on the morbidity and mortality among traditional prostitutes of the Beria Caste of Sagar district, Madhya Pradesh. Their findings revealed that morbidity and mortality rates are very high among them. They also found that infant mortality rate may be associated with sanitary conditions, health status of the mothers and age of the maternity, etc.

Naharani (2007) who analysed the consanguinity, reproductive performance and selection potential among the Khond and Savara of Andhra Pradesh reported that the

Khond who enjoy a better status in demographic transition (i.e., socio-cultural, bio-genetic and nutritional factors) have a better reproductive performance than the Savara. The study also reported that infant and child mortality is recorded to be lowest among the families where there is no water stagnation around the house and also among the families who use hand pump water for drinking purpose at household level. Whereas, the highest percent of infant mortality and child mortality are recorded among the families who obtain their drinking water either from canal or river.

A study on demography of the tribal groups of Rajasthan by Bhasin and Nag (2007) shows that mortality differences across Scheduled Tribes reflect the influence of independent economic, socio-cultural and physical environmental determinants.

Gharami and Sharma (2007) who studied the household environment influence on infant and child mortality with special reference to Kol tribe of Madhya Pradesh reported that infant and child mortality is recorded to be lowest among the families where there is no water stagnation around the house, however, high percent of infant and child mortality is reported in families where stagnation nearer to the house is a regular phenomenon. They further reported that both infant and child mortality are found to be lowest among the families who use hand pump water for drinking purpose at household level. Whereas, highest percent of infant mortality and child mortality are recorded among the families who obtain their drinking water either from canal or river.

Paul (2007) conducted a study on the infant and child mortality in Uttar Pradesh and concluded that infants are more vulnerable to death compared to children in the age

group 1-4 years. The study also revealed that birth order, maternal education and place of delivery seem to be the crucial determinants of infant mortality.

Kannan and Nagaranjan (2008) analyse the factors and multiple regression for human fertility in Kanyakumari district. They concluded that higher employment, higher income and nuclear family system could bring the reduction of the fertility rate in the Kanyakumari District women.

Kapoor (2009) reported that female work participation rate, female literacy and the percentage of female labourers in agricultural work seem to have the strongest affect in infant mortality rate in India. Improving the quality of female capitals does seem to have a significant and positive affect on reducing the infant mortality rate. The increase in percentage of male workers outside of agriculture has indirectly reduced infant mortality rates.

A case study among the Setti Balija community of Andhra Pradesh on the influence of bio-social factors on fertility and mortality was conducted by Reddy and Sudha (2010). They reported that, all fertility components are higher for non-consanguineous couples compared to the consanguineous couples. However, reverse trend is observed for mortality measures. They also reported that, low income group shows high fertility and mortality than middle and high income groups.

A study on the determinants of infant and child mortality in periurban areas of Kolkata city in India was conducted by Ghosh and Bharati (2010). They reported that

higher infant mortality rate was noted in the older and younger Munda women, in contrast to lower infant mortality rate in younger Pod women. Child mortality rate was also lower in younger women in both the ethnic groups. The study further reported that stagnation in infant mortality rate in younger Munda women indicates poor delivery practices whereas lower rate among the Pod reflects better adoption of safe delivery practices.

Das and Das, in 1985 conducted a study on child mortality among rural Assamese. They found that the infant mortality rate among the rural Assamese of the Brahmaputra Valley of Assam was low in comparison to the Hindu and Muslim.

Koko (1987) reported that the risk of death among infants and children occurs due to lack of medical facilities to deal with infections, inadequate food and lack of elementary hygiene.

A study on family type, fertility and mortality among the Ahoms of Assam by Sengupta and Chakravarty in 1995 shows that nuclear family had a higher total fertility rate as well as foetal wastages compared to the joint family among the Ahoms of Upper Assam.

Khongsdier (1995) in his study on the prenatal and postnatal mortality among the War Khasi of Meghalaya reported that the infant and juvenile mortality rates were quite moderate, as compared to other populations in the Northeast India. He also stated that

religion seemed to have played its role in regulating the prenatal and postnatal mortality rates among the War Khasi of Maghalaya.

Adak (1996) in his study on infant and early childhood mortality among the Khasis of Shillong reported that infant mortality rate is high to the mothers who married between 13 to 17 years of age, illiterate mothers, mothers belonging to family having 10 or more members and the mothers who were attended during delivery by neighbours or relatives. Adak further estimated infant and early childhood mortality among the Khasi and found that greater percentage of infant or early childhood mortality among the mothers with no lactation, mothers without immunization and medical check-up before delivery and mothers who used unboiled drinking water at household level.

The findings of the National Family Health Survey (NFHS - 2) (IIPS, 2000) have reported that education of the mothers are inversely related to fertility and mortality rates in some of the Northeastern states like Mizoram, Arunachal Pradesh and Tripura, though it is not clearly perceptible in the states of Meghalaya and Nagaland.

Khongsdier (2002) on his study of fertility and mortality differentials among the War Khasi of Meghalaya concluded that the mean number of live births decreases significantly with the increasing level of maternal education in both Christians and non-Christians.

Das and Majumder (2003) reported that diarrhoea is to be the killer disease among the Bihari Harijan children of Guwahati, Assam. Poor environmental sanitation, lack of

sense of personal hygiene, lack of seriousness of the mothers towards child care may be attributed as the cause of diarrhoea among the children.

Murrey et al, (2005), reported the decrease of mortality with proper vaccination and better income level among the Lotha Nagas of Nagaland.

Singh (2006) conducted a study on ethnic variation in fertility patterns among four communities of Manipur. The findings show conformity with the views of inverse relationship between fertility and educational level as the number of live birth decreases with the increase in the literacy rate of the mothers. Illiterate mothers have highest average number of live births. The study further shows that women engaged in manual labour work give birth to higher number of children however, among the labours, those engaged in agriculture give birth to highest number of live birth.

Ladusingh and Singh (2006) examined the relevance of socio-cultural and environmental factors in explaining child mortality in Northeast India. They provided evidence that lack of hygiene in the household and poor women's engagement in physically demanding agriculture based work contributes to higher risk of child mortality. Community education is also found as the dominant factor outside the household to have a significant effect on child mortality.

Khiloni (2009) reported that age at menarche, education and economic status has an impact on fertility among the Anal women of Lambung village in Chandel district of Manipur.

Dey and Goswami (2009) conducted a study on fertility patterns and its correlates in Northeast India. They reported that mother's education and age at marriage had a significant effect on reducing fertility. The study also indicates that even without the use of family planning method, increasing level of education, age at marriage and providing opportunities for women to work outside the home can go a long way in reducing fertility.

CHAPTER - III

MATERIALS AND METHODS

In this chapter, we shall discuss about the materials collected and methods that have been applied for the present study. Fieldwork for the present study was conducted among the Khongsai Kukis in Saikul sub-division and Imphal town of Manipur.

Selection of sample localities: For the purpose of data collection, a total of seven villages namely, Songlei Mongbung, Maoyang, Ng. Phainom, Lhungjang, New Boljang, Old Boljang and Twichamphai in Saikul sub-division; and four localities namely Khongsai Veng, K.C.C. Campus, Langol and National Game village in Imphal town were selected. Saikul sub-division will represent the rural area whereas Imphal town will represent the urban area.

Collection of Data: Data for the present study were collected from 127 married women in Imphal town and 335 married women in Saikul sub-division, who are aged between 15 and 49 years by adopting deliberate sampling method where sample selection was done based on the ease of access. However, a complete enumeration of the households was made for demographic information from the two study areas. Data collection was carried out in three phases. The first phase of field work was carried out between August and October 2007 in all the selected localities of Imphal town. In the second phase, data were collected from three out of the seven villages in Saikul sub-division, namely Songlei Mongbung, Twichamphai and Lhungjang between September and November, 2008. The third and final phase of data collection was carried out at the remaining four villages, namely, Maoyang, Ng. Phainom, New Boljang and Old Boljang between January and March 2009.

Nature of data

Demographic data: The demographic data were collected through interview schedule for household census and other demographic parameters like fertility and mortality of children from the mother or head of the family. The nature of demographic data collected for the present study was based on those parameters as suggested by World Health Organisation (1967) and Mahadevan (1986). These are:

a) *Individual household records* like name of informant, date and place at which record is taken, clan, tribe, religion, total number of family members, age, sex, marital status, birth order, place of birth, place of residence, occupation, education, income and expenditure of household, etc.

b) *Fertility records* which include pregnancy history of each married women, present age of the mother, age at marriage, age at each conception, total number of live births, birth order, name, age, sex and marital status of each offspring.

c) *Mortality records* like numbers of dead children, sex, date of birth, age at death, causes of death, number of reproductive wastage (spontaneous or induced abortion and still births) etc.

d) *Social proximates:* These include occupation, education, monthly income of the household, monthly expenditure of the household, age at marriage and religion.

Such data were collected by interviewing the ever-married women aged 15- 49 years from the sample with the help of interview schedule.

Data on biological determinants: Data on all possible biological determinants have been collected from the study population. These include age of the mother, age at marriage of the mother, order and interval between births, causes of death, ABO and Rh blood group compatibility, etc.

(a) Age of the mothers: For the present study, current age of the mothers was classified into four age groups: (i) $\leq$ 25 years, (ii) 26-35 years, (iii) 36-45 years and $\geq$ 46 year. We have taken 25 years as a generation length for both the study areas as suggested by Glass (1956).

(b) Age at marriage of the mothers: Age at first marriage has a profound impact on childbearing because women who marry early have on average a longer period of exposure to pregnancy and a greater number of lifetime births. Information on age at first marriage was obtained by asking respondents the month and year, or age at when they started living with their first partner (NHFS-2) (IIPS, 2000).

(c) Serology: Blood samples were collected from parents, following the standard techniques suggested by Lawler and Lawler (1951) and Mourant (1954). Blood samples were obtained by pricking the fourth finger of the left hand of each subject with the help of sterilized disposable needle. Before pricking, the finger was cleaned with absolute alcohol and dried. Anti-A, anti-B and anti-D sera were used to identify the ABO blood group and Rh-factor.

(d) ABO Blood Groups: One drop of anti-A sera and the same amount of anti-B sera were first taken on a micro slide. Then an equal volume of suspended red cells were added to each of the anti-A and anti-B sera, and mixed thoroughly by stirring with a glass rod. Agglutination of blood cells was carefully observed. If there was reaction with both anti-A and anti-B sera, the blood type was considered as AB blood group. If the agglutination occurs only with anti-A, then it was blood type A, and similarly, if it reacts with anti-B, it was considered as blood type B. If there were no reaction in both anti-A and anti-B sera, then it was O type blood group.

(e) Rh (D) blood groups: For Rh blood grouping, one drop of anti-D sera was taken in a clean micro slide and an equal amount of red cells was added to it. It was then thoroughly mixed by stirring with a glass rod. After incubating for a minute, the result was noted. Then the blood samples were typed as Rh negative (Rh-) and Rh positive (Rh+) with the absence and agglutination respectively.

(f) Birth order: This for the present study was divided into- 1^{st}, 2^{nd}, 3^{rd}, 4^{th}, 5^{th} and 6^{th}+ birth orders.

(g) Birth interval: Data on each birth interval was collected from the mothers and then recorded in terms of months.

(h) Causes of death: For the present study, data on causes of death were classified into (i) cold and/or respiratory disorders, (ii) intestinal disorders (include

diarrhoea and typhoid), (iii) immunizable diseases, (iv) unknown/accident and (v) other health problems (malaria, fever, BP stroke, cancer, and congenital diseases).

Data on socio-economic determinants: Information relating to social determinants of fertility and child mortality like family size, family types, education, household income, occupation of parents, child care, sanitation, household characteristics, etc. were collected as suggested by Mahadevan (1986).

(a) Family size: The size of the family affects fertility and mortality in different ways. For the present study the family size was classified into three categories. The individuals who lived in a household with less than 5 family members were considered as **Small Family Size**. The household which has 5-6 family members and more than 6 family members were considered to be **Average/Middle and Large Family Size** respectively.

(b) Types of family: Questions on types of family include nuclear and joint types of family.

(c) Education: Education plays an important role in influencing fertility and child mortality. In countries where the percentage of literates is high, rate of fertility and child mortality is low. Data on educational attainment of individuals in the present study were arbitrarily classified as: (i) **Illiterate** (those individuals who could not read and write), (ii) **Primary** Level of Education (those individuals who attain their education upto class VIII), (iii) **Secondary** Level of Education

(those individuals who studied upto classes IX – X) and (iv) **Higher Secondary and above** Level of Education (those individuals who attain their education from XI standard and above).

(d) Occupation: Data regarding occupation of the parents in the present study include housewife (in case of mothers), services, cultivators and others (business, carpentry, etc.).

(e) Income: Data on household income were collected from the informants and were cross-checked taking into consideration some aspects of socio-economic conditions such as condition of the house, types of occupation, amount of land owned, monthly expenditure, etc. Data on monthly household income of the family were classified into three quartiles (Q_1= First Quartile, Q_2= Second Quartile and Q_3= Third Quartile) with the help of Microsoft Office Excel, 2007 as follows:

Above 75^{th} percentile (> Rs. 10200) = High Income Group

50^{th} to 75^{th} percentile (Rs. 7000 to 10200)= Middle Income Group

Below 50^{th} percentile (< Rs. 7000) = Low Income Group

(f) Consanguinity: Each of the marriages was specially investigated with the view to find out the degree of consanguinity between couples before their marriage. These include marriages between uncle-niece/first cousins/second cousins, etc.

(g) Types of house: These include questions on whether the house is *kaccha/ pucca/semi-pucca*/double storied.

(h) *Types of toilet*: Questions on types of toilet include: no toilet, septic tank, drainage, public toilet and own pit.

(i) *Types of cooking*: These include smoke emitting *chullah*, stoves, smokeless *chullah*, L.P.G., firewood and charcoal.

(j) *Source of drinking water*: Questions on source of drinking water include unprotected well, protected well, hand pump, pond reservoir, streams, rivers, PHE pipe water and village pipe water.

Data on Family Planning Method: Information regarding knowledge and use of contraceptive methods were collected from married women (aged 15 to 49 years) with the help of interview schedule based on those included in the NFHS-2 (IIPS, 2000). The questions on family planning method consist of the followings:

(a) *Awareness of Family Planning Method*: This includes questions which are related to knowledge of contraceptives or family planning methods.

(b) *Source of Family Planning Method*: This includes questions about the source of family planning method. The sources are categorized as doctor (private and government), ANM, newspapers, magazines, family and friends, etc.

(c) *Attitude towards Family Planning*: This includes questions regarding positive and negative attitudes towards family planning methods. Mothers were asked whether they accepted or opposed the family planning method.

(d) Adoption and Methods of Family Planning: These include questions related to adoption of family planning methods. The contraceptive methods consists of pill, intra-uterine device (IUD) such as copper T, condom, female sterilization, male sterilization, safe period, withdrawal, use of herbal medicine, etc.

Data on reproductive history: Data on reproductive history of the each mother were collected from the study population with the help of interview schedule which consist of the followings:

(a) *Age at menarche*: Information on age at menarche was collected from all the married women (aged 15-49 years) in order to find out whether it has an impact on fertility and child mortality.

(b) *Number of infant deaths:* This includes number of infant deaths below1 year of age.

(c) *Number of child deaths*: Information on number of child deaths have been collected from mothers whose child dies. Although child mortality rate is the number of child deaths between 1 and 4 years of age (WHO, 2008; NFHS-3), we had considered upto the age of 14 years, as this age group is generally considered as childhood stage.

(d) *Number of abortions*: These include questions regarding the number of abortions including date, month and year of the abortion. For the present study, abortion has been divided into two types i.e., spontaneous or induced abortion and still births.

Data on antenatal and post-natal care: Information was collected from each woman on specific problems during their pregnancies and whether they received any antenatal check-ups. Women who received antenatal check-ups were asked about the check-up timings (in months) of their first to last pregnancies and total number of check-up during pregnancy. The respondents were also asked whether they received tetanus injection, iron/folic acid tablets during their visits to antenatal care centres. The availability and non-availability of heath centres/medicine facilities/clinic were also recorded from the respondents. Some of the most important data on antenatal and post-natal child care are classified as follows:

(a) Number of visits: This includes questions about attending and number of antenatal check-up.

(b) Stage of pregnancy at first abdominal check up: These include questions about the stage of pregnancy at first ANC visit and whether women received iron/folic acid tablet and tetanus injections. The stage of pregnancy was divided into 3 stages, i.e., **first trimester** (the first three months of pregnancy), **second trimester** i.e., (the second three months of pregnancy) and **third trimester** (the last three months of pregnancy).

(c) Place of delivery: This includes questions regarding the place of delivery– hospital, clinic and home.

(d) Reasons for no antenatal check up: This question is for those women who did not go for antenatal check-up during pregnancy. The reasons are: lack of

knowledge, no visit of ANM, financial burden, socio-cultural barriers, far distance of hospital/clinic, did not feel necessary, not permitted by husband, etc.

(e) Antenatal disease: This includes questions regarding any health problems faced by each woman during pregnancy like swelling of hands and feet, paleness, weakness, tiredness, dizziness, visual disturbance, bleeding, convulsions, no movement of foetus, vomiting, fever, headache, etc.

(f) Post-natal disease: This included information regarding health problems that occur to mothers during the first week from delivery. They are fever, headache, excess bleeding, dizziness, severe jaundice, low abdominal pain, vomiting, etc.

Besides, information regarding any additional diet taken during and after pregnancy was also collected from each woman who had pregnancy records in the past years in order to find out whether they have any relationship with fertility and child mortality in the study population.

Data on immunization and child care: Data on several areas of importance to child health, vaccination status of children and treatment of childhood illness were collected from mothers having child born in the last 5 years from the date of interview. Mothers were asked whether colostrums were fed to their children and also the availability of the vaccination/immunization card. If a card was available, the dates when the child received vaccinations against each disease was noted down. If the mother could not show a vaccination card, she was asked whether the child had received any vaccinations. For the

present study we selected four types of vaccinations viz, polio, Bacillus Calmette Guerin (BCG), whooping cough and measles. Information on immunization coverage is important for monitoring and evaluation of the Expanded Programme on Immunization (EPI). In short, an attempt was made to follow as far as possible to those guidelines given by the NFHS-2 (IIPS, 2000).

Data on child morbidity: The health status of a population is reflected in the levels of morbidity and the treatment behaviours of its members. Data on morbidity was based on "self-reported illness experience" of a subject as generally adopted in surveys, which did not involve clinician (Strickland and Ulijaszek, 1993; Garcia and Kennedy, 1994; Strickland and Tuffrey, 1997). The term "morbidity" in the present study was defined simply in terms of the number of illness in the last 28 days time before field work. Morbidity of the children upto 14 years of age was recorded as has been reported by their parents. Any child reported to be at least two days ill was classified as being "ill". Data on child morbidity for the present study was classified as follows:

(a) *Cold and/or respiratory disorders*: These included cough + runny nose + headache, cough + runny nose headache fever, fever cough, cough alone, swollen glands cold, ear problem, breathing problem, chest pain sore throat, tuberculosis. The prevalence of acute respiratory infection was estimated by asking mothers whether their children upto 14 years of age had been ill with a cough accompanied by short, rapid breathing which was chest related in the past 28 days preceding the survey.

(b) Intestinal disorders: These included diarrhea, dysentery, worms and vomiting, fever, bleeding from stool, stomach pain and heart pain.

(c) Diarrhea/dysentery: Diarrhea is one of the single most common causes of death among children under the age of five years worldwide, following acute respiratory infection (NHFS-3) (IIPS, 2007). Deaths from acute diarrhea are most often caused by dehydration due to loss of water and electrolytes.

(d) Malaria: Malaria contributes to high levels of malnutrition and mortality. It is also a major contributory cause of death in infancy and childhood in many developing countries.

(e) Tuberculosis: Tuberculosis is contagious and spreads through droplets that can travel through the air when a person with the infection coughs, talks, or sneezes.

(f) Fever: Fever is a major manifestation of malaria and other acute infections in children. Like malaria, fever also contributes to high levels of malnutrition and mortality.

(g) Others: These included sores/boils, fever alone, chicken pox, typhoid, scabies, jaundice, body pain, headache alone, malnutrition, weakness and other symptoms.

Data on statistical analysis: The required statistical analysis have been applied for the presentation of data mentioned above, keeping in view the objectives of the present study. Special attention has also been given to find out the various bio-social determinants that are associated with fertility and child mortality. All data were managed and analyzed using SPSS (PC Software), version 16 in which the level of significance was set at 5%. Some of the data were also calculated manually. The analysis was first carried out to present the basic demographic structure of the Khongsai Kuki population of Saikul sub-division and Imphal town of Manipur in terms of age, sex and marital status, which were based on household census data. The sex ratios for different age groups were calculated with the ideal sex ratio of 1:1. The t-test (2-tailed) was used to determine the statistical significance of the differences between two means like age at menarche, age at marriage, age at first child birth, etc. The differences between proportions were tested, using chi-square (χ^2) test. One way analysis of variance (ANOVA) was used to test the differences between more than two means by assuming such means as independent.

Coefficient of correlation (r) was tested to find out an association between two continuous variables. The relationship between two variables may be positive or negative or scattered. When one variable increases, the other tends to increase (e.g. the child mortality rate increase as the age of mothers increases) – this is positive correlation. But there are relationships that are negatively correlated – as when one variable decreases, the other tends to increase (e.g. the child mortality rate decreases as the maternal educational level increases). Again, there are variables in which there exists no relationship. The value of correlation coefficient ranges from +1 to –1. The value of 'r' when closer to +1

indicates highly positive correlation; a value of 'r' closer to –1 indicates a highly negative correlation and when the value of 'r' = 0, then it indicates no association between the two variables.

Multiple regression analysis was done to estimate the coefficients of the linear equation, involving one or more independent variables that best predict the value of the dependent variables. For example, we may predict a number of live births (the dependent variable) from independent variables such as age, educational level, income level, etc. However, in the present study, we are interested in testing whether the coefficient regression (B) is significant or insignificant after taking into consideration more than one independent variables.

CHAPTER - IV

DEMOGRAPHY

In this chapter we shall describe the demographic structure of the Khongsai Kukis in Saikul sub-division and Imphal town of Manipur. Saikul sub-division represents the rural area whereas Imphal town represents the urban area.

Age and sex structure

Table 4.1 shows distribution of total population by age and sex of the Khongsai Kukis in Saikul sub-division and Imphal town. The total Khongsai Kuki population in the seven villages of Saikul sub-division is 1918, of which 974 (i.e., 50.78%) are males and 944 (i.e., 49.21) are females, whereas the total population in the four localities of Imphal town is 666, of which 353 (i.e., 53.00) are males and 313 (i.e., 46.99%) are females. The overall sex ratio, i.e., the number of males per 100 females is higher than the ideal sex ratio of 1:1 in both Saikul sub-division (103.17) and Imphal town (112.77) indicating that the number of males in both the areas is slightly more than that of their female counterparts, although it is more or less according to the ideal sex ratio in Saikul sub-division. However, the overall sex difference is not statistically significant in both the study areas (Saikul: $\chi^2 = 0.31$, d.f. = 1, $p > 0.051$; Imphal: $\chi^2 = 0.60$, d.f. = 1, $p > 0.05$).

It is seen in Saikul sub-division that 21.95% of males and 22.73% of females belong to the pre-reproductive age group i.e., 0-14 years. In the reproductive age group i.e., 15-49 years, 23.72% are males and 23.82% are females, whereas in the post-reproductive age group, i.e., $\geq$ 50 years, 5.11% and 2.65% are males and females respectively. In Imphal town, there are 20.72% of males and 17.72% of females in the pre-reproductive age group, i.e., 0-14 years. In the reproductive age group, i.e., 15-49

Table 4.1. Distribution of population by age and sex of the Khongsai Kuki

Age groups (in years)	SAIKUL			IMPHAL		
	Male	Female	Total	Male	Female	Total
0-4	172	174	346	47	46	93
5-9	135	164	299	46	38	84
10-14	114	98	212	45	34	79
Total 0-14 (%)	421 (21.95)	436 (22.73)	857 (44.68)	138 (20.72)	118 (17.72)	256 (38.44)
Sex ratio	96.55 males per 100 females ($\chi^2 = 0.65$, d.f. = 1, $p > 0.05$)			116.94 males per 100 females ($\chi^2 = 1.04$, d.f. = 1, $p > 0.05$)		
15-19	86	80	166	42	30	72
20-24	70	91	161	30	24	54
25-29	83	86	169	18	33	51
30-34	75	60	135	29	29	58
35-39	56	52	108	28	21	49
40-44	42	33	75	15	20	35
45-49	43	55	98	21	26	47
Total 15-49 (%)	455 (23.72)	457 (23.83)	912 (47.55)	183 (27.48)	183 (27.48)	366 (54.95)
Sex ratio	99.56 males per 100 females ($\chi^2 = 0.19$, .d.f = 1, $p > 0.05$)			100 males per 100 females		
50-54	45	25	70	18	6	24
55-59	27	4	31	8	2	10
60-64	9	6	15	1	2	3
65-69	3	3	6	2	0	2
≥ 70	14	13	27	3	2	5
Total ≥ 50	98 (5.12)	51 (2.66)	149 (7.77)	32 (4.80)	12 (1.80)	44 (6.61)
Sex ratio	192.15 males per 100 females ($\chi^2 = 12.45$, d.f. = 1, $p < 0.005$)			266.66 males per 100 females ($\chi^2 = 6.46$, d.f. = 1, $p < 0.025$)		
Grand total (%)	974 (50.78)	944 (49.22)	1918 (100)	353 (53.00)	313 (46.99)	666 (100)
Overall sex ratio	103.17 males per 100 females ($\chi^2 = 0.31$, d.f. = 1, $p > 0.05$)			112.77 males per 100 females ($\chi^2 = 1.60$, d.f. = 1, $p > 0.05$)		

years, there are 27.48% each of males and females, whereas in the post-reproductive age group, i.e., ≥ 50 years, 4.81% and 1.80% are males and females respectively.

In Saikul sub-division, 44.68%, 47.54% and 7.76% of all individuals belong to the pre-reproductive age group, reproductive age group and post reproductive age group respectively, whereas in Imphal town, 38.44%, 54.95% and 6.61% of all individuals belong to the pre-reproductive age group, reproductive age group and post-reproductive age group respectively. According to Sundbarg's classification of population, based on age-group distributions (Datta, 1972), the Khongsai Kukis in both the study areas seem to be of *progressive type*.

In Saikul sub-division, the sex ratio in the pre-reproductive age group is slightly tilted in favour of females, i.e., 96.55, despite the absence of significant difference (χ^2 = 0.65, d.f. = 1, $p > 0.05$). But, the sex ratio in the reproductive age group is almost according to the ideal sex ratio of 1:1 (i.e., 99.56). In the post reproductive age group, the sex ratio is highly tilted in favour of males (192.15) and the difference is highly significant as well (χ^2 = 12.45, d.f. = 1, $p > 0.05$). It is further observed that, in Imphal town, the sex ratio in the pre-reproductive is 116.94 indicating that the number of male is higher than that of the females, although it is not statistically significant (χ^2 = 1.04, d.f. = 1, $p > 0.05$). But, the sex ratio in the reproductive age group is exactly according to the ideal sex ratio of 1:1. The sex ratio in the post reproductive age group (266.66) is significantly higher than the ideal sex ratio of 1:1 (χ^2 = 6.46, d.f. = 1, $p < 0.05$). The above table further shows that the average longevity of the present population in both the study areas is much more among males than their female counterparts.

Marital status

Table 4.2. Marital status of individuals by present age groups of the Khongsai Kuki

Marital status by age groups	SAIKUL		IMPHAL	
	Male	Female	Male	Female
≤ 24 years				
Unmarried	569 (94.99)	551 (98.75)	210 (95.02)	166 (95.40)
Married	8 (2.22)	56 (15.51)	0 (0.00)	6 (4.58)
DSW*	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
25-29 years				
Unmarried	24 (4.01)	6 (1.08)	10 (4.52)	6 (3.45)
Married	59 (16.34)	80 (22.16)	8 (6.15)	27 (20.61)
DSW*	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
30-34 years				
Unmarried	5 (0.83)	1 (0.18)	1 (0.45)	2 (1.15)
Married	70 (19.39)	58 (16.07)	28 (21.54)	27 (20.61)
DSW*	0 (0.00)	1 (4.00)	0 (0.00)	0 (0.00)
≥ 35 years				
Unmarried	1 (0.19)	0 (0.00)	0 (0.00)	0 (0.00)
Married	224 (62.01)	167 (46.26)	94 (72.31)	71 (54.28)
DSW*	14 (100)	24 (96.00)	2 (100)	8 (100)
Total	974	944	353	313
Unmarried	599 (31.23)	558 (29.10)	221 (33.18)	174 (26.13)
Married	361 (18.82)	361 (18.82)	130 (19.52)	131 (19.67)
DSW*	14 (0.73)	25 (1.30)	2 (0.30)	8 (1.20)

DSW* = Divorced, Widowed and Separated

- Figures in parentheses indicate percentage

Table 4.2 shows the marital status of individuals by present age groups of the Khongsai Kukis in Saikul sub-division and Imphal town. It is found that, of all individuals in Saikul

sub-division, 31.23%, 18.82% and 0.73% of males are unmarried, married and widowed/divorced respectively. These are 29.10%, 18.82% and 1.30% respectively in females. In Imphal town, 33.27%, 19.52% and 0.30% of males are unmarried, married and widowed/divorced respectively, whereas among females, these are 26.12%, 19.67% and 1.20% respectively. It is seen that no individual after the age of 34 years remains unmarried, except in the case of only one male (0.05%) in Saikul sub-division. It is also found that both males and females in Saikul sub-division married earlier than their Imphal town counterparts. The mean age at marriage is 24.95 ± 0.20 years for males and 20.26 ± 0.15 years for females in Saikul sub-division, whereas it is 26.60±0.58 years and 22.09±0.28 years respectively in Imphal town.

The above table further shows that, of all married males in Saikul sub-division, 2.22%, 16.34%19.39% and 62.01% belong to the age groups ≤ 24 years, 25-29 years, 30-34 years and ≥ 35 years respectively. In case of the females, these are 15.51%, 22.16%, 16.07% and 46.26% respectively. On the other hand, among all married males in Imphal town, 6.15%, 21.54% and 72.31% belong to the age groups 25-29 years, 30-34 years and ≥ 35 years respectively and not a single married male was found in the age group ≤ 24 years. In case of the females, 4.58%, 20.61%, 20.61% 54.28% belong to the age groups ≤ 24 years, 25-29 years, 30-34 years and ≥ 35 years respectively.

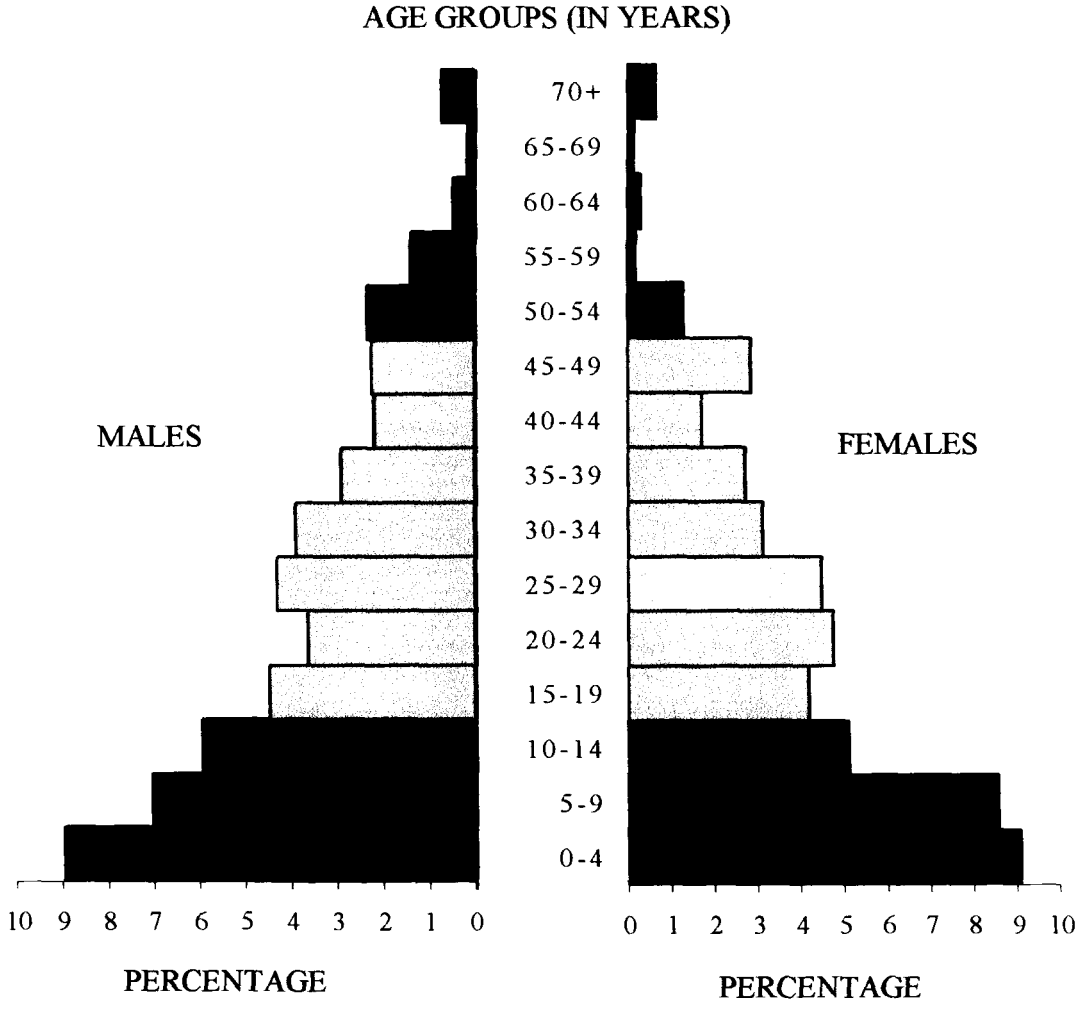


Fig. 1: Population pyramid of the Khongsai Kuki in Saikul sub-division

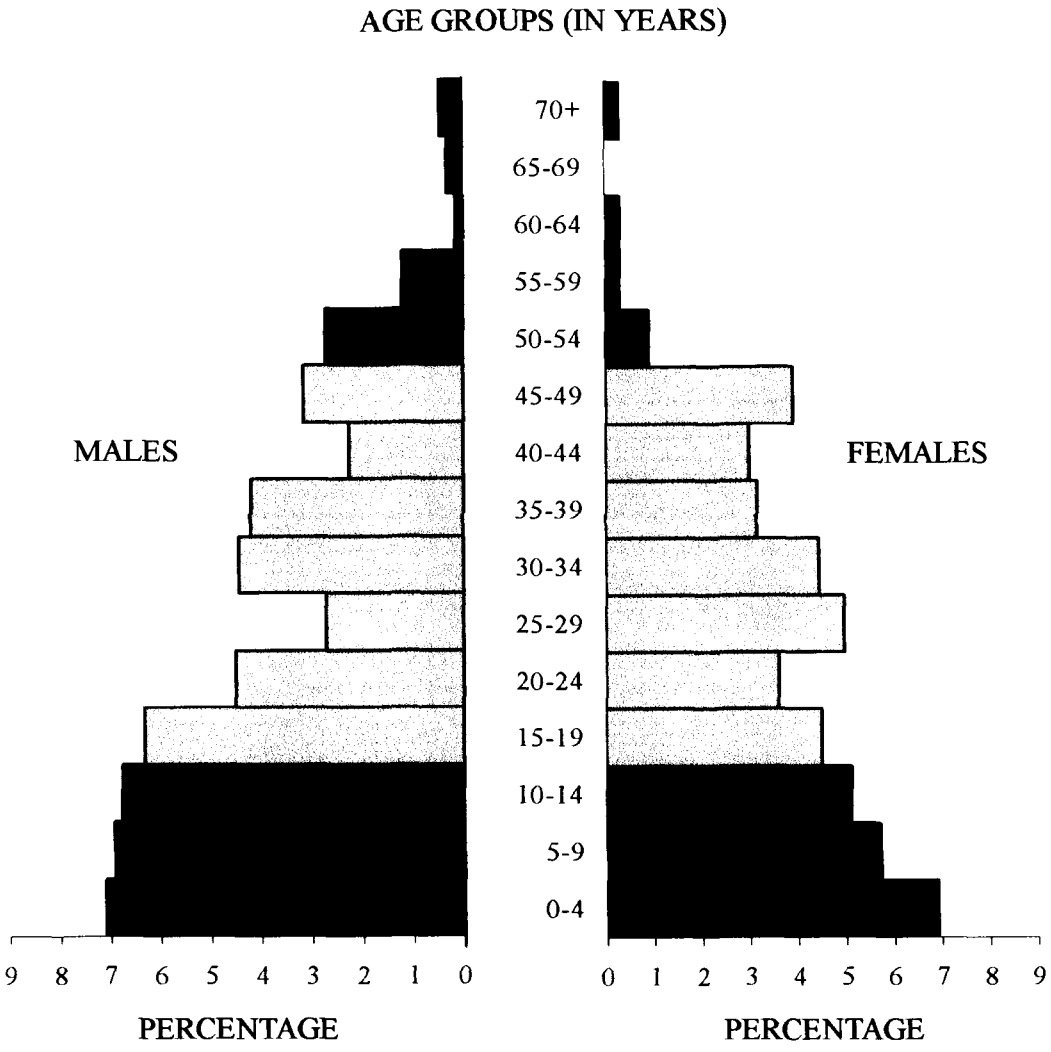


Fig. 2: Population pyramid of the Khongsai Kuki in Imphal town

Fig. 1 shows a diagrammatic distribution of the Khongsai Kuki population by age groups and sex in Saikul sub-division. The entire population has been classified into 15 age groups. It is seen that the base of the pyramid is broadest in the age group 0-4 years in both males and females which then becomes narrower at the higher age groups. So, the pyramid indicates that the present population in this is of *progressive type*.

Fig. 2 shows the diagrammatic distribution of the Khongsai Kuki population by age groups and sex in Imphal town. The entire population has been classified into 15 age groups. In general, the base of the pyramid is broader at the lower age groups and it becomes narrower as we move up to the higher age groups indicating that the present population in Imphal town is also of *progressive type*.

Mean age at menarche

Table 4.3. Mean age at menarche of the Khongsai Kuki married women

SAIKUL		IMPHAL		t-value
No. of married women	Mean ±SE	No. of married women	Mean ±SE	
335	14.53 ±0.21	127	13.94 ±0.08	2.64, P < 0.01

Table 4.3 shows that the mean age at menarche of the Khongsai Kuki women is 14.53 ± 0.21 years in Saikul sub-division and 13.94 ± 0.08 years in Imphal town indicating that the Khongsai Kuki women in Imphal town attain their menarcheal age much earlier than that of their Saikul counterparts. The difference between the two areas in respect of age at menarche is statistically significant ($t = 2.64$, $p < 0.01$).

Mean age at marriage

Table 4.4. Mean age at marriage of the Khongsai Kuki

Sex	SAIKUL		IMPHAL		t - value (2 tailed)
	Number	Mean ±SE	Number	Mean ±SE	
Male	335	25.19 ±0.22	127	26.85 ±0.31	4.37, $p < 0.001$
Female	335	20.36 ±0.17	127	22.24 ±0.30	6.26, $p < 0.001$

Table 4.4 shows the mean age at marriage of the Khongsai Kuki males and females. The mean age at marriage in Saikul sub-division is 25.19 ± 0.22 years for males and 20.36 ± 0.17 years for females, whereas it is 26.85 ± 0.31 years and 22.24 ± 0.30 years respectively in Imphal town. Marriages among the Khongsai Kuki take place earlier in females than in males in both the areas. The mean age at marriage is significantly greater in Imphal town than in Saikul sub-division among both males ($t = 4.37$, $p < 0.001$) and females ($t = 6.26$, $p < 0.001$). In other words, marriages among the Khongsai Kuki take place earlier in Saikul sub-division than in Imphal town.

Mean age at first child birth

Table 4.5. Mean age at first child birth of the Khongsai Kuki

Sex	SAIKUL		IMPHAL		TOTAL	t- value (2 tailed)
	Number	Mean ±SE	Number	Mean ±SE	Mean ±SE	
Male	313	26.29 ±0.23	123	28.21 ±0.32	24.51 ± 0.15	4.89, $p < 0.001$
Female	313	21.58 ±0.17	123	23.69 ±0.31		5.99, $p < 0.001$

Table 4.5 shows the mean age at first child birth of the Khongsai Kuki males and females. The mean age at first child birth is found to be 26.29 ± 0.23 years for males and

21.58 ± 0.17 years for males in Saikul sub-division, whereas it is 28.21 ± 0.32 years and 23.69 ± 0.31 years respectively in Imphal town. Comparing the two study areas, the mean age at first child birth for both males and females is significantly greater (Male: $t = 4.89$, $p < 0.001$; Female: $t = 5.99$, $p < 0.001$) in Imphal town. Pooling data for both males and females of the two study areas, the mean age at first marriage in the present population is found to be 24.51 ± 0.15 years.

Fertility and mortality

Table 4.6. Fertility rate of the Khongsai Kuki

Variables	SAIKUL	IMPHAL	Total
Total no. of mothers	335	127	462
Total no. of live births	1254	405	1659
Mean number of live births	3.74 ± 0.11	3.19 ± 0.13	3.59 ± 0.09

t - value between Saikul and Imphal difference is 0.93, $p > 0.05$

Table 4.6 shows the fertility rate of the Khongsai Kukis in Saikul sub-division and Imphal town. It is observed that the mean number of live births per mother is higher in Saikul sub-division (3.74 ± 0.11) than Imphal town (3.19 ± 0.13), although it is not significant. Pooling data for both the study areas, the mean number of live births in the population is found to be 3.59 ± 0.09.

Table 4.7 shows that the infant and child mortality rates of the Khongsai Kuki are found to be higher in Saikul sub-division compared to their Imphal counterparts. The infant mortality rate is 2.39% for Saikul and 0.99% for Imphal, whereas the child mortality rate is 3.51% and 2.72% respectively. Comparing the two study areas, the difference in the

infant mortality rate is statistically significant ($\chi^2 = 4.02$, d.f. =1, $p < 0.05$), although the child mortality rate is statistically not significant ($\chi^2 = 1.41$, d.f. =1, $p > 0.05$). Pooling the two study areas, the infant and child mortality rate in the present population is found to be 2.05% and 3.32% respectively.

Table 4.7. Infant and child mortality rates of the Khongsai Kuki

Variables	SAIKUL	IMPHAL	Total
Total no. of live births	1254	405	1659
No. of infant deaths (below 1 years)	30	4	34
No. of child deaths (1-14 years)*	44	11	55
Infant mortality rate (per 100 live births)	2.39	0.99	2.05
Child mortality rate (per 100 live births)	3.51	2.72	3.32

χ^2 difference for infant mortality between Saikul and Imphal is 4.02, d.f. = 1, $P < 0.05$
χ^2 difference for child mortality between Saikul and Imphal is 1.41, d.f. = 1, $P > 0.05$

Table 4.8. Completed fertility size of the Khongsai Kuki

No. of mothers aged ≥ 45 yrs	Total pregnancy	Live births			Average no. of live births per mother	Average no. of surviving offspring per mother
		Living	Dead	Total		
SAIKUL 50	317	264	25	289	5.78	5.28
IMPHAL 22	126	101	5	106	4.82	4.60

Table 4.8 shows the completed fertility size of the Khongsai Kuki. Only those women, who are aged 45 years and above and lived continuously in wedlock till attainment of 45 years of age, have been taken into consideration to find out the completed fertility size. There are 50 such mothers, who have had 317 pregnancies and 289 live births in Saikul sub-division; and 22 such mothers who have had 126 pregnancies and 106 live births in

Imphal town. The average number of live births per mother in Saikul sub-division (5.78) is found to be higher than in Imphal town (i.e. 4.82) indicating that the completed fertility size in the study population is moderate. The table further shows that, the average number of surviving offspring per such mother is also higher in Saikul sub-division (i.e. 5.28) than in Imphal town (i.e. 4.60).

Table 4.9. Child-women ratio (fertility ratio) of the Khongsai Kuki

Area	No. of children (0-4) years	No. of married women (15-49) years	Fertility ratio
SAIKUL	346	457	75.71
IMPHAL	93	183	50.82

Table 4.9 shows the child-women ratio of the Khongsai Kuki. It is another measure of fertility in which all children aged 0 to 4 years and all women aged 15 to 49 years, irrespective of their marital status, have been taken into consideration. It is found that there are 346 children in Saikul sub-division and 93 in Imphal town who are aged 0 to 4 years, whereas there are 457 women in Saikul sub-division and 183 in Imphal town who are aged 15 to 49 years, irrespective of their marital status. The child-women ratio (fertility ratio) in Saikul sub-division (i.e. 75.71) seems to be high though the same in Imphal town (i.e. 50.82) seems to be quite moderate.

Table 4.10. Ever pregnant and never pregnant married women of the Khongsai Kuki

	Age of married women				Total
	≤ 25 yrs	26-35 yrs	36-45 yrs	≥ 46 yrs	
SAIKUL					
Ever pregnant	72 (21.49)	127 (37.91)	78 (23.28)	46 (13.73)	323 (96.42)
Never pregnant	4 (1.19)	4 (1.19)	4 (1.19)	0 (0.00)	12 (3.58)
Never pregnant % of all	5.26	3.05	4.87	0.00	3.58
IMPHAL					
Ever pregnant	10 (7.87)	52 (40.94)	42 (33.07)	20 (15.74)	124 (97.64)
Never pregnant	1 (0.78)	1 (0.78)	1 (0.78)	0 (0.00)	3 (2.36)
Never pregnant % of all	9.09	1.88	2.32	000	2.36

- Figures in parentheses indicate percentage based on total no. of married women

Table 4.10 shows the frequency of ever-pregnant and never-pregnant women of the Khongsai Kuki. It is found that out of 335 married women in Saikul sub-division, 323 (i.e., 96.42%) have experienced pregnancy at least once, whereas there are 12 (i.e., 3.58%) women, who have never experienced any pregnancy. In Imphal town, out of 127 married women, 124 (i.e., 97.64%) have experienced pregnancy at least once, whereas there are only 3 (i.e., 2.36%) women, who have never experienced any pregnancy. It is further seen that, the frequency of ever pregnant women is highest in the age group of 26 - 35 years in both the study areas. The frequency of ever pregnant women in this age group is 40.31% and 40.94% respectively. The lowest frequency of ever pregnant women is seen in the age group ≥ 46 years (i.e., 13.73%) in Saikul sub-division and ≤ 25 years

(i.e., 7.87%) in Imphal town. It is also observed that there is not a single woman who is aged ≥ 46 years and has not experienced any pregnancy in both the study areas. So, most of the never-pregnant women are in the early and middle part of their reproductive life. The table further shows that, all the Khongsai Kuki married women in both the study areas have experienced pregnancy before attaining their post-reproductive life.

Table 4.11. Reproductive wastage by age of the Khongsai Kuki mothers

Age groups (in years)	Total no. of mothers	Total pregnancies*	Reproductive wastage		
			Abortion	Still birth	Total
SAIKUL					
≤ 25	64	139	10	0	10
%			(7.19)	(0.00)	(7.19)
26-35	127	517**	47	11	58
%			(9.09)	(2.13)	(11.22)
36-45	76	432	25	11	36
%			(5.79)	(2.55)	(8.33)
≥ 46	46	287	15	3	18
%			(5.23)	(1.05)	(6.27)
Total	313	1375	97	25	122
%			(7.05)	(1.82)	(8.87)
IMPHAL					
≤ 25	9	16	0	0	0
%			(0.00)	(0.00)	(0.00)
26-35	52	146**	14	1	15
%			(9.59)	(0.68)	(10.27)
36-45	42	177	11	1	12
%			(6.21)	(0.56)	(6.78)
≥ 46	20	102	10	0	10
%			(9.80)	(0.00)	(9.80)
Total	123	441	35	2	37
%			(7.94)	(0.45)	(8.39)

* Current pregnancies are not included.

** Includes one twin birth each in both the areas.

Table 4.11 shows the frequency of reproductive wastages by age of the Khongsai Kuki mothers. Out of the total 1375 pregnancies in Saikul sub-division, 7.05% have terminated into abortions and 1.82% into still births, whereas out of the total 441 pregnancies in Imphal town, 7.94% have terminated into abortions and 0.45% into still births. It is found that the frequency of reproductive wastages of all pregnancies, combining abortions and still births is almost similar in the two areas. It is 8.87% in Saikul sub-division and 8.39% in Imphal town. The table further shows the frequency of reproductive wastages by age group of mothers. In Saikul sub-division, the frequency of reproductive wastages is found to be highest in the age group 26 - 35 years (i.e., 11.22%) and lowest in the age group of $\geq$ 46 years (i.e., 6.27%). The reproductive wastages in the age group $\leq$ 25 years and 36-45 years are 7.19% and 8.33% respectively. The highest frequency of the reproductive wastages in Imphal town is also recorded in the age group 26 - 35 years (i.e., 10.27%) and none in the lowest age group i.e., $\leq$ 25 years. It is 6.78% and 9.80% in the age groups 36 – 45 years and $\geq$ 46 years. So far as the reproductive wastages is concerned, no consistent pattern is observed with age of the mothers.

Table 4.12. Surviving sib-ship size of the Khongsai Kuki married women

No. of married women	No. of surviving children (N = 1178 for Saikul and 389 for Imphal)											Average no. of surviving children per married women
	0	1	2	3	4	5	6	7	8	9	10	
SAIKUL												
335	23	29	56	56	66	57	29	11	5	1	2	3.51
%	6.86	8.65	16.71	16.71	19.70	17.01	8.65	3.28	1.49	0.29	0.59	
IMPHAL												
127	4	10	32	34	29	12	5	1	0	0	0	3.06
%	3.14	7.87	25.19	26.77	22.83	9.44	3.93	0.78	0.00	0.00	0.00	

Table 4.12 shows the surviving sib-ship size by number of the Khongsai Kuki married women. In Saikul sub-division, there are altogether 335 married women who have had 1178 surviving children, whereas in Imphal town, there are altogether 127 married women who have had 389 surviving children. The average number of surviving children per married women is slightly higher in Saikul sub-division (3.51) than that of the Imphal town (3.06).

It is further seen that, there are 23 women, i.e., 6.86% of all married women in Saikul sub-division and 4 women i.e., 3.14% of all married women in Imphal town having no surviving children. In Saikul sub-division, mothers having 4 numbers of surviving children are in majority, i.e., 66 mothers recording 19.70% of all married women, whereas in Imphal town, mothers having 3 surviving children are in majority, i.e., 34 mothers recording 26.77% of all married women.

Table 4.13. Age-specific marital fertility rate of the Khongsai Kuki married women

Age-class no.	Age group (in years)	SAIKUL			IMPHAL		
		No. of married women	No. of live births	Age-specific Fertility	No. of married women	No. of live births	Age-specific Fertility
3	15-19	335	85	0.2537	127	13	0.1023
2	20-24	332	468	1.4096	127	124	0.9763
3	25-29	279	402	1.4408	121	169	1.3966
4	30-34	199	214	1.0753	94	70	0.7446
5	35-39	140	70	0.5000	60	27	0.4500
6	40-44	88	15	0.1704	46	2	0.0434
7	45+	55	0	0.0000	26	0	0.00
Total Marital Fertility Rate			1254	4.8498		405	3.7132

Table 4.13 shows the age-specific marital fertility rate (ASMFR) of the Khongsai Kuki married women. It is found that, the ASMFR in both Saikul sub-division and Imphal town increases from the women, aged 15-19years, to the women, aged 25-29 years which then decreases as the age group advances. In Saikul sub-division, ASMFR in this period increases from 0.2537 to 1.4408, and thereafter decreases from 1.0753 in the age group 30-34 years to 0.1704 in the age group 40-44 years. Similarly, the ASMFR in Imphal town increases from 0.1023 in the age group 15-19 to 1.3966 in the age group 25-29 years, and thereafter, decreases from 0.7446 in the age group 30-34 to 0.434 in the age group 40-44 years. There is no live birth in the age group 45+ years among all married women in both the areas. The ASMFR reaches its highest peak in the age group 25-29 years in both the study areas. It is also observed that the ASMFR in Saikul sub-division exceed Imphal town in all the age groups. Therefore, the total marital fertility rate (TMFR) in this population is found to be higher in Saikul sub-division (i.e. 4.8498) than their Imphal town counterparts (i.e. 3.7132). Fig. 3 depicts the age-specific marital fertility rate of the Khongsai Kuki in Saikul sub-division and Imphal town.

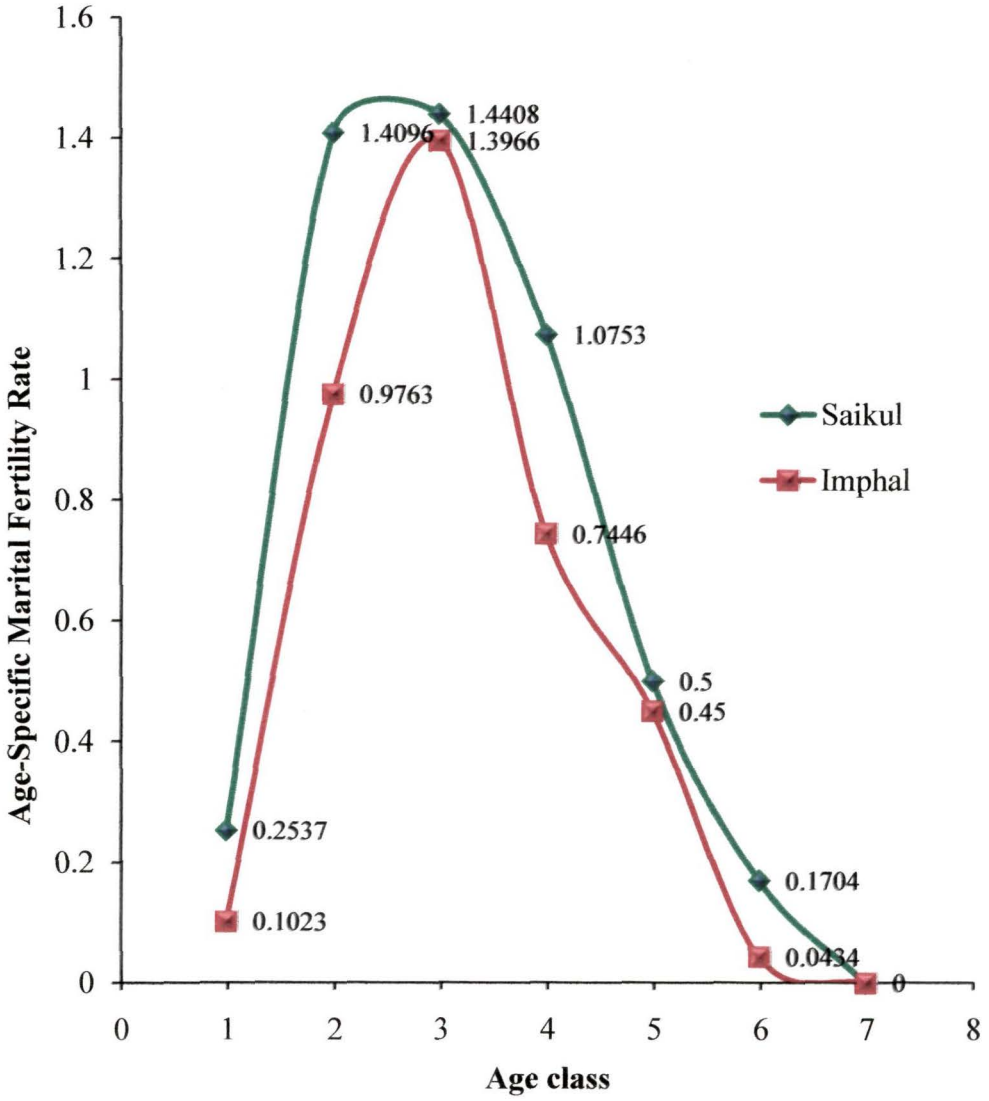


Fig. 3: **Age-Specific Marital Fertility Rate by age class of the Khongsai Kuki married women in Saikul sub-division and Imphal town** (age groups as in Table 4.13).

CHAPTER - V

DETERMINANTS OF FERTILITY AND CHILD MORTALITY

In this chapter, we shall describe the selected bio-social factors determining the fertility and, infant and child mortality among the Khongsai Kukis of Saikul sub-division and Imphal town in Manipur. It is widely accepted that fertility and mortality are influenced by a large number of biosocial factors such as age at menarche, maternal age, age at marriage, age at first child birth, type of marriage, type of family, education, religion, economic conditions, value of children, health condition and adoption of contraceptive devices and so on (Caldwell, 1979; Lee, 1979; Reddy et al, 2006 and others).

Biological determinants

Age group of mothers

Table 5.1. Fertility rate by age groups of the Khongsai Kuki mothers

Age groups (in years)	SAIKUL			IMPHAL		
	No. of mothers	Mean no. of live births	(±) SE	No. of mothers	Mean no. of live births	(±) SE
≤ 25 (%)	76 (22.69)	1.69	0.12	11 (8.66)	1.45	0.28
26-35 (%)	131 (39.10)	3.51	0.12	53 (41.73)	2.49	0.13
36-45 (%)	82 (22.68)	4.83	0.22	43 (33.85)	3.84	0.22
≥ 46 (%)	46 (13.73)	5.84	0.31	20 (15.75)	4.60	0.27
F - statistics	82.338, $p < 0.001$			28.746, $p < 0.001$		

Table 5.1 shows the fertility rate by present age groups of the Khongsai Kuki mothers. It shows that the highest number of mother in both Saikul sub-division (39.10%) and Imphal town (41.73%) belong to the age group 26 - 35 years. The mean number of live

births per mother increases with the increase of mothers' age groups. It varies from 1.69 ± 0.12 to 5.84 ± 0.31 among mothers who are in the age groups ≤ 25 years and ≥ 46 years respectively in Saikul sub-division, whereas the same is observed to vary from 1.45 ± 0.28 to 4.6 ± 0.27 respectively in Imphal town. The ANOVA test also shows that the differences between mean live births in respect of mother's age group are statistically significant (Saikul: $F = 82.338$, $p < 0.001$; Imphal: $F = 28.746$, $p < 0.001$) in both the study areas.

Table 5.1.1 Infant and child mortality rates by age group of the Khongsai Kuki mothers

Age group (in years)	No. of live births	Mortality rate (per 100 live births)		
		Below 1 year	1-14 years	Total
SAIKUL				
≤ 25	129	4	1	5
%		(3.10)	(0.78)	(3.88)
26-35	460	12	12	24
%		(2.61)	(2.61)	(5.22)
36-45	396	8	13	21
%		(2.02)	(3.29)	(5.30)
≥ 46	269	6	18	24
%		(2.23)	(6.69)	(8.92)
Coefficient of correlation (r)		0.07	0.31**	0.27**
IMPHAL				
≤ 25	16	0	0	0
%		(0.00)	(0.00)	(0.00)
26-35	132	1	1	2
%		(0.76)	(0.76)	(1.51)
36-45	165	3	7	10
%		(1.82)	(4.24)	(6.06)
≥ 46	92	0	3	3
%		(0.00)	(3.26)	(3.26)
Coefficient of correlation (r)		0.04	0.22*	0.21*

*$p < 0.05$, **$p < 0.01$

Table 5.1.1 shows the infant and child mortality rates by age group of the Khongsai Kuki mothers. The infant mortality rates in Saikul sub-division are 3.10%, 2.61%, 2.02% and 2.23% among mothers in the age groups ≤ 25, 26-35, 36-45 and ≥ 46 years respectively. The infant mortality rates in this area are inversely and positively correlated ($r = 0.07$, $p > 0.05$) to the age group of mothers excepting in the case of ≥ 46 years where it is slightly higher than the preceding age group. But, the child mortality rate is positively and significantly correlated ($r = 0.31$, $p < 0.01$) to mother's age groups as it varies between 0.78% and 6.69 among mothers in the age group ≤ 25 and ≥ 46 years respectively. In Imphal town, the infant mortality rates were recorded only among mothers who are in the age groups 26-35 years (0.76%) and 36-45 years (1.82%), though it is statistically insignificant ($r = 0.04$, $p > 0.05$). The child mortality rates in the same area are observed to be 0.76%, 4.24% and 3.26% among the mothers who are in the age groups of 26-35 years, 36-45 years and ≥ 46 years respectively. The coefficients of correlation (r) are statistically significant ($r = 0.22$, $p < 0.05$) as well. So, the above table furthers reveals that mother's age group is an important factor influencing the child mortality rate than the infant mortality rate in both the study areas.

Age at marriage of mothers

Table 5.2 shows the fertility rate by age at marriage of the Khongsai Kuki mothers. It is seen that the highest frequency of mothers in Saikul sub-division (46.27%) married at the age of ≤ 19 years, whereas majority of the mothers in Imphal town (50.39%) married at the age group 20 - 23 years. The mean number of live births is inversely related to

Table 5.2. Fertility rate by age at marriage of the Khongsai Kuki mothers

Age at marriage (in years)	SAIKUL			IMPHAL		
	No. of mothers	Mean no. of live births	(±) SE	No. of mothers	Mean no. of live births	(±) SE
≤ 19 (%)	155 (46.27)	4.14	0.17	25 (19.68)	3.44	0.28
20-23 (%)	137 (40.89)	3.50	0.18	64 (50.39)	3.31	0.19
≥ 24 (%)	43 (12.83)	3.07	0.27	38 (29.92)	2.82	0.23
F - statistics	3.967, $p < 0.05$			2.486, $p > 0.05$		

Table 5.2.1. Infant and child mortality rates by age at marriage of the Khongsai Kuki mothers

Age at marriage (in years)	No. of live births	Mortality rate (per 100 live births)		
		Below 1 year	1-14 years	Total
SAIKUL				
≤ 19 (%)	642	14 (2.18)	24 (3.74)	38 (5.92)
20-23 (%)	480	13 (2.71)	16 (3.33)	29 (6.04)
≥ 24 (%)	132	3 (2.27)	4 (3.03)	7 (5.30)
Coefficient of correlation (r)		- 0.01	- 0.07	- 0.06
IMPHAL				
≤ 19 (%)	86	0 (0.00)	1 (1.16)	1 (1.16)
20-23 (%)	212	4 (1.89)	8 (3.77)	12 (5.66)
≥ 24 (%)	107	0 (0.00)	2 (1.87)	2 (1.87)
Coefficient of correlation (r)		- 0.03	- 0.01	- 0.02

mother's age at marriage in both Saikul sub-division and Imphal town, although they are more or less similar in Imphal town among all age groups. It ranges between 3.07 ± 0.27

in the age group ≥ 24 years and 4.14 ± 0.17 in the age group ≤ 19 years in Saikul sub-division whereas it ranges between 2.82 ± 0.23 and 3.44 ± 0.28 respectively in Imphal town. The ANOVA test also reveals that the differences in live births among mother's age group at marriage are statistically significant in Saikul sub-division ($F = 3.967$, $p < 0.05$), although the same is not significant in Imphal town ($F = 2.486$, $p > 0.05$).

Table 5.2.1 shows the infant and child mortality rates by age at marriage of the Khongsai Kuki mothers. The table shows that infant mortality rates are by and large similar among all age groups in Saikul sub-division. These are 2.18%, 2.71% and 2.27% among the mothers who got married at ≤ 19 years, 20-23 years and ≥ 24 years respectively. In Imphal town, infant death had occurred only in the age group of 20-23 years i.e., 1.89%. There is a negative relationship between mother's age group at marriage and infant mortality rates, although they are not statistically significant (Saikul: $r = - 0.01$, $p > 0.05$; Imphal: $r = - 0.03$, $p > 0.05$) in both the study areas. The child mortality rate in Saikul sub-division is inversely related to mother's age at marriage. Here, it varies from 3.03% among mothers who married in the age group ≥ 24 years to 3.74% in the age group ≤ 19 years. In Imphal town, it is recorded to be 3.77%, 1.16% and 1.87% in the age groups 20-23 years, ≤ 19 years, and ≥ 24 years respectively. The coefficients of correlation (r) show that there is a negative relationship between mothers' age group at marriage and child mortality rates, although these relationship are not statistically significant (Saikul: $r = - 0.07$, $p > 0.05$; Imphal: $r = - 0.01$, $p > 0.05$).

Table 5.2.2. Regression of age at marriage of the Khongsai Kuki mothers on independent factors

Parameters	Coefficients of regression (B) and its Standard Error (SE)	t – value	p – level
	B ± SE		
Age at marriage			
Residence (Saikul/Imphal)	0.343 ± 0.094	3.648	Significant at 1%
Maternal education	0.178 ± 0.049	3.650	Significant at 1%
Paternal education	0.041 ± 0.052	0.781	Insignificant
Maternal occupation	- 0.012 ± 0.043	- 0.279	Insignificant
Paternal occupation	- 0.071 ± 0.075	- 0.943	Insignificant
Household income	- 0.077 ± 0.044	- 1.731	Insignificant
Constant	1.067 ± 0.140	7.631	Significant at 1%

Table 5.2.2 shows the regression of age at marriage of the Khongsai Kuki mothers on independent factors. It is seen that among the selected independent factors, only residence (rural/urban) and maternal education are independently associated with mother's age at marriage. The coefficients of regression (B) are 0.343 ± 0.094, $p < 0.01$ and 0.178 ± 0.049, $p < 0.01$ for residence and maternal education respectively. Thus, it indicates that urban setting and higher level of maternal education plays a significant role in increasing the age at marriage of mothers in the study population.

Compatible and Incompatible matings according to ABO blood groups

Table 5.3. Fertility rate by Compatible and Incompatible matings of the Khongsai Kuki

Matings	SAIKUL			IMPHAL		
	No. of mothers	Mean no. of live births	(±) SE	No. of mothers	Mean no. of live births	(±) SE
Compatible (%)	175 (54.51)	3.98	0.15	71 (53.35)	3.23	0.17
Incompatible (%)	146 (45.50)	3.57	0.18	55 (43.65)	3.20	0.21
F - statistics	3.112, $p > 0.05$			0.009, $p > 0.05$		

Table 5.3 shows the fertility rate by compatible and incompatible matings of the Khongsai Kuki in respect of ABO blood groups. Compatible matings is slightly higher than incompatible matings in both Saikul sub-division (54.51%) and Imphal town (53.35%). Accordingly, the mean number of live births is also slightly higher among the compatible types of mating than incompatible matings in both the study areas. It is 3.98 ± 0.15 among compatible and 3.57 ± 0.18 among incompatible matings in Saikul sub-division, whereas it is 3.23 ± 0.17 and 3.20 ± 0.21 respectively in Imphal town. The ANOVA test between the mean number of live births shows no significant differences in respect of mating types according to the ABO blood groups in both the study areas (Saikul: $F = 3.112$, $p > 0.05$; Imphal: 0.009, $p > 0.05$).

Table 5.3.1 shows the infant and child mortality rates by ABO blood group mating types of the Khongsai Kuki. The infant as well as the child mortality rates are found to be higher among incompatible matings than the compatible matings in both Saikul sub-division and Imphal town. The infant mortality rates among compatible and incompatible

types of matings are 1.29% and 4.03% respectively in Saikul sub-division; and 0.44% and 1.70% respectively in Imphal town. The coefficient of correlation shows a positive relationship between the infant mortality rate and mating types in both the study areas, although it not significant in Imphal town (Saikul: $r = 0.14$, $p < 0.05$; Imphal: $r = 0.11$, $p > 0.05$). The child mortality rates in Saikul sub-division are 2.29% and 5.37% among the compatible and incompatible matings respectively. In Imphal town, these are 1.31% and 4.55% respectively. The relationship between child mortality rate and mating types is positive and significant as well in both the areas (Saikul: $r = 0.14$, $p < 0.05$; Imphal: $r = 0.18$, $p < 0.05$. Pooling data for infant and child mortality rates, their relationship with mating types is more significant in Saikul sub-division ($r = 0.19$, $p < 0.01$) than in Imphal town ($r = 0.22$, $p < 0.05$).

Table 5.3.1. Infant and child mortality rates by compatible and incompatible matings of the Khongsai Kuki

Matings	No. of live births	Mortality rate (per 100 live births)		
		Below 1 year	1-14 years	Total
SAIKUL				
Compatible (%)	697	9 (1.29)	16 (2.29)	25 (3.59)
Incompatible (%)	521	21 (4.03)	28 (5.37)	49 (9.40)
Coefficient of correlation (r)		0.14*	0.14*	0.19**
IMPHAL				
Compatible (%)	229	1 (0.44)	3 (1.31)	4 (1.75)
Incompatible (%)	176	3 (1.70)	8 (4.55)	11 (6.25)
Coefficient of correlation (r)		0.11	0.18*	0.22*

*$p < 0.05$, **$p < 0.01$

Birth order

Table 5.4. Infant and child mortality rates by birth order of the Khongsai Kuki

Birth order	SAIKUL			IMPHAL		
	No. of live births	Mortality		No. of live births	Mortality	
		Below 1 year	1-14 years		Below 1 year	1-14 years
1	313	7 (2.24)	7 (2.24)	123	1 (0.82)	2 (1.63)
2	288	12 (4.17)	15 (5.21)	113	0 (0.00)	3 (2.65)
3	233	3 (1.29)	5 (2.15)	82	2 (2.44)	3 (3.66)
4	185	3 (1.62)	10 (5.41)	51	0 (0.00)	3 (5.88)
5	124	1 (0.81)	1 (0.81)	26	0 (0.00)	0 (0.00)
6+	111	4 (3.60)	6 (5.41)	10	1 (10.00)	0 (0.00)

- Figures in parenthesis indicate percentage

χ^2 for Saikul - Imphal difference in respect of infant mortality is 6.40, d.f. = 5, $p > 0.05$
χ^2 for Saikul - Imphal difference in respect of child mortality is 3.54, d.f. = 5, $p > 0.05$.

Table 5.4 shows the infant and child mortality rates by birth order of the Khongsai Kuki. It is seen that there is no consistent pattern in respect of infant and child mortality among all birth orders in both Saikul and Imphal. The infant mortality rate is 2.24%, 4.17%, 129%, 1.62%, 0.81% and 3.60% for the birth orders of 1st, 2nd, 3rd, 4th, 5th and 6+ respectively in Saikul. In Imphal, these are 2.44% and 10.00% for the birth orders of 3rd and 6+ respectively with no child death in the remaining birth orders. Comparing the two areas, the χ^2 value (infant mortality: $\chi^2 = 6.40$, d.f. = 5, $p > 0.05$; child mortality: $\chi^2 = 3.54$, d.f. = 5, $p > 0.05$) shows no significant differences.

Birth Intervals

Table 5.5. Fertility rate by mean birth intervals of the Khongsai Kuki mothers

Birth intervals (in months)	SAIKUL			IMPHAL		
	No. of mothers	Mean no. of live births	(±) SE	No. of mothers	Mean no. of live births	(±) SE
< 24 (%)	85 (29.72)	4.50	0.24	42 (37.17)	3.71	0.21
24 – 35 (%)	154 (53.84)	4.34	0.12	52 (46.02)	3.46	0.16
> 35 (%)	47 (16.43)	3.72	0.22	19 (16.81)	3.11	0.31
F - statistics	3.12, $p < 0.05$			1.46, $p > 0.05$		

Table 5.5 shows the fertility rate by mean birth intervals of the Khongsai Kuki mothers. It shows that the highest frequency of mothers have 24-35 months of the mean pregnancy interval in both Saikul sub-division (53.84%) and Imphal town (46.02%). The mean number of live births per mother decreases with the increase of mean birth intervals in both Saikul sub-division and Imphal town. In Saikul sub-division, the mean number of live births increases from 3.72 ± 0.22 in the intervals of > 35 months to 4.50 ± 0.24 in the intervals of < 24 months. The same in Imphal town varies from 3.11 ± 0.31 to 3.71 ± 0.21 respectively. The differences between live births in respect of mean birth intervals are statistically significant in Saikul sub-division ($F = 3.12$, $p < 0.05$), although it is not significant in Imphal town ($F = 1.46$, $p > 0.05$). So, the mean interval between births is more important in influencing the fertility rate in Saikul sub-division compared to Imphal town.

Table 5.5.1 Infant and child mortality rates by mean birth intervals of the Khongsai Kuki mothers

Birth intervals (in months)	No. of live births	Mortality rate (per 100 live births)		
		Below 1 year	1-14 years	Total
SAIKUL				
< 24	382	15	14	29
(%)		(3.93)	(3.66)	(7.59)
24 – 35	668	12	23	35
(%)		(1.79)	(3.44)	(5.24)
> 35	175	1	7	8
(%)		(0.57)	(4.00)	(4.57)
Coefficient of correlation (r)		- 0.16**	- 0.02	- 0.12*
IMPHAL				
< 24	156	4	4	8
(%)		(2.56)	(2.56)	(5.13)
24 – 35	180	0	6	6
(%)		(0.00)	(3.33)	(3.33)
> 35	59	0	1	1
(%)		(0.00)	(1.69)	(1.69)
Coefficient of correlation (r)		- 0.21*	0.06	- 0.01

*$p < 0.05$, **$p < 0.01$

Table 5.5.1 shows the infant and child mortality rates by mean birth intervals of the Khongsai Kuki mothers. There is a negative relationship between infant mortality rate and the mean birth intervals in both the study areas (Saikul: $r = - 0.16$, $p < 0.01$; Imphal: $r = - 0.21$, $p < 0.05$). In Saikul sub-division, it increases from 0.57% in the intervals of > 35 months to 3.93% in the interval of < 24 months whereas in Imphal town, infant death is recorded only in the intervals of < 24 months (2.56%). The relationship between child mortality rate and mean birth intervals is not significant in both the study areas. Pooling data for infant and child mortality rates, there is a negative relationship between them and

the mean birth intervals, despite the absence of statistical significance in Imphal town (Saikul: $r = -0.12$, $p < 0.05$; Imphal: $r = -0.01$, $p > 0.05$). So, the above table reveals that the mean birth intervals play a significant role in reducing the mortality rate in Saikul sub-division.

Table 5.5.2. Regression of mean birth intervals of the Khongsai Kuki mothers on independent factors

Parameters	Coefficients of regression (B) and its Standard Error (SE) B ± SE	t – value	p – level
Birth intervals			
Residence (Saikul/Imphal)	- 0.083 ± 0.106	- 0.785	Insignificant
Maternal education	0.017 ± 0.055	0.304	Insignificant
Paternal education	- 0.091 ± 0.057	- 1.618	Insignificant
Maternal occupation	0.008 ± 0.046	0.164	Insignificant
Paternal occupation	- 0.053 ± 0.083	- 0.633	Insignificant
Household income	0.156 ± 0.052	2.994	Significant at 1%
Size of family	- 0.109 ± 0.052	- 2.110	Significant at 5%
Constant	2.196 ± 0.192	11.416	Significant at 1%

Table 5.5.2 shows the regression of average birth intervals of the Khongsai Kuki mothers on independent factors. It is seen that the average birth intervals is significantly dependent only on household income and family size. The coefficients of correlation (B) is positively associated with household income ($B = 0.156 \pm 0.052$, $p < 0.01$) and negatively associated with family size ($B = - 0.109 \pm 0.052$, $p < 0.05$). In other words, the

mean birth interval is likely to increase as the household income increases and it is likely to decrease as the family size increases.

Causes of infant and child mortality

Table 5.6. Causes of infant and child mortality rates of the Khongsai Kuki

Causes	Mortality rate (per 100 live births)			
	SAIKUL		IMPHAL	
	Below 1 yr	1-14 years	Below 1 yr	1-14 years
Cold and respiratory disorders	2 (0.16)	1 (0.08)	0 (0.00)	0 (0.00)
Intestinal disorders*	2 (0.16)	7 (0.56)	0 (0.00)	1 (0.25)
Immunizable diseases	1 (0.08)	8 (0.64)	0 (0.00)	1 (0.25)
Unknown/ Accident	15 (1.21)	9 (0.72)	3 (0.74)	3 (0.74)
Other health problems**	10 (0.81)	19 (1.52)	1 (0.25)	6 (1.48)
No. of live births	1254		405	

χ^2 difference for Saikul and Imphal in respect of infant mortality is 1.15, d.f. = 4, $p > 0.05$
χ^2 difference for Saikul and Imphal in respect of child mortality is 1.41, d.f. = 4, $p > 0.05$
* Intestinal disorders include diarrhoea and typhoid
** Other health problems include malaria, fever, BP stroke, cancer, and congenital disease.

Table 5.6 shows causes of the infant and child mortality rates of the Khongsai Kuki. It is observed that unknown/accident is the main cause of infant mortality in both the study areas which caused the death of 15 (1.21%) in Saikul and 3 (0.74%) in Imphal. In Saikul, 2 (0.16%) each have died due to cold, respiratory and intestinal disorders, 1 (0.08%) died due to immunizable disease and 10 (0.80%) died due to other health problems whereas in Imphal, other than unknown/accident, only 1 (0.25%) infant deaths took place.

The above table further reveals that, other kind of health problems is the main cause of child mortality (1-14 years) in both the study areas which caused the death of 19

are highly significant in both the study areas (Saikul: $F = 92.717$, $p < 0.001$; Imphal: $F = 4.509$, $p < 0.001$).

Table 5.8.1. Infant and child mortality rates by size of the Khongsai Kuki family

Family sizes	No. of live births	Mortality rate (per 100 live births)		
		Below 1 year	1-14 years	Total
SAIKUL				
Small (≤ 4)	134	12	4	16
(%)		(8.96)	(2.99)	(11.94)
Medium (5 – 6)	411	8	20	28
(%)		(1.95)	(4.87)	(6.81)
Large (≥ 7)	709	10	20	30
(%)		(1.41)	(2.82)	(4.23)
Coefficient of correlation (r)		- 0.09	0.07	- 0.02
IMPHAL				
Small (≤ 4)	64	0	1	1
(%)		(0.00)	(1.56)	(1.56)
Medium (5 – 6)	207	3	6	9
(%)		(1.45)	(2.89)	(4.35)
Large (≥ 7)	134	1	4	5
(%)		(0.75)	(2.99)	(3.73)
Coefficient of correlation (r)		0.08	0.15	0.17

Table 5.8.1 shows the infant and child mortality rates by size of the Khongsai Kuki families. It shows a negative relationship between the infant mortality rates and size of families in Saikul sub-division, although it is not significant ($r = - 0.09$, $p > 0.05$). It varies from 1.41% in the large size families to 8.96% in the small size families. But, in Imphal town, the highest infant mortality occurred in medium size families (1.45%) followed by the large size families (0.75%) and no infant death in the small size families.

The child mortality rates occurred highest in the medium size families (4.87%) in Saikul sub-division followed by the small size (2.99%) and large size families (2.83%). But, in Imphal town, it is corresponding to the size of families, i.e., from 1.56% in the small size families to 2.99% in the large size families, despite the absence of significant correlation ($r = 0.15$, $p > 0.05$). So, family size is not an important factor influencing the infant and child mortality in the present study population.

Consanguineous marriages

Table 5.9. Fertility rate by consanguineous and non-consanguineous marriages of the Khongsai Kuki

Marriages	SAIKUL			IMPHAL		
	No. of mothers	Mean no. of live births	(±) SE	No. of mothers	Mean no. of live births	(±) SE
Consanguineous* (%)	14 (4.18)	3.86	0.46	5 (3.93)	3.20	0.27
Non-Consanguineous (%)	321 (95.82)	3.74	0.12	122 (96.06)	3.19	0.38
F - statistics	0.065, $p > 0.05$			0.043, $p > 0.05$		

* Includes 12 first cousin and 3 second cousin marriages in Saikul sub-division; 2 first cousin and 3 second cousin marriages in Imphal town.

Table 5.9 shows the fertility rate by consanguineous and non-consanguineous marriages of the Khongsai Kuki. There are only 4.18% and 3.94% of consanguineous marriages in Saikul sub-division and Imphal town respectively. The mean number of live births are 3.86 ± 0.46 among consanguineous marriages and 3.74 ± 0.12 among non-consanguineous marriages in Saikul sub-division, whereas, these are 3.20 ± 0.27 and 3.18 ± 0.38 respectively in Imphal town. The ANOVA test shows that the differences in live

births among the types of marriages are not statistically significant in both the study areas (Saikul: $F = 0.065$, $p > 0.05$; Imphal: $F = 0.043$, $p > 0.05$).

Table 5.9.1. Infant and child mortality rates by consanguineous and non-consanguineous marriages of the Khongsai Kuki

Marriages	No. of live births	Mortality rate (per 100 live births)		
		Below 1 year	1-14 years	Total
SAIKUL				
Consanguineous*	54	1	2	3
(%)		(1.85)	(3.70)	(5.56)
Non-Consanguineous	1200	29	42	71
(%)		(2.42)	(3.50)	(5.91)
Coefficient of correlation (r)		0.01	- 0.01	0.00
IMPHAL				
Consanguineous*	16	0	0	0
(%)		(0.00)	(0.00)	(0.00)
Non-Consanguineous	389	4	11	15
(%)		(1.03)	(2.83)	(3.86)
Coefficient of correlation (r)		0.03	0.06	0.07

Table 5.9.1 shows the infant and child mortality rates by consanguineous and non-consanguineous marriages of the Khongsai Kuki. It is seen that the infant mortality rate is higher among non-consanguineous marriages (2.42%) than consanguineous marriages (1.85%) in Saikul sub-division. In Imphal town, the infant and child mortality rates are recorded only among non-consanguineous marriages, i.e., 1.03% for infant mortality and 2.83% for child mortality. The child mortality rate in Saikul sub-division is slightly higher among consanguineous marriages (3.70%) than that of the non-consanguineous marriages (3.50%). The relationship between infant as well as the child mortality rates

and types of marriages are not statistically significant in both the study areas. But, the influence of types of marriage on the mortality rates in Imphal town cannot be ignored as there are no infant or child deaths among non-consanguineous marriages in this area.

Educational level of the mothers

Table 5.10. Fertility rate by educational level of the Khongsai Kuki mothers

Education levels	SAIKUL			IMPHAL		
	No. of mothers	Mean no. of live births	(±) SE	No. of mothers	Mean no. of live births	(±) SE
Illiterate (%)	48 (14.33)	4.67	0.30	-	-	-
Primary (%)	197 (58.81)	3.89	0.14	35 (27.56)	3.71	0.28
Secondary (%)	63 (18.81)	2.92	0.27	40 (30.08)	3.28	0.19
Hr. Sec. and above (%)	27 (8.06)	2.89	0.32	52 (21.95)	2.77	0.21
F - statistics	8.790, $p < 0.001$			4.483, $p < 0.05$		

Table 5.10 shows the fertility rate by educational level of the Khongsai Kuki mothers. There are a total of 335 mothers in Saikul sub-division out of which 48 (14.33%) are illiterates, whereas in Imphal town, there are altogether 127 mothers and all of them are literates. The above table shows that there is a tendency to decline in the average number of live births per mother with the increase in the educational level of the mothers in both the study areas. The mean number of live births varies from 2.89 ± 0.32 among higher secondary and above to 4.67 ± 0.30 among illiterate mothers in Saikul sub-division; and 2.77 ± 0.21 among higher secondary and above to 3.71 ± 0.28 among primary educated

mothers in Imphal town. The ANOVA test indicates that the differences in live births among mother's educational qualification are statistically significant in both Saikul sub-division ($F = 8.790$, $p < 0.001$) and Imphal town ($F = 4.483$, $p < 0.05$). Therefore, maternal education is an important factor in regulating the fertility rate in the study population.

Table 5.10.1. Infant and child mortality rates by educational level of the Khongsai Kuki mothers

Educational levels	No. of live births	Mortality rate (per 100 live births)		
		Below 1 year	1-14 years	Total
SAIKUL				
Illiterate	224	10	17	27
(%)		(4.46)	(7.59)	(12.05)
Primary	768	19	24	43
(%)		(2.47)	(3.13)	(5.59)
Secondary	184	1	3	4
(%)		(0.54)	(1.63)	(2.17)
Hr. Sec. and above	78	0	0	0
(%)		(0.00)	(0.00)	(0.00)
Coefficient of correlation (r)		- 0.18**	- 0.25**	- 0.31**
IMPHAL				
Illiterate	-	-	-	-
(%)				
Primary	130	3	6	9
(%)		(2.31)	(4.62)	(6.92)
Secondary	131	0	3	3
(%)		(0.00)	(2.29)	(2.29)
Hr. Sec. and above	144	1	1	2
(%)		(0.69)	(0.69)	(1.39)
Coefficient of correlation (r)		- 0.14	- 0.19*	- 0.24**

*$p < 0.05$, **$p < 0.01$

Table 5.10.1 shows the infant and child mortality rates by educational level of the Khongsai Kuki mothers. It is observed that infant and child mortality rates are inversely related to mother's education in both Saikul sub-division and Imphal town. There is a negative relationship between infant mortality rates and mothers' education in both the study areas, although it is not significant in Imphal town (Saikul: $r = -0.18$, $p < 0.01$; Imphal: $r = -0.14$, $p > 0.05$). In Saikul sub-division, the infant mortality rates vary from 0.54% among secondary level to 4.46% among illiterate mothers and none was found among the higher secondary and above levels of education. The infant mortality rates in Imphal town are 2.31% among mothers of primary level, 0.69% among higher secondary and above, and none among the secondary educated mothers. The child mortality rate varies from 1.63% among mothers who are in secondary level to 7.59% among illiterate mothers in Saikul sub-division, whereas it varies from 0.69% among higher secondary and above level to 4.62% among primary educated mothers in Imphal town. The coefficients of correlation (r) shows a significant negative relationship between the child mortality rates and mother's education in both the study areas (Saikul: $r = -0.25$, $p < 0.01$; Imphal: $r = -0.19$, $p < 0.05$). Like in the case of fertility rates, the infant mortality rate in Saikul sub-division and the child mortality rates in both the areas are significantly influenced by maternal education.

Educational level of the fathers

Table 5.11. Fertility rate by educational level of the Khongsai Kuki fathers

Education levels	SAIKUL			IMPHAL		
	No. of fathers	Mean no. of live births	(±) SE	No. of fathers	Mean no. of live births	(±) SE
Illiterate (%)	14 (4.27)	5.21	0.38	-	-	-
Primary (%)	165 (50.30)	3.84	0.16	8 (6.56)	3.38	0.42
Secondary (%)	93 (28.35)	3.55	0.22	22 (18.03)	3.41	0.24
Hr. Sec. and above (%)	56 (17.07)	3.27	0.26	92 (75.41)	3.15	0.17
F - statistics	3.788, $p < 0.05$			0.309, $p > 0.05$		

Table 5.11 shows the fertility rate by educational level of the Khongsai Kuki fathers. In Saikul sub-division, there are only 4.27% of illiterate fathers, while all the fathers in Imphal town are literate. It is seen that the mean number of live births per father is inversely related to their education varying from 3.27 ± 0.26 among higher secondary and above level to 5.21 ± 0.38 among illiterate fathers in Saikul sub-division. In Imphal town, the highest mean number of live births per father is recorded among secondary level (3.41 ± 0.24) followed by primary level (3.38 ± 0.42) and the least is recorded among higher secondary and above level (3.15 ± 0.17). The ANOVA test shows significant differences in live births among father's educational levels in Saikul sub-division ($F = 3.788$, $p < 0.05$), although the same is not significant in Imphal town ($F = 0.309$, $p > 0.05$). So, the influence of father's education on the fertility rate is different in the two study areas.

Table 5.11.1. Infant and child mortality rates by educational level of the Khongsai Kuki fathers

Education levels	No. of live births	Mortality rate (per 100 live births)		
		Below 1 year	1-14 years	Total
SAIKUL				
Illiterate	73	3	6	9
(%)		(4.12)	(8.22)	(12.33)
Primary	634	21	26	47
(%)		(3.31)	(4.10)	(7.41)
Secondary	330	4	9	13
(%)		(1.21)	(2.73)	(3.94)
Hr. Sec. and above	183	2	0	2
(%)		(1.09)	(0.00)	(1.09)
Coefficient of correlation (r)		- 0.14*	- 0.23**	- 0.25**
IMPHAL				
Illiterate	-	-	-	-
(%)				
Primary	27	1	1	2
(%)		(3.70)	(3.70)	(7.41)
Secondary	75	1	3	4
(%)		(1.33)	(4.00)	(5.33)
Hr. Sec. and above	290	2	7	9
(%)		(0.69)	(2.41)	(3.10)
Coefficient of correlation (r)		- 0.14	- 0.08	- 0.14

*$p < 0.05$, **$p < 0.01$

The 5.11.1 shows the infant and child mortality rates by educational level of the Khongsai Kuki fathers. It shows that the infant and child mortality rates are inversely related to father's education in both Saikul sub-division and Imphal town. The infant mortality rate varies from 1.09% among higher secondary and above level to 4.12% among illiterate fathers in Saikul sub-division; 0.69% among higher secondary and above level to 3.70% among primary educated fathers in Imphal town. The relationship between

the infant mortality rates and father's education is negative in both the study areas, although it is not significant in Imphal town (Saikul: $r = -0.14$, $p < 0.05$; Imphal: $r = -0.14$, $p > 0.050$. In Saikul sub-division, the child mortality rate varies from 2.73% among secondary level to 8.22% among illiterate fathers and no child death is recorded among higher secondary and above level. In Imphal town, it is found to be highest among secondary level (4.00%) followed by primary level (3.70%) and higher secondary and above level (2.41%). There is a negative correlation between the child mortality rates and father's education in both the study areas. But, it is not statistically significant in Imphal town ($r = -0.08$, $p > 0.05$), although the same is highly significant in Saikul sub-division ($r = -0.23$, $p < 0.01$). The total mortality rate (pooling data for infant and child mortality rates) is inversely related to father's education in both the study areas, although the relationship is not significant in Imphal town. Therefore, father's education is found to play an important role in reducing the mortality rates in the present population, although its influence is more significant in Saikul sub-division.

Occupation of the mothers

Table 5.12 shows that agriculture, being the main occupation in Saikul subdivision, 88.82% of mothers are in this category, whereas 6.07% are service holders and the remaining 3.83% belong to business. In Imphal town, there are 37.79% each of housewives and service holders, whereas the remaining are business. It also shows that the mean number of live births per mother is recorded to be highest among service holders (4.85 ± 0.53) in Saikul sub-division. The same is 3.75 ± 0.12 among cultivators

and 2.13 ± 0.32 among business. In Imphal town, the highest mean number of live births per mother is recorded among business mothers (3.68 ± 0.23) followed by service holders (3.08 ± 0.23) and the least among housewives (2.98 ± 0.22). The difference in live births among mother's occupational groups is statistically significant in Saikul sub-division ($F = 14.553$, $p < 0.001$), although it is not significant in Imphal town ($F = 0.448$, $p > 0.05$).

Table 5.12 Fertility rate by occupation of the Khongsai Kuki mothers

Occupation	SAIKUL			IMPHAL		
	No. of mothers	Mean no. of live births	(±) SE	No. of mothers	Mean no. of live births	(±) SE
Housewife (%)	-	-	-	48 (37.79)	2.98	0.22
Cultivators (%)	300 (88.82)	3.75	0.12	-	-	-
Service (%)	20 (6.07)	4.85	0.53	48 (37.79)	3.08	0.23
Business (%)	15 (3.83)	2.13	0.32	31 (24.41)	3.68	0.23
F - statistics	14.553, $p < 0.001$			0.448, $p > 0.05$		

Table 5.12.1. Infant and child mortality rates by occupation of the Khongsai Kuki mothers

Occupation	No. of live births	Mortality rate (per 100 live births)		
		Below 1 year	1-14 years	Total
SAIKUL				
Housewives (%)	-	-	-	-
Cultivators (%)	1125	29 (2.58)	42 (3.73)	71 (6.31)
Services (%)	97	1 (1.03)	2 (2.06)	3 (3.09)
Business (%)	32	0 (0.00)	0 (0.00)	0 (0.00)
Coefficient of correlation (r)		- 0.06	- 0.05	- 0.07

Contd.

IMPHAL				
Housewives (%)	143	2 (1.39)	4 (2.79)	6 (4.19)
Cultivators (%)	-	-	-	-
Services (%)	148	1 (0.68)	4 (2.70)	5 (3.38)
Business (%)	114	1 (0.89)	3 (2.63)	4 (3.51)
Coefficient of correlation (r)		- 0.05	0.00	- 0.03

Table 5.12.1 shows the infant and child mortality rates by occupation of the Khongsai Kuki mothers. It shows that, mothers who are engaged in agriculture have recorded the highest infant and child mortality in Saikul sub-division, although their relationship with mother's occupation is not statistically significant (Infant mortality: r - 0.06, $p > 0.05$; Child mortality: r = - 0.05, $p > 0.05$). The infant mortality rates in this area are 2.58% and 1.03% whereas the child mortality rates are 3.73% and 2.06% among service holders and cultivators respectively. No infant and child death was recorded among business mothers in this area. In Imphal town, the infant mortality rate is recorded to be highest among housewives (1.39%) followed by business (0.89%) and then service holders (0.68%). The child mortality rates in the same area are 2.79%, 2.63% and 2.70% for housewives, business and services respectively. Like in the case of Saikul sub-division, no significant relationship between mortality rates and mother's occupation is seen in Imphal town (Infant mortality: r = - 0.05, $p > 0.05$; Child mortality: r = 0.00, $p > 0.05$). So, mother's occupation has no significant influence on the mortality rates in both the study areas.

Occupation of the fathers

Table 5.13. Fertility rate by occupation of the Khongsai Kuki fathers

Occupation	SAIKUL			IMPHAL		
	No. of mothers	Mean no. of live births	(±) SE	No. of mothers	Mean no. of live births	(±) SE
Cultivators (%)	238 (72.56)	3.81	0.13	-	-	-
Services (%)	77 (23.51)	3.49	0.26	107 (87.70)	3.29	0.14
Others*	13 (3.96)	3.31	0.60	15 (12.29)	2.66	0.17
F – statistics	0.819, $p > 0.05$			2.310, $p > 0.05$		

* Others include business, carpentry, etc.

The fertility rate by occupation of the Khongsai Kuki fathers is given in Tables 5.13. Cultivation is the main occupation of the fathers in Saikul sub-division, whereas service is their main occupation in Imphal town. So, there are 72.56% of fathers who are cultivators in Saikul sub-division, whereas there are 87.70% of them who are service holders in Imphal town. In Saikul sub-division, the mean or average number of live births per father is found to be highest among the cultivators (3.81 ± 0.13) followed by service holders (3.49 ± 0.26) and other's category (3.31 ± 0.60). But, in Imphal town, the highest mean number of live births per father is recorded among service holders (3.29 ± 0.14) followed by other's category (2.66 ± 0.17). The differences in live births among father's occupational groups are not statistically significant in both the study areas (Saikul: $F = 0.819$, $p > 0.05$; Imphal: $F = 2.310$, $p > 0.05$) indicating that father's occupation is not an important factor in regulating the fertility rate in the present population.

Table 5.13.1. Infant and child mortality rates by occupation of the Khongsai Kuki fathers

Occupation	No. of live births	Mortality rate (per 100 live births)		
		Below 1 year	1-14 years	Total
SAIKUL				
Cultivators	906	28	35	63
(%)		(3.10)	(3.90)	(6.95)
Services	271	2	5	7
(%)		(0.74)	(1.51)	(2.58)
Others	43	0	1	1
(%)		(0.00)	(2.33)	(2.33)
Coefficient of correlation (r)		- 0.13*	- 0.09	- 0.15**
IMPHAL				
Cultivators	-	-	-	-
Services	352	3	8	11
		(0.85)	(2.27)	(3.13)
Others***	40	1	3	4
		(2.50)	(7.50)	(10.00)
Coefficient of correlation (r)		0.07	0.14	0.16

*p < 0.05, **p < 0.01
*** Others include business, carpentry, etc.

Table 5.13.1 shows the infant and child mortality rates by occupation of the Khongsai Kuki fathers. In Saikul sub-division, the infant mortality rate is recorded only among those fathers who are cultivators (3.10%) and service holders (0.74%). But in Imphal town, it is recorded among fathers who are service holders (0.85%) and other's category (2.50%). The relationship between the infant mortality rates and father's occupation is statistically significant in Saikul sub-division ($r = - 0.13$, $p < 0.05$), but the same in not true in case of the Imphal town ($r = 0.07$, $p > 0.05$). Like infant mortality, the child mortality rate in Saikul sub-division is also recorded to be highest among those fathers

who are engaged in agriculture (3.90%) followed by other's category (2.33%) and service holders (1.51%). Their relationship with father's occupation is negative, although it is not statistically significant ($r = -0.09$, $p > 0.05$). In Imphal town, the highest child mortality rate is recorded among fathers whose occupation falls under other's category (7.50%) followed by services (2.27%). However, the coefficients of correlation is not statistically significant ($r = 0.14$, $p > 0.05$). Pooling the data for the infant and child mortality rates, the coefficients of correlation according to their father's occupation is highly significant in Saikul sub-division ($r = -0.15$, $p < 0.01$), although it is not significant in Imphal town ($r = 0.16$, $p > 0.05$). Therefore, father's occupation has a significantly impact on the mortality rates in Saikul sub-division compared to the Imphal town. In other words, cultivation is significantly correlated with higher mortality rates in Saikul sub-division.

Household Income

Table 5.14. Fertility rate by monthly household income of the Khongsai Kuki

Income groups	SAIKUL			IMPHAL		
	No. of mothers	Mean no. of live births	(±) SE	No. of mothers	Mean no. of live births	(±) SE
Low Income Group (LIG)	201 (60.00)	3.54	0.13	27 (21.25)	2.51	0.31
Middle Income Group (MIG)	72 (21.49)	3.97	0.25	48 (37.79)	3.39	0.19
High Income Group (HIG)	62 (18.50)	4.15	0.32	52 (40.94)	3.35	0.21
F - statistics	2.569, $p > 0.05$			3.580, $p < 0.05$		

Table 5.14 shows the fertility rate by monthly household income of the Khongsai Kuki which is divided into Low income group (LIG), Middle income group (MIG) and High income group (HIG). Households having a monthly income of ≤ Rs. 7,000, Rs. 7,001 – 10,200 and Rs. ≥ 10,201 are categorized as LIG, MIG and HIG respectively. The above table shows that majority of the mothers in Saikul sub-division belong to LIG (60.00%), whereas the highest frequency of mothers in Imphal town belong to HIG (40.94%). The mean number of live births is corresponding to the income level of the households in both Saikul sub-division and Imphal town varying from 3.54 ± 0.13 among LIG to 4.15 ± 0.32 among HIG in Saikul sub-division; and 2.51 ± 0.31 to 3.35 ± 0.21 respectively in Imphal town. However, the ANOVA test shows that the differences in live births among income groups are not statistically significant in Saikul sub-division ($F = 2.569$, $p > 0.05$), although the same is significant in Imphal town ($F = 3.580$, $p < 0.05$). So, household income is an important factor in regulating the fertility rates in Imphal town.

Table 5.14.1. Infant and child mortality rates by monthly household income of the Khongsai Kuki

Income groups	No. of live births	Mortality rate (per 100 live births)		
		Below 1 year	1-14 years	Total
SAIKUL				
Low Income Group (LIG)	711	23 (3.23)	29 (4.08)	52 (7.31)
Middle Income Group (MIG)	286	4 (1.39)	12 (4.19)	16 (5.59)
High Income Group (HIG)	257	3 (1.17)	3 (1.17)	6 (2.33)
Coefficient of correlation (r)		- 0.09	- 0.09	- 0.12*

Contd.

IMPHAL				
Low Income Group (LIG)	68	1 (1.47)	3 (4.41)	4 (5.88)
Middle Income Group (MIG)	163	2 (1.23)	5 (3.07)	7 (4.29)
High Income Group (HIG)	174	1 (0.57)	3 (1.72)	4 (2.29)
Coefficient of correlation (r)		- 0.05	- 0.08	- 0.09

*$p < 0.05$

Table 5.14.1 shows the infant and child mortality rates by monthly household income of the Khongsai Kuki. It shows that the infant mortality rate is negatively related to the household income in both Saikul sub-division and Imphal town, though they are not statistically significant (Saikul: $r = - 0.09$, $p > 0.05$; Imphal: $r = - 0.05$, $p > 0.05$). It varies from 1.17% among the HIG to 3.23% among the LIG in Saikul sub-division; and 0.57% to 1.47% respectively in Imphal town. The child mortality rate among the LIG, MIG and HIG are 4.08%, 4.19% and 1.17% respectively in Saikul sub-division. In Imphal town, it decreases from 1.72% among HIG to 4.41% among LIG. The relationship between the child mortality rate and household income is found to be negative, despite the absence of significant correlations in both the study areas (Saikul: $r = - 0.09$, $p > 0.05$; Imphal: $r = - 0.08$, $p > 0.05$). However, pooling data for the infant and child mortality rates, their relationship with household income is significant negative in Saikul sub-division ($r = - 0.12$, $p < 0.05$).

House types

Table 5.15. Fertility rate by types of the Khongsai Kuki house

House type	SAIKUL			IMPHAL		
	No. of mothers	Mean no. of live births	(±) SE	No. of mothers	Mean no. of live births	(±) SE
Kaccha	214 (63.88)	3.61	0.14	5 (3.94)	3.00	0.71
Semi-pucca	121 (36.12)	3.98	0.20	32 (25.19)	3.19	0.24
Pucca	-	-	-	90 (70.86)	3.20	0.55
F - statistics	2.504, $p > 0.05$			0.041, $p > 0.05$		

The fertility rate by types of the Khongsai Kuki house is shown in Table 5.15. There are only *kaccha* and *semi-pucca* houses in Saikul sub-division, whereas *kaccha*, *semi-pucca* and *pucca* houses are found in Imphal town. The mean number of live births per mother is recorded to be slightly higher in *semi-pucca* (3.98 ± 0.20) than in *kaccha* (3.61 ± 0.14) houses in Saikul sub-division. In Imphal town, the mean number of live births increases from 3.00 ± 0.71 in *kaccha* to 3.19 ± 0.24 and 3.20 ± 0.55 in *semi-pucca* and *pucca* houses respectively. However, the differences in live births among types of houses are not statistically significant (Saikul: $F = 2.504$, $p > 0.05$; Imphal: $F = 0.041$, $p > 0.05$) in both the study areas.

Table 5.15.1. Infant and child mortality rates by types of the Khongsai Kuki house

House type	No. of live births	Mortality rate (per 100 live births)		
		Below 1 year	1-14 years	Total
SAIKUL				
Kaccha	772	26 (3.37)	34 (4.40)	60 (7.77)
Semi-pucca	482	4 (0.83)	10 (2.07)	14 (2.90)
Pucca	-	-	-	-
Coefficient of correlation (r)		- 0.13*	- 0.11	- 0.16**
IMPHAL				
Kaccha	15	1 (6.67)	0 (0.00)	1 (6.67)
Semi-pucca	102	1 (0.98)	5 (4.91)	6 (5.88)
Pucca	288	2 (0.69)	6 (2.08)	8 (2.78)
Coefficient of correlation (r)		- 0.14	- 0.07	- 0.14

*$p < 0.05$, **$p < 0.01$

Table 5.15.1 shows the infant and child mortality rates by types of the Khongsai Kuki house. The infant mortality rate is found to be higher in *kaccha* houses (3.37%) compared to the *semi-pucca* houses (0.83%) in Saikul sub-division. In Imphal town, it decreases from 6.67% in *kaccha* houses to 0.98% and 0.84% in *semi-pucca* and *pucca* houses respectively. The coefficients of correlation shows that there is a negative relationship between infant mortality and house types in both the study areas, although it is not significant in Imphal town (Saikul: $r = - 0.13$, $p < 0.05$; Imphal: $r = - 0.14$, $p > 0.05$). The child mortality rate in Saikul sub-division is also higher in *kaccha* houses (4.40%) than in *semi-pucca* houses (2.07%), whereas the child mortality rates in Imphal town are 4.91%

in *semi-pucca* and 2.08 % in *pucca* houses. Not a single case of child death is recorded in *kaccha* houses in this area. Although the relationship between the child mortality rates and house types are found to be negative in both the study areas, they are not statistically significant (Saikul: $r = -0.11$, $p > 0.05$; Imphal: $r = -0.07$, $p > 0.05$). However, pooling data for the infant and child mortality rates, their relationship with house types is statistically significant in Saikul sub-division.

Main fuel for cooking

Table 5.16. Infant and child mortality rates by main fuel for cooking of the Khongsai Kuki

Main fuel	No. of mothers	No. of live births	Mortality (%)		
			Below 1 year	1-14 years	Total
SAIKUL					
Firewood	335	1254	30 (2.39)	44 (3.51)	74 (5.66)
LPG	-	-	-	-	-
IMPHAL					
Firewood	-	-	-	-	-
LPG	127	405	4 (0.99)	11 (2.71)	15 (3.70)

Table 5.16 shows the infant and child mortality rates by main fuel for cooking of the Khongsai Kuki. It is seen that the only main fuel used for cooking in Saikul sub-division is firewood, whereas it is Liquid Petroleum Gas (LPG) in Imphal town. Therefore, the influence of main fuel for cooking on the infant and child mortality rates could not be found in the present study.

Main source of drinking water

Table 5.17. Infant and child mortality rates by main source of drinking water of the Khongsai Kuki

Main source	No. of live births	Mortality rate (per 100 live births)		
		Below 1 year	1-14 years	Total
SAIKUL				
PHE pipe water	259	3 (1.16)	5 (1.93)	8 (3.09)
Village pipe water	995	27 (2.71)	39 (3.92)	66 (6.63)
Others**	-	-	-	-
Coefficient of correlation (r)		0.08	0.09	0.12*
IMPHAL				
PHE pipe water	296	4 (1.35)	7 (2.36)	11 (3.72)
Village pipe water	-	-	-	-
Others**	109	0 (0.00)	4 (3.67)	4 (3.67)
Coefficient of correlation (r)		- 0.11	0.07	0.00

*$p < 0.05$
** Others include well, water tanker, etc.

Table 5.17 shows the infant and child mortality rates by main source of drinking water of the Khongsai Kuki. It shows that the only sources of drinking water in Saikul sub-division are PHE pipe water and village pipe water. In Imphal town, these are PHE pipe water, water tankers and protected well. The latter two sources are being categorized as 'others'. In Saikul sub-division, the infant mortality rate is found to be higher in households whose main source is village pipe water (2.71%) than PHE pipe water (1.16%), whereas in Imphal town, the same is recorded only in households whose main

source is PHE pipe water (1.35%). The coefficients of correlation between the infant mortality rates and main source of drinking water are not statistically significant in both the areas. The same is true for both the areas in respect of the child mortality rates. However, the child mortality rate in Saikul sub-division is higher in households depending on village pipe water (3.92%) rather than PHE pipe water (1.93%). The same in Imphal town is slightly higher in households depending on other's category (3.67%) rather than PHE pipe water (2.36%). Like infant mortality, the relationship between the child mortality rates and source of drinking water are not statistically significant in both the study areas. But, when data for the infant and child mortality rates are pooled together, their relationship with source of drinking water is statistically significant in Saikul sub-division ($r = 0.12$, $p < 0.05$).

Types of toilet

Table 5.18. Infant and child mortality rates by types of toilet of the Khongsai Kuki

Types of toilet	No. of live births	Mortality rate (per 100 live births)		
		Below 1 year	1-14 years	Total
SAIKUL				
Own pit	1068	28 (2.62)	43 (4.03)	71 (6.65)
Septic tank	186	2 (1.07)	1 (0.53)	3 (1.61)
Coefficient of correlation (r)		- 0.06	- 0.13*	- 0.13*
IMPHAL				
Own pit	37	1 (2.70)	1 (2.70)	2 (5.41)
Septic tank	368	3 (0.82)	10 (2.72)	13 (3.53)
Coefficient of correlation (r)		- 0.08	0.02	- 0.03

*$p < 0.05$

The infant and child mortality rates by types of toilet of the Khongsai Kuki is shown in Table 5.18. In the present study, there are only two types of toilets used viz., own pit and septic tank. The infant mortality rate is found to be higher among the households who used own pit type rather than that of the septic tank in both Saikul sub-division and Imphal town. The infant mortality rates are 2.62% and 1.07% for those who used own pit types and septic tank types of toilet respectively in Saikul sub-division, whereas these are 2.70% and 0.82% respectively in Imphal town. The relationship between the infant mortality rates and types of toilet used are negative, although they are not statistically significant in both the study areas (Saikul: $r = - 0.06$, $p > 0.05$; Imphal: $r = - 0.08$, $p > 0.05$). In Saikul sub-division, the child mortality rate is significantly higher ($r = - 0.13$, $p < 0.05$) in own pit types (4.03%) than that of the septic tank types of toilet (0.53%). But, in Imphal town, the child mortality rate is found to be similar among both types (i.e., 2.70% for own pit types and 2.72% for septic tank types of toilet). The above table further shows that the relationship between the overall mortality rates (pooling data for the infant and child mortality rates) and types of toilet is statistically significant in Saikul sub-division ($r = - 0.13$, $p < 0.05$), although the same is not true in Imphal town ($r = - 0.03$, $p > 0.05$). Therefore, hygienic types of toilet is significantly correlated with lower mortality rates in Saikul sub-division.

Actual and desired number of children

Table 5.19 shows the actual and desired number of children of the Khongsai Kuki married women. It is seen that the mean desired number of children is found to be higher

than that of the actual number of children in both Saikul sub-division and Imphal town. The mean desired number of children is 4.23 ± 0.05 IN Saikul sub-division and 3.85 ± 0.08 in Imphal town, whereas, the mean actual number of children is 3.48 ± 0.12 and 3.85 ± 0.08 respectively. It is also observed that mothers in Saikul sub-division have the desire to have more number of children than their Imphal town counterparts. Comparing the two study areas, the differences in respect of both the actual and desire number of children are statistically significant (Actual: $t = 2.22$, $p < 0.05$; Desire: $t = 4.04$, $p < 0.001$).

Table 5.19: Actual and desired number of children of the Khongsai Kuki married women

Characteristics	SAIKUL (n = 326)*		IMPHAL (n = 126)**		t -value
	No. of children	(Mean ± SE)	No. of children	(Mean ± SE)	
Actual	1136	3.48 ± 0.12	387	3.11 ± 0.12	2.22, $p < 0.05$
Desired	1375	4.23 ± 0.05	485	3.85 ± 0.08	4.04, $p < 0.001$

* There are 9 mothers having no decision on the desired number of children
** There is only1 mother having no decision on the desired number of children

Mother's preference on sex of the child

Table 5.20: Fertility rate by preference on male and female child of the Khongsai Kuki mothers

Preference	SAIKUL (n = 335*)			IMPHAL (n – 127*)		
	No. of mothers	Mean no. of live births	(±) SE	No. of mothers	Mean no. of live births	(±) SE
Male (%)	274 (81.80)	3.77	0.13	73 (57.50)	3.18	0.17
Female (%)	2 (0.60)	3.50	2.50	6 (4.72)	3.33	0.84
F - statistics	0.126, $p > 0.05$			0.029, $p > 0.05$		

*There are 59 mothers in Saikul sub-division and 48 mothers in Imphal town having no preference on sex of the child.

Table 5.20 shows the fertility rate by preference on male and female child of the Khongsai Kuki mothers. It shows that preference on male child among the Khongsai Kuki mothers is very common in both Saikul sub-division and Imphal town. There are altogether 81.80% of mothers in Saikul sub-division and 57.50% of mothers in Imphal town preferring male child over female child. On the other hand, there are only 0.60% and 4.72% of mothers preferring female child over male child in Saikul sub-division and Imphal town respectively. The difference in live births on mother's preference is not statistically significant in both the study areas (Saikul: $F = 0.126$, $p > 0.05$; Imphal: $F = 0.029$, $p > 0.05$). The average number of live births are 3.77 ± 0.13 among mother's preferring male child and 3.50 ± 2.50 among mother's preferring female child in Saikul sub-division; and 3.18 ± 0.17 and 3.33 ± 0.84 respectively in Imphal town.

Table 5.20.1. Reasons for preference on male child of the Khongsai Kuki mothers

Reasons	SAIKUL (n = 335)		IMPHAL (n = 127)	
	No.	Percent	No.	Percent
Continuation of family lineage	188	56.12	58	45.67
To look after the family and parents	140	41.79	27	21.26
Marriage is successful only after having male child	20	5.97	3	2.42
Overall preference of male child	274	81.80	73	57.50

χ^2 difference for Saikul and Imphal is 4.16, d.f. = 1, $p < 0.05$

Table 5.20.1 reveals the reasons for preference on male child over female child of the Khongsai Kuki mothers. The overall preference on male child is found to be higher in Saikul sub-division (81.80%) than in Imphal town (57.50%). There are 56.12% of mothers in Saikul sub-division and 45.67% of mothers in Imphal town who are in

majority and preferred male child over female child for continuation of their family lineage. The other reasons are: - to look after the family and parents (Saikul: 41.79%; Imphal: 21.26%) and marriage is successful only after having male child (Saikul: 5.97%; Imphal: 2.42%). The χ^2 value i.e., 4.16, d.f. = 1, $p < 0.05$ shows significant difference between the two study areas in respect of the overall preference on male child.

Family planning

Characteristics of family planning

Table 5.21. Characteristics of family planning method of the Khongsai Kuki

Characters	SAIKUL (n = 335)		IMPHAL (n = 127)		χ^2 value
	Frequency	Percent	Frequency	Percent	
Awareness of family planning method					
No	60	17.91	10	7.87	χ^2= 7.22, $p < 0.01$
Yes	275	82.08	117	92.12	
Adoption of family planning method					
Non-adopters	290	86.56	91	71.65	χ^2 = 14.17, $p < 0.005$
Adopters	45	13.43	36	28.35	
Source of information about family planning method					
Doctor	44	13.13	29	22.83	χ^2 = 41.34, $p < 0.005$
ANM	17	5.07	11	8.66	
Health workers	-	-	13	10.23	
Others*	214	63.88	64	50.39	
Attitude of family planning method**					
Positive	204	60.89	94	74.02	χ^2 = 0.37, $p > 0.05$
Negative	59	17.61	23	18.11	

* Others include media, elder persons of the family and friends.

** There are 12 mothers in Saikul who were aware and had no attitude toward FP.

Table 5.21 shows mother's awareness, adoption, source and attitude of family planning method of the Khongsai Kuki mothers. 82.02% of the mothers in Saikul sub-division and 92.12% in Imphal town are aware of the family planning method. The difference between the two areas is found to be statistically significantly (χ^2 = 7.22, d.f. = 1, $p < 0.01$). Similarly, adoption of family planning method is found to be significantly higher (χ^2 = 14.17, d.f. = 1, $p < 0.005$) in Imphal town (28.35%) than in Saikul sub-division (13.43%).

The main source of information regarding family planning method is 'others' category (media, elderly persons of the family and friends) in both the study areas as there are 63.88% of mothers in Saikul sub-division and 50.39% in Imphal town in this category. In Saikul sub-division, there are 13.13% and 5.07% of mothers whose source of information is doctor and ANM respectively. In Imphal town, there are 22.83%, 8.66% and 10.23% of mothers whose main source of family planning are doctor, ANM and health workers respectively. Comparing the two areas, the difference in respect of source of family planning is highly significant (χ^2 = 41.34, d.f. = 1, $p < 0.005$).

The above table further shows that majority of the mothers i.e., 60.89% in Saikul sub-division and 74.02% in Imphal town have positive attitude toward family planning method. Comparing the two study areas, the percentage of mothers having positive attitude is found to be higher in Imphal town than in Saikul sub-division, although the difference is not statistically significant (χ^2 = 0.37, d.f. = 1, $p > 0.05$). Further, there are 12 mothers in Saikul sub-division who were aware and had no attitude toward family planning method.

Table 5.21.1. Fertility rate by adoption of family planning method of the Khongsai Kuki

Family planning	SAIKUL			IMPHAL		
	No. of mothers	Mean no. of live births	(±) SE	No. of mothers	Mean no. of live births	(±) SE
Non-adopters	290	3.77	0.13	91	3.21	0.18
Adopters	45	3.56	0.14	36	3.14	0.15
F - statistics	0.362, $p > 0.05$			0.056, $p > 0.05$		

Table 5.21.1 shows the fertility rate by adoption and non-adoption of family planning method of the Khongsai Kuki. It shows that the mean number of live births is slightly higher among non-adopters than adopters in both the study areas. In Saikul sub-division, the mean number of live births is 3.56 ± 0.14 for adopters and 3.77 ± 0.13 for non-adopters, whereas in Imphal town, these are 3.14 ± 0.15 and 3.21 ± 0.18 respectively. However, the difference in live births among adopters and non-adopters of family planning method is not statistically significant in both the study areas (Saikul: $F = 0.362$, $p > 0.05$; Imphal: $F = 0.056$, $p > 0.05$). So, family planning is not an important factor in determining the fertility rates in the present population.

Table 5.21.2. Infant and child mortality rates by adoption of family planning method of the Khongsai Kuki

Family planning	No. of live births	Mortality rate (per 100 live births)		
		Below 1 year	1-14 years	Total
SAIKUL				
Non-adopters	1094	28 (2.56)	39 (3.56)	67 (6.12)
Adopters	160	2 (1.25)	5 (3.13)	7 (4.38)
Coefficient of correlation (r)		- 0.05	- 0.02	- 0.05

Contd.

IMPHAL				
Non-adopters	292	4 (1.37)	8 (2.74)	12 (4.11)
Adopters	113	0 (0.00)	3 (2.65)	3 (2.65)
Coefficient of correlation (r)		- 0.13	- 0.01	- 0.07

Table 5.21.2 shows the infant and child mortality rates by adoption and non-adoption of family planning method of the Khongsai Kuki. The infant mortality rate is higher among non-adopters (2.56%) than adopters (1.25%) in Saikul sub-division, whereas, in Imphal town, it is recorded only among non-adopters (1.37%). The coefficients of correlation shows no significant relationship between the infant mortality rates and adoption or non-adoption of family planning in both the study areas (Saikul: $r = - 0.05$, $p > 0.05$; Imphal: $r = - 0.13$, $p > 0.05$). The child mortality rates are slightly higher among non-adopters than the adopters of family planning in both the study areas, although their relationship is not statistically significant (Saikul: $r = - 0.02$, $p > 0.05$; Imphal: $r = - 0.02$, $p > 0.05$). The child mortality rates are 3.13% for adopters and 3.56% for non-adopters in Saikul sub-division, whereas these are 2.65% and 2.74% respectively in Imphal town. So, adoption or non-adoption of family planning has no significant correlation with the infant and child mortality rates in the present population.

Antenatal and post-natal care

To find out the impact of antenatal and post-natal care on the fertility as well as infant and child mortality rates in the present population, we included only those mothers who have had pregnancy in the past years.

ANC Characteristics

Table 5.22 shows the characteristics of antenatal care (ANC) among the Khongsai Kuki mothers in Saikul sub-division and Imphal town. There are altogether 323 mothers in Saikul sub-division and 124 in Imphal town who have had pregnancy at least once in the past years. It shows that there are 278 (86.18%) mothers in Saikul sub-division and 121 (97.58%) in Imphal town who had attended ANC indicating that the overall attendance of ANC among mothers is significantly higher ($\chi^2 = 12.38$, d.f. = 1, $p < 0.005$) in Imphal town compared to Saikul sub-division. The above table also shows that 26.32% and 27.86% of mothers who are in majority in Saikul sub-division have visited ANC twice and thrice respectively during pregnancy. In Imphal town, majority of the mothers (49.23%) have visited ANC for 5 or more times during their pregnancy. The difference between the two study areas in respect of the number of ANC visits is highly significant ($\chi^2 = 90.21$, d.f. = 5, $p < 0.005$). The stage of ANC visit during pregnancy is divided into 1st trimester (upto 3 months of pregnancy), 2nd trimester (4-6 months of pregnancy) and 3rd trimester (7-9 months of pregnancy). It is observed that stages of ANC visit is inversely related to the frequency of the mothers in both the study areas. The frequency of mothers who visited ANC at the stages of 1st trimester, 2nd trimester and 3rd trimester are 59.44%,

Table 5.22. Characteristics of antenatal care (ANC) among the Khongsai Kuki mothers

Characters	SAIKUL (n = 323)		IMPHAL (n = 124)		χ^2 value
	Frequency	%	Frequency	%	
Attending ANC					
No	45	13.93	3	2.42	$\chi^2 = 12.38$, $p < 0.005$
Yes	278	86.18	121	97.58	
No. of ANC visit (times)					
0	45	13.93	3	2.42	
1	24	7.43	1	0.81	
2	85	26.32	18	14.52	$\chi^2 = 90.21$, $p < 0.005$
3	90	27.86	18	14.52	
4	42	13.00	23	18.55	
5+	37	11.46	61	49.23	
Stage of pregnancy at 1st ANC visit					
1st trimester (≤ 3 months)	192	59.44	111	89.52	$\chi^2 = 24.29$, $p < 0.005$
2nd trimester (4-6 months)	76	23.53	10	8.06	
3rd trimester (7-9 months)	10	3.41	0	0.00	
Received of iron and folic acid tablet					
No	200	61.92	26	20.97	$\chi^2 = 60.10$, $p < 0.005$
Yes	123	38.10	98	79.03	
Received of tetanus injection					
No	21	6.50	5	4.03	$\chi^2 = 0.99$, $p > 0.05$
Yes	302	93.58	119	95.97	

23.53% and 3.41% respectively in Saikul sub-division, whereas in Imphal town, these are 89.52% for 1st trimester, 8.06% for 2nd trimester and none during the 3rd trimester in

Imphal. The χ^2 test shows significant differences ($\chi^2 = 24.29$, d.f. = 1, $p < 0.005$) between the two areas in respect of the stages of ANC visit.

The above table further reveals that mothers living in Imphal town are higher (79.03%) than that of Saikul sub-division (38.10%) in terms of receiving of the iron and folic acid tablets during their pregnancy. The difference between the two areas in respect of receiving this tablet is highly significant ($\chi^2 = 60.10$, d.f. = 1, $p < 0.005$). Regarding vaccination of tetanus toxoid during pregnancy, the difference between the two study areas is not statistically significant ($\chi^2 = 0.99$, d.f. = 1, $p > 0.05$), although it is slightly higher in Imphal town (95.97%) than that of the Saikul sub-division (93.58%).

ANC Attendance

Table 5.22.1. Fertility rate by ANC attendance during pregnancy of the Khongsai Kuki mothers

ANC visit	SAIKUL			IMPHAL		
	No. of mothers	Mean no. of live births	(±) SE	No. of mothers	Mean no. of live births	(±) SE
No	45	4.93	0.32	No	5.33	0.33
Yes	278	3.71	0.12	121	3.21	0.13
F - statistics	9.679, $p < 0.01$			9.155, $p < 0.01$		

Table 5.22.1 shows the fertility rate by ANC attendance during pregnancy of the Khongsai Kuki mothers. It shows that the mean number of live births is higher among mothers who did not attend ANC than those who have attended in both Saikul sub-division and Imphal town. These are 3.71 ± 0.12 for the mothers who have attended and 4.93 ± 0.32 for those who did not attend ANC in Saikul sub-division, whereas these are

3.21 ± 0.13 and 5.33 ± 0.33 respectively in Imphal town. The ANOVA test also shows significant difference among live birth in respect of ANC attendance in both the study areas (Saikul: F= 9.679, $p < 0.01$; Imphal: F = 9.155, $p < 0.01$). So, ANC attendance is important in regulating the fertility rate in the present population.

Table 5.22.2. Infant and child mortality rates by ANC attendance during pregnancy of the Khongsai Kuki mothers

ANC visit	No. of live births	Mortality rate (per 100 live births)		
		Below 1 year	1-14 years	Total
SAIKUL				
No (%)	222	6 (2.70)	15 (6.76)	21 (9.46)
Yes (%)	1032	24 (2.32)	29 (2.81)	53 (5.14)
Coefficient of correlation (r)		- 0.05	- 0.23**	- 0.19**
IMPHAL				
No (%)	16	1 (6.25)	2 (12.50)	3 (18.75)
Yes (%)	389	3 (0.77)	9 (2.31)	12 (1.75)
Coefficient of correlation (r)		- 0.27**	- 0.32**	- 0.42**

**$p < 0.01$

Table 5.22.2 shows the infant and child mortality rates by ANC attendance of the Khongsai Kuki mothers. The infant and child mortality rates are found to be higher among the mothers who did not attend ANC in both Saikul sub-division and Imphal town. The infant mortality rates are 2.32% for mothers who have attended ANC and 2.70% for those who did not attend ANC in Saikul sub-division, whereas these are 0.77% and 6.25% respectively in Imphal town. The relationship between the infant mortality

rates and ANC attendance is negative, although it is not significant in Saikul sub-division (Saikul: r = - 0.05, p > 0.05; Imphal: r = - 0.27, p < 0.01). The child mortality rates are 2.81% for mothers who have attended ANC and 6.76% for those who did not attend ANC in Saikul sub-division, whereas, these are 2.31% and 12.50% respectively in Imphal town. There is a significant negative correlation between the child mortality rates and ANC attendance in both the study areas (Saikul: r = - 0.23, p < 0.01; Imphal: r = - 0.32, p < 0.01). Pooling data for the infant and child mortality rates, their relationship with ANC attendance is statistically significant in both the study areas indicating that ANC attendance is significantly related to low mortality rates in the present population.

Table 5.22.3. Regression of ANC attendance of the Khongsai Kuki mothers on independent factors

Parameters/Area	Coefficient of regression (B) and its Standard Error (SE)	t – value	p – level
	B ± SE		
ANC attendance			
Maternal age	- 0.034 ± 0.016	- 2.062	Significant at 5%
Residence (Saikul/Imphal)	0.018 ± 0.042	- 0.436	Insignificant
Maternal education	0.034 ± 0.022	1.558	Insignificant
Paternal education	0.066 ± 0.023	2.911	Significant 1%
Maternal occupation	- 0.009 ± 0.019	- 0.511	Insignificant
Paternal occupation	0.012 ± 0.032	1.360	Insignificant
Household income	- 0.019 ± 0.021	- 0.911	Insignificant
Constant	0.714 ± 0.070	10.150	Significant at 1%

Table 5.22.3 shows the regression of ANC attendance of the Khongsai Kuki mothers on independent factors. Of all the independent factors, the coefficients of regression (B) is negatively associated with maternal age ($B = -0.034 \pm 0.016$, $p < 0.05$) and positively associated with paternal education ($B = 0.066 \pm 0.023$, $p < 0.05$). In other words, mothers of the younger age groups are more likely to attend ANC during pregnancy, whereas higher educational level of the husbands is also significantly associated with ANC attendance during pregnancy in the present population.

Table 5.22.4. Reasons for not attending ANC during pregnancy of the Khongsai Kuki mothers

Reasons	SAIKUL (n = 323)		IMPHAL (n = 124)	
	No.	Percent	No.	Percent
No visit of ANM	4	1.23	-	-
Financial burden	17	5.26	-	-
Far location of health centre	19	5.88	-	-
Did not feel necessary	18	5.57	3	2.42
Overall percent of no ANC visit	45	13.93	3	2.42

χ^2 for Saikul and Imphal difference is 10.50, d.f. = 1, $p < 0.005$

Table 5.22.4 shows the reasons for not attending ANC during pregnancy of the Khongsai Kuki mothers. In Saikul sub-division, there are altogether 45 mothers (13.93%) who did not go for antenatal check-ups, whereas in Imphal town, there are only 3 (2.42%) such mothers. In Saikul sub-division, the main reasons for not having antenatal check-ups are: due to far location of the health centres (5.88%), did not feel necessary (5.57%), financial burden (5.26%) and no visit of ANM (1.23%), whereas the only reason in Imphal town is that they did not feel necessary (2.42%). Comparing the two areas, the overall percentage

of mothers not attending ANC is significantly higher ($\chi^2 = 10.50$, d.f. = 1, $p < 0.005$) in Saikul sub-division than in Imphal town.

Obstetric morbidity during pregnancy

Table 5.23. Self reported obstetric morbidity of the Khongsai Kuki mothers during pregnancy

Health problems*	SAIKUL (n = 323)		IMPHAL (n =124)	
	No.	%	No.	%
Cold and fever	44	13.62	19	15.32
Abdominal and pelvic pain	14	4.33	3	2.42
Swelling of hands and legs	83	25.76	37	29.84
Night blindness and blurred vision	34	10.53	9	7.26
Weakness and tiredness	69	21.36	35	28.23
Dizziness and vomiting	141	43.65	57	45.97
Vaginal bleeding	5	1.55	5	4.03
Paleness	18	5.57	9	7.26
Excessive fatigue	20	6.19	10	8.10
Overall morbidity**	253	78.33	111	89.52

*Based on the last pregnancy for the non-pregnant mothers during survey.
**Based on the no. of mothers who suffered from at least one of the mentioned categories of health problems.

Table 5.23 shows the obstetric morbidity of the Khongsai Kuki mothers during pregnancy. It is seen that dizziness and vomiting is the common health problem faced by the mothers in both Saikul sub-division and Imphal town. There are 43.65% of mothers in Saikul sub-division and 45.97% mothers in Imphal town who suffered from dizziness and vomiting. The other major health problems are swelling of hand and legs (Saikul: 35.76%; Imphal: 29.84%) and weakness and tiredness (Saikul: 21.36%; Imphal: 28.23%).

Besides, abdominal and pelvic pain, night blindness and blurred vision, vaginal bleeding, paleness and excessive fatigue are the other obstetric morbidity. The above table further shows that the overall percentage of mothers having health problems during pregnancy is higher in Imphal town (89.52%) than in Saikul sub-division (78.33%).

5.23.1. Coefficients of the logistic regression of obstetric morbidity of the Khongsai Kuki mothers during pregnancy on independent factors (based on the number of mothers who suffered from any health problems during the last pregnancy)

Parameters	Coefficients of regression (B) and its Standard Error (SE)			
	Model -1		Model – 2	
	B	(±) SE	B	(±) SE
Obstetric morbidity				
Maternal age	- 0.023	0.028	-	-
No. of live births	0.019	0.014	-	-
Residence (Saikul/Imphal)	0.132*	0.058	0.060	0.046
Maternal education	0.061*	0.029	0.031	0.023
Paternal education	- 0.035	0.030	-	-
Household income	- 0.005	0.028	-	-
Maternal occupation	- 0.002	0.023	-	-
Paternal occupation	- 0.034	0.030	-	-
ANC attendance	0.234**	0.063	0.198*	0.060

*P < 0.05, **P < 0.001
Model -1 includes obstetric morbidity and each independent variable.
Model -2 includes only residence, maternal education and ANC attendance as covariates.

Table 5.23.1 shows the coefficients of logistic regression of obstetric morbidity of the Khongsai Kuki mothers during pregnancy on independent factors. The coefficients of regression (B) is positively associated with residence ($B = 0.132 \pm 0.058$, $p < 0.05$), maternal education ($B = 0.061 \pm 0.029$, $p < 0.05$) and ANC attendance 0.234 ± 0.063, $p <$

0.01). In model 2, we included only those variables which are significantly associated with obstetric morbidity in order to understand the relative importance of each independent variables and found that the impact of residence and maternal education disappeared indicating that ANC attendance is the most important factors determining the obstetric morbidity during pregnancy. It is not clear why obstetric morbidity is significantly higher among mothers who are highly educated and attended ANC during their pregnancy. But, mothers who are less educated as well as who did not attend ANC are expected to underrate their health problems.

Health problems after delivery

Table 5.24. Self reported health problems of the Khongsai Kuki mothers during the first week after delivery

Health problems*	SAIKUL (n = 314)		IMPHAL (n = 123)	
	No.	%	No.	%
Cold and fever	63	20.10	21	16.91
Abdominal and/or pelvic pain	196	62.42	75	60.10
Severe headache	1	0.32	0	0.00
Dizziness and vomiting	90	28.66	32	25.81
Vaginal bleeding	9	2.96	9	7.18
Overall morbidity**	253	80.57	103	83.74

*Based on the last delivery.
**Based on the number of mothers who suffered from at least one of the mentioned categories of health problems.

Table 5.24 shows the self reported health problems of the Khongsai Kuki mothers during the first week after delivery. It is found that abdominal and/or pelvic pain is the most common health problems of mothers during the first week after delivery in both Saikul

sub-division and Imphal town as there are 62.42% of mothers in Saikul sub-division and 60.10% in Imphal town who are in this category. The other common health problems are dizziness and vomiting, cold and fever, and vaginal bleeding. Comparing the two study areas, the overall prevalence of health problems during the first week after delivery is slightly higher in Imphal town (83.74%) than in Saikul sub-division (80.57%).

Table 5.24.1. Coefficients of the logistic regression of mother's health problem of the Khongsai Kuki during the first week after delivery on independent factors (based on the number of mothers who suffered from any health problems during the last delivery)

Parameters	Coefficients of regression (B) and its Standard Error (SE)			
	Model -1		Model – 2	
	B	(±) SE	B	(±) SE
Health problems				
Maternal age	0.039	0.028	-	-
No. of live births	0.000	0.015	-	-
Residence (Saikul/Imphal)	0.143*	0.063	0.137*	0.048
Maternal education	- 0.042	0.030	-	-
Paternal education	- 0.000	0.030	-	-
Household income	0.031	0.028	-	-
Maternal occupation	- 0.050*	0.024	- 0.058*	0.024
Paternal occupation	- 0.006	0.043	-	-
ANC attendance	0.051	0.063	-	-
Place of delivery	- 0.177**	0.061	- 0.183**	0.049
Person conducting delivery	0.014	0.063	-	-

*$p < 0.05$, **$p < 0.001$
Model -1 includes mother's health problems and each independent variable.
Model -2 includes only residence, maternal occupation place of delivery and mother's diet during pregnancy as covariates.

Table 5.24.1 shows the coefficients of logistic regression of mother's health problem of the Khongsai Kuki during the first week after delivery on independent factors. It is seen

that the coefficients of regression (B) is positively associated with residence (B = 0.117 ± 0.059, $p < 0.05$) and negatively associated with maternal occupation (B = - 0.053 ± 0.024, $p < 0.05$) and place of delivery (B = - 0.192 ± 0.052, $p < 0.001$). Like in the case of obstetric morbidity, we included only those variables which are significantly associated in Model 1 as covariates in Model 2 and found that all these variables are again significantly correlated with mother's health problems after delivery. In other words, health problem during the first week after delivery is likely to be more among urban mothers and whose place of delivery is at home. However, among the three significant variables, place of delivery is found to be the most important factor determining mother's health problem after delivery in the present population.

Place of delivery

Table 5.25. Infant and child mortality rates by place of delivery of the Khongsai Kuki mothers (based on their last delivery)

Place of delivery	No. of mothers	No. of live births	Mortality rate (per 100 live births)		
			Below 1 year	1-14 years	Total
SAIKUL					
Home	280	1164	28	43	71
(%)	(89.46)		(2.41)	(3.69)	(6.09)
Hospital/Clinic	33	90	2	1	3
(%)	(10.54)		(2.22)	(1.11)	(3.33)
Coefficient of correlation (r)			- 0.04	- 0.11	- 0.10
IMPHAL					
Home	51	197	3	7	10
(%)	(41.46)		(1.52)	(3.55)	(5.08)
Hospital/Clinic	72	208	1	4	5
(%)	(58.53)		(0.48)	(1.92)	(2.40)
Coefficient of correlation (r)			- 0.13	- 0.14	- 0.19*

*$p < 0.05$

Table 5.25 shows the infant and child mortality rates by the place of delivery of the Khongsai Kuki mothers based on their last delivery. It is seen that the frequency of delivery in hospital/clinic is much higher in Imphal town (58.53%) than in Saikul sub-division (10.54%). The infant and child mortality rates are higher among mothers whose place of delivery is home than that of hospitals/clinic in both Saikul sub-division and Imphal town. But, the coefficient of correlation shows that there are no significant relationship between the infant as well as the child mortality rates and place of delivery in both the study areas. The infant mortality rates in Saikul sub-division are 2.22% among mothers whose delivery took place at hospital/clinic and 2.41% among mothers whose delivery took place at home. The child mortality rates in the same area are 3.69% and 1.11% respectively. In Imphal town, the infant mortality rates are 1.52% and 0.48% among mothers whose delivery took place at home and hospital/clinic respectively whereas the child mortality rates in the same area are 3.55% and 1.92% respectively. Pooling data for infant and child mortality rates together, their relationship with place of delivery is statistically significant in Imphal town ($r = -0.10$, $p < 0.05$), although the same is not significant in Saikul sub-division ($r = -0.19$, $p > 0.05$). So, place of delivery can be an important factor determining the mortality rates in Imphal town.

Persons conducting delivery

Infant and child mortality rates by persons conducting delivery (based on the last delivery) of the Khongsai Kuki mothers is shown in Table 5.26. The above table shows that the proportion of deliveries conducted by health personnel is higher in Imphal town

Table 5.26. Infant and child mortality rates by persons conducting delivery of the Khongsai Kuki mothers (based on the last delivery)

Persons conducting delivery	No. of mothers	No. of live births	Mortality rate (per 100 live births)		
			Below 1 year	1-14 years	Total
SAIKUL					
Elderly ladies	268	1131	27	43	70
(%)	(85.62)		(2.40)	(3.80)	(6.19)
Health personnel***	45	123	3	1	4
(%)	(14.37)		(2.44)	(0.81)	(3.25)
Coefficient of correlation (r)			- 0.04	- 0.14*	- 0.12*
IMPHAL					
Elderly ladies	23	91	3	6	9
(%)	(18.69)		(3.29)	(6.59)	(9.89)
Health personnel***	100	314	1	5	6
(%)	(81.30)		(0.31)	(1.59)	(1.91)
Coefficient of correlation (r)			- 0.27**	- 0.29**	- 0.39**

*p < 0.05, **p < 0.01
*** Health personnel include doctor and ANM.

(81.30%) compared to Saikul sub-division (14.37%). The infant mortality rate is significantly correlated with persons conducting the delivery in Imphal town ($r = - 0.27$, $p < 0.01$), although the same is not in Saikul sub-division ($r = - 0.04$, $p > 0.05$). In Saikul sub-division, the infant mortality rate is 2.40% and 2.44% among mothers whose deliveries were conducted by elderly ladies and health personnel respectively, whereas in Imphal town, it is 3.29% and 0.31% respectively. The child mortality rates are also significantly higher (Saikul: $r = - 0.14$, $p < 0.05$; Imphal: $r = - 0.29$, $p < 0.001$) among mothers whose deliveries were conducted by elderly ladies (Saikul: 3.80%; Imphal: 6.59%) than that of the health personnel (Saikul: 0.81%; Imphal: 1.59%) in both the study areas. Pooling data for the infant and child mortality rates, there is a significant

negative correlation between them and persons conducting delivery in both the study areas (Saikul: $r = -0.12$, $p < 0.05$; Imphal: $r = -0.39$, $p < 0.01$), although it is higher in Imphal town.

Diet of the mothers

Table 5.27. Additional diet of the Khongsai Kuki mothers during pregnancy

Additional diet*	SAIKUL (n = 323)		IMPHAL (n = 124)	
	No.	%	No.	%
Fruits	33	10.22	42	33.87
Fresh milk	4	1.24	14	11.29
Raw egg	3	0.93	9	7.26
Meat and/or Fish	3	0.93	28	22.58
Nutrients	8	2.48	6	4.84
Overall diet takers**	39	12.07	71	57.25

χ^2 difference for Saikul and Imphal is 52.56, d.f. = 1, $p < 0.005$
*Based on the last pregnancy
**Based on the number of mothers who took at least one of the mentioned diets.

Table 5.27 shows the percentage of the Khongsai Kuki mothers by additional diet taken during pregnancy. There are altogether 323 mothers in Saikul sub-division and 124 mothers in Imphal town who have had at least one pregnancy. It is observed that additional diet taken during pregnancy is very rare among the mothers living in Saikul sub-division (12.07%) compared to their Imphal counterparts (57.25%). 'Fruits' is the most preferred diet by mothers of both the study areas. The frequency of mothers taking fruits during pregnancy is 10.22% for Saikul sub-division and 33.87% for Imphal town. It also shows that the frequency of mothers taking fresh milk, raw egg, meat and/or fish and

nutrients are 1.24%, 0.93%, 0.93% and 2.48% respectively in Saikul sub-division; 11.29%, 7.26%, 22.58% and 4.84% respectively in Imphal town. The difference between the two study areas in respect of the overall percentage of mother's additional diet taken during pregnancy is highly significant ($\chi^2 = 52.56$, d.f. = 1, $p < 0.005$).

Table 5.28. Special diet of the Khongsai Kuki mothers after delivery

Special diet*	SAIKUL (n = 314)		IMPHAL (n = 123)	
	No.	%	No.	%
Chicken and/or its soup	179	57.01	86	69.92
Fruits	3	0.96	7	5.69
Fresh milk	16	5.11	28	22.76
Raw egg	20	6.37	13	10.57
Beef soup	1	0.32	7	5.69
Nutrients	21	6.69	30	24.39
Overall diet takers**	185	58.92	106	86.18

χ^2 difference for Saikul and Imphal is 5.56, d.f. = 1, $p < 0.025$
*Based on the last delivery
**Based on the number of mothers who took at least one of the mentioned diets.

Table 5.28 shows special diet of the Khongsai Kuki mothers during the first week after delivery. There are altogether 314 mothers in Saikul and 123 mothers in Imphal who have had at least one live birth. The overall percentage of mothers taking special diet is much more in Imphal town (86.18%) compared to their Saikul counterparts (58.92%), and the difference between the two areas is also statistically significant ($\chi^2 = 5.56$, d.f. = 1, $p < 0.025$). Chicken and/or its soup is the most common special diet after delivery in both the study areas. There are 57.01% of mothers in Saikul sub-division and 69.92% in

Imphal town who took chicken and/or its soup. Other special diet includes fruits, fresh milk, raw egg, beef soup and nutrients.

Immunization and child care

For the present study, we included those mothers having child born in the last five years preceding the survey to find out the influence of immunization and child care on the infant and child mortality rates in the present population.

Feeding of colostrums

Table 5.29. Infant and child mortality rates by feeding of colostrums of the Khongsai Kuki mothers

Feeding of colostrums	No. of mothers	No. of live births	Mortality rate (per 100 live births)		
			Below 1 year	1-14 years	Total
SAIKUL					
No	81	321	14	8	22
(%)	(35.23)		(4.36)	(2.49)	(6.85)
Yes	149	511	7	10	17
(%)	(64.78)		(1.36)	(1.95)	(3.32)
Coefficient of correlation (r)			0.04	0.04	0.06
IMPHAL					
No	9	33	0	1	1
(%)	(13.43)		(0.00)	(3.03)	(3.03)
Yes	58	146	2	3	5
(%)	(86.57)		(1.36)	(2.07)	(3.42)
Coefficient of correlation (r)			- 0.07	- 0.09	- 0.03

Table 5.29 shows the infant and child mortality rates by feeding of colostrums of the Khongsai Kuki mothers. It is observed that the frequency of mothers who fed colostrums to their children is higher than those who did not fed in both the study areas. There are

64.78% of mothers in Saikul sub-division and 86.57% in Imphal town who fed colostrums to their children indicating that the frequency of mothers feeding colostrums is much higher in urban area than the rural area. The Infant mortality rate is higher to mothers who did not fed colostrums (4.36%) than those who fed (1.36%) in Saikul sub-division. But, the reverse is true in the case of Imphal town where there is no infant death to mothers who did not fed. The infant mortality rate in this area for mothers who fed colostrums is 1.36%. But, the relationship between the infant mortality rates and feeding of colostrums is not statistically significant in both the areas (Saikul: $r = 0.04$, $p > 0.05$; Imphal: $r = - 0.07$, $p > 0.05$). It also shows that the child mortality rate in both the study areas are higher to mothers who did not fed colostrums than those who fed, although their relationship is not statistically significant (Saikul: $r = 0.04$, $p > 0.05$; Imphal: $r = - 0.09$, $p > 0.05$). So, feeding of colostrums has no significant influence on the infant and child mortality rates in the present study population.

Persons consulted for diarrhoea

Table 5.30 shows the infant and child mortality rates by persons consulted for treatment of diarrhoea of the Khongsai Kuki. It is seen that consultation of doctor for treatment of diarrhoea is high in both Saikul sub-division (73.04%) and Imphal town (83.58%), although it is slightly higher in Imphal town. The infant and child mortality rates are higher to mothers who consulted medicine man rather than doctor in both Saikul sub-division and Imphal town although the relationship between them is not statistically significant in both the study areas. The infant mortality rates in Saikul sub-division are

4.11% and 1.96% to mothers who consulted medicine man and doctor respectively. The same in Imphal town are 2.56% and 0.71% respectively. The child mortality rates to mothers who consulted doctor are 1.79% in Saikul sub-division and 1.43% in Imphal town, whereas these are 3.26% and 5.13% respectively among mothers who consulted medicine man. Pooling data for the infant and child mortality rates, their relationship with persons consulted for diarrhoea is statistically significant in Saikul sub-division ($r = 0.16$, $p < 0.01$) although it is not significant in Imphal town ($r = 0.23$, $p > 0.05$). So, consulting doctor seems to play a significant role in reducing the total mortality rates in Saikul sub-division.

Table 5.30. Infant and child mortality rates by persons consulted for treatment of diarrhoea of the Khongsai Kuki

Persons consulted	No. of mothers	No. of live births	Mortality rate (per 100 live births)		
			Below 1 year	1-14 years	Total
SAIKUL					
Doctor	168	613	12	11	23
(%)	(73.04)		(1.96)	(1.79)	(3.75)
Medicine man	62	219	9	7	16
(%)	(26.95)		(4.11)	(3.26)	(7.31)
Coefficient of correlation (r)			0.12	0.11	0.16**
IMPHAL					
Doctor	56	140	1	2	2
(%)	(83.58)		(0.71)	(1.43)	(1.43)
Medicine man	11	39	1	2	3
(%)	(16.42)		(2.56)	(5.13)	(7.69)
Coefficient of correlation (r)			0.09	0.21	0.23

**$p < 0.01$

Persons consulted for Pneumonia

Table 5.31. Infant and child mortality rates by persons consulted for treatment of Pneumonia of the Khongsai Kuki

Persons consulted	No. of mothers	No. of live births	Mortality rate (per 100 live births)		
			Below 1 year	1-14 years	Total
SAIKUL					
Doctor	176	638	12	13	25
(%)	(76.52)		(1.88)	(2.04)	(3.92)
Medicine man	54	194	9	5	14
(%)	(23.47)		(4.64)	(2.58)	(7.22)
Coefficient of correlation (r)			0.15*	0.03	0.12
IMPHAL					
Doctor	55	138	0	3	3
(%)	(82.08)		(0.00)	(2.17)	(2.17)
Medicine man	12	41	2	1	3
(%)	(19.91)		(4.88)	(2.44)	(7.32)
Coefficient of correlation (r)			0.38**	0.05	0.26*

*p < 0.05, **p < 0.01

The infant and child mortality rates by persons consulted for treatment of Pneumonia of the Khongsai Kuki is shown in Table 5.31. Majority of the mothers in both Saikul sub-division (76.52%) and Imphal town (83.58%) consulted doctor for treatment of Pneumonia. It shows that the infant mortality rates are higher to mothers who consulted medicine man rather than doctor for treatment of Pneumonia in both the study areas. Their relationship is statistically significant as well in both the study areas (Saikul: r = 0.15, < 0.05; Imphal: r = 0.38, p < 0.01). The infant mortality rates are 1.88% for mothers who consulted doctor and 4.64% for mothers who consulted medicine man in Saikul sub-division, whereas in Imphal town, these are 4.88% among mothers who consulted medicine man and no infant death to mothers who consulted doctor. The child mortality

rate is more or less similar to mothers who consulted doctors as well as medicine man, though it is slightly higher to the later in both the study areas. The coefficients of correlations also shows no significant relationship between the child mortality rates and person consulted in both the study areas (Saikul: $r = 0.03$, $p > 0.05$; Imphal: $r = 0.05$, $p > 0.05$). However, pooling data for infant and child mortality rates, their relationship with persons consulted is statistically significant in Imphal town ($r = 0.26$ $p < 0.05$), although it is not significant in Saikul sub-division ($r = 0.12$, $p > 0.05$).

Immunization for children

Table 5.32. Reported immunizations of the Khongsai Kuki children aged 1-5 years

Vaccinations	SAIKUL		IMPHAL	
	No.	%	No.	%
Males				
Polio	166	93.26	48	97.96
BCG	161	90.44	41	83.67
Whooping cough	53	29.78	28	57.14
Measles	78	43.82	36	73.47
No immunization	16	8.98	2	4.08
Overall immunization rate*	162	91.01	47	95.92
Total no. of children	178	100.00	49	100.00
χ^2 difference for Saikul and Imphal is 0.05, d.f. = 1, $p > 0.05$				
Females				
Polio	186	98.93	49	98.00
BCG	172	91.49	46	92.00
Whooping cough	57	30.32	31	62.00
Measles	74	39.36	38	76.00
No immunization	15	7.97	2	4.00
Overall immunization rate*	173	92.02	48	96.00
Total no. of children	188	100.00	50	100.00
χ^2 difference for Saikul and Imphal is 0.03, d.f. = 1, $p > 0.05$				

* Based on the no. of children who received at least two of the given vaccinations.

Table 5.32.1. Regression of immunization of the Khongsai Kuki children aged 1 - 5 years on independent factors

Parameters	Coefficient of regression (B) and its Standard Error (SE) B ± SE	t - value	p – level
Immunization			
Age of children	- 0.002 ± 0.009	- 0.262	Insignificant
Sex of children	0.000 ± 0.024	0.017	Insignificant
Residence (Saikul/Imphal)	- 0.034 ± 0.038	- 0.908	Insignificant
Maternal education	0.036 ± 0.020	1.807	Significant at 5%
Paternal education	0.014 ± 0.018	0.774	Insignificant
Household income	0.038 ± 0.018	2.137	Significant at 5%
Family size	- 0.009 ± 0.018	- 0.516	Insignificant
Constant	0.842 ± 0.074	11.454	Significant at 1%

Table 5.32 shows the reported immunization of the Khongsai Kuki children aged 1 - 5 years. It shows that the overall immunization rate is higher in Imphal town than in Saikul sub-division among both males (Saikul: 91.01%; Imphal: 95.92%) and females (Saikul: 92.02%; Imphal: 96.00%). However, the differences between the two study areas among males ($\chi^2 = 0.05$, d.f. = 1, $p > 0.05$) as well as females ($\chi^2 = 0.03$, d.f. = 1, $p > 0.05$) are not statistically significant. The most common type of vaccination is polio and BCG in both the study areas. There are 93.26% of males in Saikul sub-division and 97.96% in Imphal town who are vaccinated with polio, whereas these among females are 98.93% and 98.00% respectively. The frequency of males who are vaccinated with BCG is 90.44% and 83.66% in Saikul sub-division and Imphal town respectively. Among females, it is 91.49% and 92% respectively. The frequency of immunizations of

whooping cough and measles is lower than polio and BCG in both the study areas. The table further shows that there is no sex differentiation in respect of the overall frequency of immunization in both the study areas.

Table 5.32.1 shows the regression of immunization of the Khongsai Kuki children aged 1-5 years on independent factors. Of all the independent factors, only maternal education ($B = 0.036 \pm 0.020$, $p < 0.05$) and household income ($B = 0.038 \pm 0.018$, $p < 0.05$) are significantly associated with immunization of children. In other words, the frequency of immunization of children is more likely to increase as the mother's educational level and household income increases in the present population.

Reported child morbidity

Table 5.33 shows the reported morbidity of the Khongsai Kuki children below 15 years of age. There are altogether 420 males and 430 females in Saikul sub-division, whereas 139 males and 114 females are in Imphal town. It is observed that, cold and respiratory disorder is the most common type of disease among both males and females in Saikul sub-division and Imphal town. It is seen that 123 (29.28%) males and 137 (31.86%) females in Saikul sub-division whereas 38 (27.34%) males and 36 (31.58%) females in Imphal town suffer from cold and/or respiratory disorders. Other type of diseases (i.e., malaria, fever, headache, etc.) is responsible for the morbidity of 21 (5.00%) males and 28 (6.51%) females in Saikul sub-division; and 9 (6.47%) males and 7 (6.14%) females in Imphal town. There are also 15 (3.57%) males and 19 (4.42%) females in Saikul sub-division; and 4 (2.87%) males and 5 (4.38%) females in Imphal town who suffer from

intestinal disorders. Comparing the two study areas, the overall prevalence of morbidity among both males and females are slightly higher in Saikul sub-division. These are 34.76% for Saikul sub-division and 33.81% for Imphal town among males, whereas these are 38.37% and 36.84% respectively among females. However, the differences between males as well as females in the two study areas are not statistically significant (Male: $\chi^2 = 0.02$, d.f. = 1, $p > 0.05$; Female: $\chi^2 = 0.04$, d.f. = 1, $p > 0.05$). It is further observed that, combining males and females, the overall prevalence of child morbidity is found to be higher in Saikul sub-division compared to their Imphal counterparts.

Table 5.33. Reported morbidity of the Khongsai Kuki children below 15 years of age

Morbidity status	SAIKUL		IMPHAL	
	No.	%	No.	%
Males				
Cold and/or respiratory disorders	123	29.28	38	27.34
Intestinal disorders*	15	3.57	4	2.87
Others**	21	5.00	9	6.47
No reported morbidity	274	65.24	92	66.19
Overall prevalence of morbidity***	146	34.76	47	33.81
Total no. of children	420	100.00	139	100.00
χ^2 difference for Saikul and Imphal is 0.02, d.f. = 1, $p > 0.05$				
Females				
Cold and respiratory disorders	137	31.86	36	31.58
Intestinal disorders*	19	4.42	5	4.38
Others**	28	6.51	7	6.14
No reported morbidity	265	61.63	72	63.16
Overall prevalence of morbidity***	165	38.37	42	36.84
Total no. of children	430	100.00	114	100.00
χ^2 difference for Saikul and Imphal is 0.04, d.f. = 1, $p > 0.05$				

* Intestinal disorders include diarrhea and dysentery.
** Other health problems include malaria, fever, headache, etc.
*** Based on the no. of children with reported morbidity.

Table 5.33.1. Regression of reported morbidity of the Khongsai Kuki children below 15 years on independent factors

Parameters	Coefficient of regression (B) and its Standard Error (SE) B ± SE	t – value	p – level
Health problems			
Age of children	- 0.034 ± 0.004	- 9.148	Significant at 1%
Sex of children	0.036 ± 0.028	1.263	Insignificant
Residence (Saikul/Imphal)	0.141 ± 0.062	2.282	Insignificant
Maternal education	- 0.046 ± 0.022	- 2.123	Significant at 5%
Paternal education	- 0.010 ± 0.021	- 0.480	Insignificant
Household income	- 0.003 ± 0.021	- 0.150	Insignificant
Types of house	0.005 ± 0.036	0.127	Insignificant
Types of toilet	- 0.064 ± 0.049	- 1.316	Insignificant
Immunization	- 0.162 ± 0.088	- 1.844	Insignificant
Constant	0.530 ± 0.086	6.161	Significant at 1%

Table 5.33.1 shows the regression of reported morbidity of the Khongsai Kuki children below 15 years of age on independent factors. It shows that of all the independent variables, the coefficients of regression (B) is negatively associated with age of the children ($B = - 0.034 \pm 0.004$, $p < 0.01$) and maternal education ($B = - 0.046 \pm 0.022$, $p < 0.05$). In other words, the child morbidity is likely to decrease with the increasing age of the children and higher educational level of the mothers. The above table further shows that of the two factors, age of children is found to be the most important factor influencing the child morbidity in the present study population.

CHAPTER - VI

DISCUSSION

In the preceding chapters, we have presented our findings on the biological and social factors that determine the fertility and child mortality among the Khongsai Kukis of Saikul sub-division and Imphal town in Manipur.

This thesis is an attempt to find out the demographic structure, status of fertility and child mortality, and bio-social determinants responsible for fertility and child mortality among the Khongsai Kuki population of Saikul Sub-division and Imphal town in Manipur. In this chapter, we shall briefly discuss our findings in the context of other neighbouring populations, especially of the Northeast India in order to understand the status of fertility and child mortality of the present population. We shall also compare the selected indicators between the two study areas in a view to understand the rural-urban differences in the present population. Therefore, we had selected Saikul sub-division in Senapati district and Imphal town of Manipur to represent the rural and urban areas respectively.

Demographic characteristics

The demographic structure of the Khongsai Kukis in Saikul sub-division and Imphal town of Manipur has been discussed in Chapter-IV. According to Sundbarg's classification of population (Datta, 1972), a population is referred to as *progressive* when the proportions of persons relative to the total population are 40.00%, 50.00% and 10.00% in the age groups 0-14 years, 15-49 years and 50+ years respectively. Following this, both the populations of Saikul sub-division and Imphal town are of *progressive type*. The overall sex ratio, i.e., the number of males per 100 females, of the population is

higher in Imphal town (112.77) as compared to their Saikul counterparts (103.17). However, the same in Saikul sub-division is found to be very near to the ideal sex ratio of 1:1, but the differences in the overall sex ratio are not statistically significant in both the study areas (Saikul: $\chi^2 = 0.31$, d.f. = 1, $p > 0.05$; Imphal: $\chi^2 = 1.60$, d.f. = 1, $p > 0.05$). The overall sex ratio of the scheduled tribe population in rural Manipur (1:0.98) seems to have a close relationship with the present population in Saikul sub-division (Statistical Abstract Manipur, 2008). But, the overall sex ratio of the present study in both areas are higher than those reported among the Christians (96.54) and Niam (97.99) Khasis of Meghalaya by Mukherjee (2002); the rural (98.79) and urban (99.76) Lois of Manipur by Chanu (2007).

In Saikul sub-division, there is no difference in the sex ratio as we move up from the age group 0-14 years to 15-49 years, indicating a similar child mortality rate among males and females till the reproductive age group. However, the sex ratio in the post-reproductive age group (192.15) is significantly higher than the ideal sex ratio of 1:1 ($\chi^2 = 12.45$, d.f. = 1, $p < 0.005$) indicating that the average longevity is much more in males than in females. In Imphal town, although the sex ratio in the pre-reproductive age group (116.94) is very much tilted in favour of males, the same in the reproductive age group is exactly according to the ideal sex ratio of 1:1. Like in the case of Saikul sub-division, the sex ratio in the post-reproductive age group (6.46) in Imphal town is higher than the ideal sex ratio of 1:1, where the differences are highly significant ($\chi^2 = 6.46$, d.f. = 1, $p < 0.025$) indicating the higher average longevity among males.

Age at marriage has been recognized as one of the prominent determinants influencing fertility. It has a profound impact on childbearing because women who marry at an early age have on average, a longer period of exposure to pregnancy and a greater number of childbirths. The mean age at marriage of the Khongsai Kuki women is greater in Imphal (i.e., 22.24 ± 0.16 years) than in Saikul sub-division (i.e., 20.36 ± 0.09 years). Similarly, the Khongsai Kuki males in Imphal town (26.85 ± 0.31 years) have the greater mean age at marriage than their Saikul counterparts (25.19 ± 0.22 years). Singh (2006) reported that the mean age at marriage among the Meitei, Pangal, Nepali and Kabui women of Manipur is 19.98 ± 0.34 years, 17.54 ± 0.21 years, 17.33 ± 0.22 years and 20.03 ± 0.12 years respectively. Chanu (2007) also reported the mean age at marriage among the Loi women in urban and rural Manipur as 21.87 ± 0.27 years and 20.95 ± 0.23 years respectively. So, the Khongsai Kuki women in both the study areas married later than all the above populations, excepting in the case of urban Loi women who married later than the Khongsai Kuki women in Saikul sub-division. The greater mean age at marriage among the present population in Imphal town may be mainly due to the influence of various social factors such as education and awareness of the family planning that are expected to be higher in urban areas than in rural areas.

Like age at marriage, the mean age at first child birth among the present population is greater in Imphal than in Saikul sub-division. It is 28.21 ± 0.32 years for males and 23.70 ± 0.16 years for females in Imphal town, and 21.60 ± 0.10 years and 26.29 ± 0.23 years respectively for Saikul sub-division. Combining the two study areas of

both males and females, the mean age at first child birth of the Khongsai Kuki is found to be 24.51 ± 0.15 years.

Age at menarche is another important parameter in bio-demographic studies. The mean menarcheal age among the Khongsai Kuki women is greater in Saikul (i.e., 14.53 ± 0.21 years) than in Imphal (i.e., 13.94 ± 0.08 years) area. Pooling data of both the study areas together, the mean age at menarche is 14.37 ± 0.05 years. Purngula and Sengupta (2002) reported the mean menarcheal age among the Ao Naga girls of Nagaland is 14.88 years. Prakash et al, (2010) reported the mean menarcheal age among Kapu, Paki, Settibalija and Yerukula of Coastal Andhra Pradesh as 13.19 years, 12.75 years, 12.69 years and 11.99 years respectively. So, it is observed that the mean menarcheal age among the present population, combining both the areas, is slightly lower than of the Ao Naga girls, but greater than the Kapu, Paki, Settibalija and Yerukula. Malnutrition, low socio-economic factors, rural-urban residence, family size etc. may be attributed to the greater mean age at menarche in rural populations (Kalita and Sengupta, 1997; Majumdar, 1996; Biswas and Kapoor, 2003).

1. Fertility Differentials

In the present study, we have included two measures of fertility, namely, the mean number of live births (or average number of live births) per married women aged 15-49 years, and the total marital fertility rate (TMFR) which is the sum of the age-specific marital fertility rate (ASMFR). The ASMFR was calculated by dividing the number of

live births in a given age group during the five-year period preceding the survey by the number of ever married women in that age group for the same period.

The mean number of live births per mother among the Khongsai Kuki is higher in Saikul sub-division than (3.74 ± 0.11) in Imphal town (3.19 ± 0.13), although it is not statistically significant ($t = 0.93$, $p > 0.05$). The higher fertility rates in rural areas than urban areas were also reported by Ahmed, 1985; UN, 1999; Findley, 2005 and Kullu, 2006. Pooling the data of both the study areas together, the mean number of live births per mother among the Khongsai Kuki population is found to be 3.59 ± 0.09. The mean number of live births per mother among the present population is higher than that of the Lois (2.56) of Imphal Valley (Chanu, 2007), overall Manipur (2.08) (NFHS-3) and overall Northeast (3.07) of India (Dey and Goswami, 2009) but lower than the Meitei (4.01), Kabui (4.12) and Nepali (4.15) of Manipur (Singh, 2006) and Khasis (5.18) of Shillong (Mukherjee, 2002). However, it is more or less similar with the Meiteis in Northeast India (Das and Mithun, 2010). Like the mean number of live births, the TMFR among the Khongsai Kuki is higher in Saikul (4.84) than in Imphal (3.71). Combining data for the two study areas, the TMFR of the present population is found to be 4.27, which is higher than the Lois (3.91) of Imphal Valley (Chanu, 2007) but lower than the Digaru Mishmi (4.45) of Arunachal Pradesh (Gogoi, 2008), Semsa (6.02) of Assam (Limbu, 1996), Hmars (6.10) of Mizoram (Varte, 2006), and the War Khasi of Meghalaya (Khongsdier, 2005c).

The completed fertility size (i.e., mean live births to mothers who are aged 45 and above years, and lived continuously in wedlock till the attainment of 45 years of age) is slightly higher in Saikul sub-division (5.78) compared to their Imphal counterparts (5.28). Pooling the data of both the areas together, the completed fertility size of the Khongsai Kuki is found to be 5.48. The completed fertility size among the Kota is reported to be 3.67 live births per mother (Ghosh, 1976). Khongsdier (1993) reported that, the completed fertility size among the Christian and non-Christian War Khasi is 6.69 and 6.61 live births per mother respectively. The completed fertility size among the Semsa is found to be 7.52 live births per mother (Limbu, 1996). Gogoi (2008) observed that the completed fertility size among the Idu Mishmi, Digaru Mishmi and Miju Mishmi as 4.86, 6.12 and 6.48 respectively. Comparing with the above populations, the completed fertility size among the Khongsai Kuki is found to be higher than the Kota and Idu Mishmi, but lower than the Digaru Mishmi, Miju Mishmi, Christian War Khasi, non-Christian War Khasi and Semsa. Therefore, the completed fertility size of the Khongsai Kuki seems to be moderate in comparison to the above populations. The average number of surviving children per mother who are aged 45 and above years and live continuously in wedlock till the attainment of 45 years in the present population is higher in Saikul sub-division (5.28) than in Imphal town (4.60). Pooling the data for both the present study areas, it is found to be 5.07.

The child-women ratio among the Khongsai Kuki in Saikul sub-division (75.71) is slightly higher than their Imphal (73.22) counterparts. Pooling the data for both areas, the child-women ratio in the present population is found to be 74.51 which is higher than

that of the Miju Mishmi (27.49), Idu Mishmi (37.43) and Digaru Mishmi (43.07) of Arunachal Pradesh (Gogoi, 2008), Semsa (50.23) of Assam (Limbu, 1996), Kota (62.17) of Nilgiri Hills (Ghosh, 1976) and Christian (61.48) and non-Christian (62.10) War Khasi of Meghalaya (Khongsdier, 1993). But, the same is lower than the Dinka (78.00) as reported by Roberts (1956) and Pnars (86.96) of Jaintia Hills (Khongsdier, 1992). So, it is observed that the child-women ratio among the Khongsai Kuki population is high, especially when compared to other populations in Northeast India. The reason for the higher child-women ratio in the present population is due to lower mortality rate upto the age of 4 years. The average number of surviving children per all married women in this population is found to be slightly higher in Saikul sub-division (3.51) than in Imphal town (3.06).

2. Mortality Differentials

Mortality rate is defined as the number of deaths registered in a given year to the total number of live births in a given year, usually expressed per 1000 live births. But, mortality rate, for the present study has been expressed as the number of deaths per 100 live births. The total mortality rate among the Khongsai Kuki population, based on all live births is 6.10% in Saikul and 3.95% in Imphal indicating that the overall mortality rate of the preset study is higher in rural than in urban area as reported by Rambhadran and Swami (1982) and NFHS-3 (IIPS, 2007).

(a) *Infant mortality rate:* The infant mortality rate among the Khongsai Kuki is significantly higher ($\chi^2 = 4.02$, d.f. = 1, $P < 0.05$) in Saikul sub-division than

that of the Imphal town. It is 2.39% and 0.99% per 100 live births respectively. Pooling data of both the areas of study, the infant mortality rate among the Khongsai Kuki is found to be 2.05%. NFHS-3 (IIPS, 2007) reported the infant mortality rate of both rural and urban India during 2001-05 as 6.2% and urban 4.2% respectively. It is 6.82% and 8.60% among the Christian and Niam Khasi of Meghalaya (Mukherjee, 2002). Gogoi (2008) reported that the infant mortality rate among the Digaru, Miju, and Idu Mishmi of Arunachal Pradesh is 10.56%, 13.22% and 6.28% respectively. So, the infant mortality rate in the present population is quite low as compared to other populations of India and Northeast India. However, the present findings in both rural and urban areas are closely related with the Lois of rural (2.09%) and urban (1.02%) Manipur respectively (Chanu, 2007).

(b) Child mortality rate: For the child mortality rate in the present study, we have taken into consideration between the ages of 1 to 14 years. So, the child mortality rate among the Khongsai Kuki is found to be higher in Saikul sub-division (3.51%) than in Imphal town (2.72%) though they are statistically not significant ($\chi^2 = 1.41$, d.f. = 1, $P > 0.05$). Pooling data for both the present study areas together, the child mortality rate per 100 live births among the Khongsai Kuki is found to be 3.32% which is much lower than those reported among the Christian (10.20%) and Non-Christian War Khasi (12.45%) of Meghalaya (Khongsdier, 1995); the Semsa (31.60%) of Assam (Limbu, 1996); the Digaru Mishmi (21.12%), Miju Mishmi (21.74%) and Idu Mishmi (8.29%)

of Arunachal Pradesh (Gogoi, 2008). But, it is higher than the Lois of rural (0.37%) and urban (0.26%) Manipur (Chanu, 2007). However, it can be concluded that the child mortality rate among the Khongsai Kuki population in Manipur is low as compared to the other populations in Northeast India.

The infant and child mortality rates in the present population are higher in Saikul sub-division than in Imphal town which in corresponding to the previous findings by Sembajawe (1977), RGI (2004), NFHS-3 (IIPS 2007), Andoh et al (2007). These differences are mainly due to the differences in age at marriage, maternal and paternal education, household income, ANC characteristics, etc., between the two study areas.

3. Reproductive Wastages

The frequency of reproductive wastages (abortions and still births) based on the total number of pregnancies among the Khongsai Kuki married women in Saikul is 8.87% (7.05% abortions and 1.82% still births), whereas it is 8.39% (7.95% abortions and 0.45% still births) in Imphal. So, there is similarity in the frequency of reproductive wastages between both Saikul and Imphal, though it is slightly higher in Saikul. Pooling both areas together, the frequency of reproductive wastage among the Khongsai Kuki married women is 8.76% which is lower than the Hajong (15.60%) of Meghalaya (Barua, 1982). It is similar with the Munda (8.83%) of Assam (Gogoi, 2002), Non-Christian War Khasi (8.09%) of Meghalaya (Khongsdier, 1995) and Khasi (8.16%) of Maghalaya (Mukherjee, 2002). But the same is higher than those reported among the Hmars (4.11%) of Mizoram (Varte, 2006), Lois (5.62%) of Manipur (Chanu, 2007), Semsa (5.90%) of

Assam (Limbu, 1996), Nepalese (5.92%) of Manipur (Singh, 2006), Christian War Khasi (7.68%) of Meghalaya (Khongsdier, 1993) and Meitei (7.85%) of Manipur (Singh, 2006). Combining the rates of child mortality and reproductive wastage together, it is found that the potential offspring loss among the Khongsai Kuki in both the study areas is 13.82%. From the above findings, we can conclude that the frequency of reproductive wastage among the Khongsai Kuki women is high in comparison to the other populations of Northeast India. It is not clear why the reproductive wastages in Imphal town is as high as of that of Saikul sub-division despite having greater score in respect of ANC characteristics than their Saikul counterparts as the present study mainly deals with the fertility and mortality.

Determinants of fertility and child mortality

Many previous findings have suggested that biological as well as social factors such as women's age, age at marriage, age at menarche, age at first child birth, age at menopause, type of marriage, education, economic status, religious attitudes, adoption of contraceptive devices and others have an effect on fertility and mortality (RGI, 1971; Caldwell, 1979; Lee, 1979; Elamin and Bhuyan, 1999; Reddy et al, 2006).

Biological factors

The highest number of the mothers in both Saikul sub-division (39.10%) and Imphal town (41.73%) belong to the age group 26 – 35 years. Regarding age at marriage, the highest number of mothers in Saikul sub-division married at the age of $\leq$ 19 years, whereas majority of them in Imphal town married at the age of 20-23 years. ABO blood

group incompatible mating in the present population is slightly higher in Saikul sub-division (45.50%) than in Imphal town (43.65%). So, ABO blood group incompatible mating in the present population of both the areas are higher than those reported among the Digaru Mishmi (28.72%), Miju Mishmi (38.05%) and Idu Mishmi (35.99%) by Gogoi (2008), but similar with the Gonds of Garriyaband, Chhattisgarh (44.66%) (Soni and Mukherjee, 2009).

Of the biological factors included in the present study, higher age group of the mothers, earlier age at marriage, lower mean birth intervals were found to be significantly related with higher fertility rates in Saikul sub-division. But, in Imphal town, only age group of the mothers seems to have a significant role in reducing the fertility rate, i.e., mother's age group is corresponding to the fertility rates. However, the impact of mother's age at marriage in this area is not negligible, as the fertility rate tends to decline with the higher age group at marriage. Similar findings on the influence of maternal age and age at marriage were reported by Pandey and Talwar (1987), Yadav and Badari (1997), Khongsdier (2002), Maheo (2004) and Bhasin and Nag (2007). Further, ABO compatible type of mating seems to have no significant role in influencing the fertility rate in the present population.

ABO compatible types of mating is found to reduce the infant mortality rate in Saikul sub-division, whereas greater mean birth interval is significantly related with lower infant mortality rates in both Saikul sub-division and Imphal town. Although, age of the mothers is not found to play a significant role in reducing the infant mortality rates,

it is significantly associated with the child mortality rates in both the study areas. In other words, higher age group of the mothers is significantly associated with higher child mortality rates. It may be mentioned that younger mothers are more likely to attend ANC than the older ones **(Table 5.22.3)** and that ANC attendance is significantly associated with the child mortality rates in both Saikul sub-division and Imphal town **(Table 5.22.2)**. Unlike in the case of infant mortality, ABO compatible mating type is equally important in reducing the child mortality rates in both the study areas. The impact of mother's age at marriage, birth order, and causes of infant and child deaths on infant and child mortality are not found in the present population of both Saikul sub-division and Imphal town.

The regression analysis shows that maternal age at marriage is independently associated with rural-urban setting and maternal education. In other words, mothers who are in Imphal town and mothers who are in higher level of education are likely to marry later than their other counterparts. Higher household income and smaller family size are also significantly associated with greater mean birth interval in the present study.

So, the importance of biological factors in influencing the fertility as well as infant and child mortality rates in the present study is found to be more in Saikul sub-division than their Imphal counterparts.

Socio-economic factors

Nuclear type of family is very common in both Saikul sub-division and Imphal town as there are 71.04% of mothers in Saikul sub-division and 85.04% in Imphal town. The highest frequency of mothers in Saikul sub-division (44.57%) belong to the large size family, whereas it is medium size family in Imphal town (44.88%). The frequency of consanguineous marriage is very less in the present population although it is slightly higher in Saikul sub-division (4.18%) than in Imphal town (3.93%). Rural and urban setting seem to play an important role in the educational level of the parents as there are 14.33% of mothers and 4.27% of fathers in Saikul sub-division who are illiterates against none in Imphal town. Cultivation, being the main occupation in Saikul sub-division, majority of the mothers (8.82%) and fathers (72.56%) in this area belong to this category. On the other hand, majority of the mothers in Imphal town are housewives (37.79%) and service holders (37.79%), whereas service is the main occupation of the fathers (87.70%) in this area. Household income is higher in Imphal town compared to their Saikul counterparts as majority of the mothers in Saikul sub-division belong to LIG (60.00%), although the highest frequency of mothers in Imphal town belong to HIG (40.94%). Majority of the mothers (63.88%) in Saikul sub-division lived in *kaccha* type of house, whereas majority of them (70.86%) in Imphal town lived in *pucca* house.

In the present study, it is observed that smaller size of family and higher educational level of the mothers and joint type of family are associated with low fertility rate in both the study areas. Besides, higher educational level of the fathers in Saikul sub-division is related to low fertility rate, whereas mothers who are service holders is

significantly related to high fertility rate in this area. The fact that women's education has a positive impact on fertility reduction has been established by many others (Bulanto et al, 1993; Khakhar and Gulati, 2000; Dwivedi and Rajaram, 2004; NFHS-2 (IIPS, 2007), Dey and Goswami, 2009). Household income is found to play a significant role in reducing the fertility rate in Imphal town. The same is also true in the case of Saikul sub-division despite the absence of statistical differences.

The relationship between the infant mortality and type of family, maternal education, paternal education, paternal occupation and type of house are significant negative in Saikul sub-division. In other words, joint type of family, higher parental education, better paternal occupation and better house type can significantly reduce the infant mortality rate in this area. Interestingly, none of the selected socio-economic factors are found to play a significant role on infant mortality in Imphal town. However, the impact of nuclear type of family, higher paternal education in reducing the infant mortality could not be ruled out in Imphal town. Household income also seems to play an important role in reducing the infant mortality rate in both the study areas, despite the absence of statistical significance.

The correlation between the child mortality rate and maternal as well as paternal education is highly significantly in Saikul sub-division signifying the decline in the child mortality rate as the parental educational level increases. Hygienic types of toilet as well, can significantly reduce the child mortality rate in this area. Gubhaju et al, (1991) also reported that toilet facility is an important determinant of mortality rate. In Imphal town,

maternal education and paternal education are found to play an important role in declining the child mortality rate, although the relationship between child the mortality and paternal education is not statistically significant. Although the influence of paternal occupation, household income, types of house and source of drinking water on the child mortality rate is not statistically significant in Saikul sub-division, they have a significant impact on the total mortality rates, i.e., pooling data for infant and child mortality rates. However, education and hygienic types of toilet seems to be the most important factor in reducing the child mortality rate in the present population. Further, the determinants of socio-economic factors on the child mortality rate in the present population are higher in Saikul sub-division than in Imphal town.

The mean actual and desire number of children are found to be significantly higher among mothers in Saikul sub-division than their Imphal counterparts. The t-values between the two areas are 2.22, $p < 0.05$ for actual and 4.04, $p < 0.05$ for desired number of children. Male child is much preferred over female child by mothers of both the study areas. Son preference is much higher among mothers in Saikul sub-division (81.80%) than their Imphal counterparts (57.50%). There are also 17.61% of mothers in Saikul sub-division and 37.79% in Imphal town with no sex preference of the child.

With the lower rate of consanguineous marriage as well as mother's preference on female child in the present study, their association with fertility and child mortality could not be perceptible.

Family planning

Mother's awareness and positive attitude of family planning method is quite high in the present population (Saikul: 82.08%; Imphal: 92.12%), although only 13.43% of couples in Saikul sub-division and 28.35% in Imphal town were found to have adopted family planning. Ramesh et al, (1996) also reported that knowledge of contraception is almost universal among Indian, but only 41% are actually using contraception. Adoption of family planning among the Khongsai Kukis is lower than those reported among the Assamese Hindus (61.30%), Muslims (46.10%) and Christians (45.60%) (NFHS-3) (IIPS, 2007); the Loi of Manipur (41.76%) (Chanu, 2007) and Nauruan (36.00%) (DHS Report, 2007). Lack of reliable source of family planning method is expected to the main reason for lower rate of adoption in the present study. Comparing the two study areas, awareness ($\chi^2 = 7.22$, d.f. = 1, $p < 0.01$) and adoption ($\chi^2 = 14.17$, d.f. = 1, $p < 0.005$) of family planning method are significantly higher in Imphal town. The main source of family planning method in the present population is media, elder persons of the family and friends which are categorized as 'others' as there are 63.88% of mothers in Saikul sub-division and 50.39% in Imphal town in this category. The frequency of mothers having positive attitude is higher in Imphal town (74.02%) than in Saikul sub-division (60.89%), despite the absence of significant differences.

Adoption of family planning is found to reduce the fertility rate in the present population of both Saikul sub-division and Imphal town, although is not statistically significant. Similarly, the infant and child mortality rates are slightly lower among adopters than non-adopters of family planning in both the study areas, although their

relationships are not significant. As mentioned above, the higher mean desire number of children than their actual number in this population **(Table 5.19)** may be the reason for a similar fertility rate among adopters and non-adopters of family planning.

Antenatal and post-natal care

In the present study, the frequency of ANC attendance during pregnancy is significantly higher (χ^2 = 12.38, d.f. = 1, $p < 0.005$) in Imphal town (97.58%) than in Saikul sub-division (86.18%). Similarly, the difference between the two areas in respect of the number of ANC visit is highly significant as majority of the mothers in Saikul sub-division (54.18%) visited for only 2 to 3 times, whereas almost half of the mothers (i.e., 49.23%) in Imphal town visited for more than 5 times. There are 59.44% of mothers in Saikul sub-division and 89.52% in Imphal town who had visited ANC during their 1st trimester of pregnancy. So, the difference between the two area is also highly significant (χ^2 = 24.29, d.f. = 2, $p < 0.005$). The frequency of mothers receiving iron and folic acid tablet is significantly higher (χ^2 = 60.10, d.f. = 1, $p < 0.005$) in Imphal town (79.03%) compared to their Saikul counterparts (38.10%). Vaccination of tetanus injection is quite high in both the study areas (Saikul: 93.58%; Imphal: 95.97%), although it is slightly higher in Imphal town despite the absence of significant difference (χ^2 = 0.99, d.f. = 1, $p > 0.05$). The frequency of mothers not attending ANC is significantly higher (χ^2 = 10.50, d.f. = 1, $p < 0.005$) in Saikul sub-division (13.93%) than in Imphal town (2.42%). So, there is a great difference between rural and urban setting in respect of antennal care in the present study as mothers in Imphal town are far more advanced than their Saikul counterparts.

ANC attendance is found to be significantly related to the decreasing fertility rate in both the study areas. Similarly, ANC attendance can decline the infant and child mortality rates in both the study areas, excepting the infant mortality rate in Saikul sub-division. So, ANC attendance is one of the most important factors in regulating the fertility and mortality rates in the present population. The coefficients of regression (B) shows that mother's who are in younger age groups and whose husbands are highly educated are more likely to attend ANC in the present study.

Dizziness and/or vomiting is found to be the most common type of obstetric morbidity during pregnancy in both Saikul sub-division (43.65%) and Imphal town (45.97%). Comparing the two study areas, the overall percentage of mothers having health obstetric morbidity is found to be higher in Imphal town (89.52%) than in Saikul sub-division (78.33%). Mother's obstetric morbidity during pregnancy in the present population is positively and significantly correlated with rural-urban setting, maternal education and ANC attendance. However, ANC attendance is the most important among the three factors. It is not clear why mother's obstetric morbidity is higher among those attending ANC. Earlier studies have also doubted the relationship between ANC attendance and maternal health as well as morbidity (McDonagh, 1996). It is also reported that mothers who attended ANC services have higher rate of obstetric morbidity due to the fact that such women are more aware of their health problems in consultation with health personnel. Therefore, the present finding is corresponding to the findings among the Lao people's democratic republic (WHO, 2000) and other related studies in India (Bhatia and Cleland, 1995; Chandhiok et al, 2006).

Regarding mother's health problem after delivery, majority of the mothers in Saikul sub-division (62.42%) and Imphal town (60.10%) are reported to have abdominal and/or pelvic pain. Comparing the two areas, the overall percentage of mothers having health problem after delivery is slightly higher in Imphal town (83.74%) than in Saikul sub-division (80.57%). Mother's health problem after delivery is positively associated with rural-urban setting, whereas it is negatively associated with maternal occupation and place of delivery. In other words, mothers are more likely to have health problem after delivery if their delivery takes place at home where there is no medical facilities.

Delivery in a medical institution promotes child survival and reduces the risk of maternal mortality (Pardeshi et al, 2011). In the present population, only 10.54% of mothers in Saikul sub-division against 58.53% in Imphal town delivered at a hospital/clinic indicating that place of delivery is very much influenced by rural-urban setting in the present population. The frequency of mothers who delivered at hospital in Saikul sub-division is much lower than those reported in Nanded district (69.00%) of Maharashtra (Pardeshi et al, 2011), rural India (31.00%) (NFHS-3) (IIPS 2007), and the Lois of rural (27.16%) and urban (54.86%) Manipur (Chanu, 2007). But, this in Imphal town is slightly lower than the Nanded district of Maharashtra, although it is higher than the rural India and the Lois of both rural and urban Manipur. Regarding delivery assisted by health personnel, the frequency is very high in Imphal town (81.30%) as compared to their Saikul counterparts (14.37%). The frequency in Saikul sub-division is much lower than those reported in Nanded (69.00%) of Maharashtra (Pardeshi et al, 2011); rural India (40.00%) (NFHS-3) (IIPS, 2007), Uttar Pradesh (71.00%) (Bloom et al, 1999) and the

Lois of rural (46.91%) and urban (71.60%) Manipur (Chanu, 2007). But, the present findings in Imphal town have greater score than the above findings with respect to the deliveries conducted by health personnel. Pathak (2007) reported that there is an enormous difference in utilization of delivery care among rural and urban population. The non-usage of medical facilities and health personnel by most of the mothers during their deliveries in Saikul sub-division may be associated with the non-availability of health care facilities in that particular area.

The influence of persons conducting delivery on infant and child mortality rates is more important than place of delivery although these rates are higher among mothers who delivered at home than in hospital/clinic in both the study areas. However, pooling data for the infant and child mortality, their relationship with place of delivery is statistically significant in Imphal town. The infant mortality rate in Imphal town is significantly higher among mothers who were assisted by elderly ladies than health personnel at the time of delivery, although it has no significant impact in Saikul sub-division. But, the child mortality rates in both the study areas are significantly higher among mothers whose deliveries were conducted by elderly persons. So, place of delivery and persons assisting delivery are more important in Imphal town than in Saikul sub-division in respect of the mortality rate.

The overall percentage of mothers taking additional diet during pregnancy in the present study is found to be higher in Imphal town (57.25%) compared to their Saikul counterparts (12.07%). Fruit is found to be the most common type of additional diet

during pregnancy in both the study areas. Mothers in both the study areas are more keen to take special diet after delivery than during pregnancy. There are 59.92% of mothers in Saikul sub-division and 86.18% in Imphal town who reported to take special diet after delivery. Majority of the mothers in both the study areas (Saikul: 57.01%; Imphal: 69.92%) took chicken and/or its soup.

Immunization and child care

Feeding of colostrums is found to be more common in Imphal town (86.57%) than in Saikul sub-division (64.78%). Feeding of colostrums is not found to have a significant impact on the mortality rate in the present population, although the infant mortality rate in Saikul sub-division and the child mortality rates in both the study areas are found to be higher among mothers who did not fed colostrums than to those who fed.

Majority of the Khongsai Kuki mothers in Saikul sub-division and Imphal town consulted doctor for treatment of diarrhoea and Pneumonia. Besides, medicine men were also consulted by some of the mothers. However, the proportion for consultation of doctor is higher in Imphal town in the case of both diarrhoea (Saikul: 73.04%; Imphal: 83.58%) and Pneumonia (Saikul: 76.52; Imphal: 82.08%). The infant and child mortality rates are higher among mothers who consulted medicine man than doctor in both the study areas. However, their relationships are not statistically significant. But, consulting doctor for treatment of diarrhoea can significantly decrease the mortality rate in Saikul sub-division when data for the infant and child mortality rates are pooled together. Persons consulted for treatment of Pneumonia is more important in determining the infant

mortality rate than the child mortality rate in both the study areas as the infant mortality rate tends to decline when doctor is consulted.

The Expanded Programme on Immunization (EPI) was initiated by the Government of India in 1978 for six diseases, namely, tuberculosis (BCG), diphtheria (whooping cough), pertussis, tetanus, poliomyelitis and measles (MOHFW, 1991). After more than 3 decades, National Rural Health Mission (NRHM) was launched in Northeast India by the Ministry of Health and Family Welfare, India to make full immunization coverage to all the hill areas resulting to the full immunization rate of more than 90% in Manipur (MOHFW, 2011). This has led to a more or less similar rate of immunization in the present population of both areas. The overall immunization rate of polio, B.C.G., whooping cough and measles among children between the ages 1-5 years is slightly higher in Imphal town than in Saikul sub-division among both males and females. Polio is found to be the most common type of vaccination in both the study areas which is higher than the overall immunization rate. In the present study, immunization includes only those children who were reported to receive at least two of the four vaccinations. The overall immunization rate among males is 90.01% in Saikul sub-division and 95.92% in Imphal town, whereas among females, it is 92.03% and 96% respectively. Comparing males and females, it is slightly higher among females in both the areas. Immunization is further associated with maternal education and household income in the present study. So, the higher the maternal education and household income, the higher is the rate of immunization in the present study which is corresponding to the finding in North India (Dey and Bhattacharya, 2002).

Reported child morbidity

The most common type of health problem among children is cold and/or respiratory disorders among both males and females. There are 29.28% of males in Saikul sub-division and 27.34% in Imphal town who were reported to suffer from cold and/or respiratory disorders, whereas these among females are 31.86% and 31.58% respectively. The overall prevalence of child morbidity is slightly higher in Saikul sub-division than in Imphal town among both males and females. There are altogether 34.76% of males and 38.37% of females in Saikul sub-division, whereas there are 33.81% of males and 36.84% of females in Imphal town who were reported ill within the last 28 days from survey. Further, females are more vulnerable to illness or sickness than their male counterparts in both the study areas. The coefficient of regression (B) shows that child morbidity is significantly influenced by age of the children and their maternal education. In other words, morbidity is less prevalent to children of higher age group and to those whose mothers are highly educated.

CHAPTER - VII

SUMMARY AND CONCLUSION

Summary

In today's scenario, fertility control is the most important way to check high population growth. Fertility is directly influenced by a set of biological and social factors. Among the factors responsible for fertility variation, maternal education, mother's age at marriage and use of contraceptives were found to play a significant role in fertility reduction (Dey and Goswami, 2009). On the other hand, the child mortality rate has in recent years been recognised as an excellent summary index of the level of living and socio-economic development of a country. This recognition has inspired international organisations as well as national governments to intensify their efforts to lower the level of mortality and raise the level of child survival (Jain and Visaria, 1988).

Most of the meaningful researches on mortality, particularly on infant and child mortality have been carried out since the 1980's which were mostly at macro level. It is proved beyond doubt that there are marked variations in mortality patterns and rates between various countries and between various populations, even within one country. It is also reported that there are lots of variations in respect of mortality patterns and rates between different ecological zones. Recent researches on mortality have shown that mortality patterns and rates are influenced by various types of biosocial phenomenon as fertility is. Mahadevan (1986) suggested that since there is no comprehensive and systematic analytical framework and conceptual model, most of the researches on mortality suffer from poor coverage of appropriate variables and lack of depth.

In the present study, we have taken into consideration the bio-social determinants of fertility and child mortality among the Khongsai Kukis of Saikul sub-division and Imphal town. The objectives of the present study are as follows:

1. To study the demographic structure of the Khongsai Kukis of Saikul sub-division and Imphal town.
2. To find out the status of fertility and child mortality in the study population.
3. To find out the biosocial determinants responsible for fertility and child mortality in the study population.

The findings of the present study may be briefly summarized as follows:

Demographic characteristics

Age, Sex and Marital Status

1. The overall sex ratio, i.e., the number of males per 100 females is slightly tilted in favour of males in both Saikul sub-division (103.17) and Imphal town (112.77) despite the absence of statistical difference **(Table 4.1)**. Comparing the two areas, the overall sex ratio is higher in Imphal town than their Saikul counterparts.
2. According to Sundbarg's classification of population, a population is referred to as *progressive* when the proportions of persons relative to the total population are 40.00%, 50.00% and 10.00% in the age groups 0-14 years, 15-49 years and 50+ years respectively. Following this, the Khongsai Kuki population in both the study

areas is of *progressive type* **(Table 4.1)**. The population pyramid **(Figure 1&2)** also shows that the base of the pyramid in both the areas are generally broader at the base and becomes narrower as we move up to the higher age groups.

3. Of the total Khongsai Kuki population in the seven villages of Saikul sub-division, 21.95% of males and 22.73% of females belong to the pre-reproductive age group (0-14 years), whereas 23.72% of males and 23.82% of females belong to the reproductive age group (15-49 years). In the post-reproductive age group (50+ years), there are 5.11% of males and 2.65% of females. On the other hand, of the total Khongsai Kuki population in the four localities of Imphal town, 20.72% of males and 17.72% of females belong to the pre-reproductive age group, whereas 27.48% each of males and females belong to the reproductive age group. In the post-reproductive age group, 4.81% and 1.80% are males and females respectively.

4. The sex ratio in the post-reproductive age group (Saikul: 192.15; Imphal: 266.66) is much higher in the post-reproductive age group than the preceding age groups in both the areas indicating the higher average longevity in males than their female counterparts **(Table 4.1)**.

5. Regarding marital status, the percentage of unmarried, married and widowed/ divorced in Saikul sub-division are 31.23%, 18.82% and 0.73% respectively in males; 29.10%, 18.82% and 1.30% respectively in females. In Imphal town, these are 33.18%, 19.52% and 0.30% respectively in males; 26.13%, 19.67% and 1.20% respectively in females **(Table 4.2).**

6. The mean age at menarche **(Table 4.3)** of the Khongsai Kuki married women is found to be significantly greater ($t = 2.64$, $p < 0.01$) in Saikul sub-division (14.53 ± 0.21) as compared to their Imphal counterparts (13.94 ± 0.08).

7. The mean age at marriage **(Table 4.4)** of both males and females is significantly greater in Imphal town (Male: 26.85 ± 0.31 years; Female: 22.24 ± 0.30 years) than in Saikul sub-division (Male: 25.19 ± 0.22 years; Females: 20.36 ± 0.17 years). The differences between the two study areas are statistically significant (Male: $t = 4.37$, $P < 0.001$; Female: $t = 6.26$, $P < 0.001$) as well.

8. Similarly, the mean age at first child birth **(Table 4.5)** is found to be greater in Imphal town than in Saikul sub-division among both males ($t = 4.89$, $p < 0.001$) and females ($t = 5.99$, $p < 0.001$). Adjusting the rural-urban and sex differences the mean age at first marriage in the present population is found to be 24.51 ± 0.15 years. So, we have considered 25 years as a generation length of the Khongsai Kuki following the method suggested by Glass (1956).

Fertility and mortality

1. The fertility rate, i.e., the mean number of live births per mother is found to be higher in Saikul sub-division (3.74 ± 0.11) than that of the Imphal town (3.19 ± 0.13), although it is not statistically significant ($t = 0.93$, $p > 0.05$) **(Table 4.6)**.

2. The infant mortality rate, i.e., the number of infant deaths below 1 year of age is found to be significant higher (χ^2 = 4.02, d.f. =1, $p < 0.05$) in Saikul sub-division (2.39%) compared to their Imphal counterparts (0.99%) **(Table 4.7)**.

3. The child mortality rate, i.e., the number of child deaths between 1 – 14 years of age is also higher in Saikul sub-division (3.51%) than in Imphal town (2.72%), despite the absence of statistically difference (χ^2 = 1.42, d.f. = 1, $p > 0.05$) **(Table 4.7)**.

4. The completed fertility size, i.e., the mean number of live births to mothers who are aged 45 years and above, and lived continuously in wedlock till the attainment of 45 years of age is found to be higher in Saikul sub-division (5.78) than that of the Imphal town (4.82) **(Table 4.8)**.

5. The child-women ratio is found to be higher in Saikul sub-division than in Imphal town **(Table 4.9)**. It is 75.71 and 50.82 respectively.

6. There are 96.42% of married women in Saikul sub-division and 97.64% in Imphal town who have had experienced pregnancy in their life time. **(Table 4.10)**. There is not a single mother aged ≥ 46 years and had not experienced any pregnancy in both the study areas.

7. The frequency of the total reproductive wastage is more or less similar in both the study areas (Saikul: 8.87%; Imphal: 8.39%) although it is slightly higher in Saikul sub-division. Of the total reproductive wastages in Saikul sub-division, 7.05% are

abortions and 1.82% still births whereas, of the total reproductive wastages in Imphal town, 7.94% are abortions and 0.45% still births **(Table 4.11)**.

8. The average number of surviving children per all married women **(Table 4.12)** is slightly higher in Saikul sub-division (3.51) than in Imphal town (3.06). In Saikul sub-division, mothers having 4 numbers of surviving children are the highest (19.70%), whereas it is 3 numbers of surviving children in Imphal town (26.77%).

9. The age-specific marital fertility rate (ASMFR) reaches its highest peak in the age group 25-29 years in both Saikul sub-division (1.4408) and Imphal town (1.3966) **(Table 4.13 & Figure 3)**. The ASMFR in Saikul sub-division exceeds their Imphal counterparts in all the age groups. Therefore, the total ASMFR is higher in Saikul sub-division (4.8498) than in Imphal town (3.7132).

Biological determinants of fertility and child mortality

Age group of mothers

1. The mean number of live births per mother is corresponding to the age group of mothers in both Saikul sub-division and Imphal town **(Table 5.1)**. The differences are also statistically significant in both the study areas (Saikul: $F = 82.338$, $p < 0.001$; Imphal: $F = 28.746$, $p < 0.001$).

2. Although there is a positive correlation between age group of the mothers and infant mortality rates in both the study areas, they are not statistically significant sub (Saikul: $r = 0.07$, $p > 0.05$; Imphal : $r = 0.04$, $p > 0.05$) **(Table 5.1.1)**. Unlike infant

mortality, mother's age group has a significant positive relationship with the child mortality rate in both the study areas (Saikul: $r = 0.31$, $p < 0.01$; Imphal: $r = 0.22$, $p < 0.05$). In other words, the child mortality rate tends to increase as the mother's age group increases.

Age at marriage of the mothers

1. The mean number of live births per mother **(Table 5.2)** tends to decrease as the mother's age group at marriage increases in both the study areas, despite the absence of statistical differences in Imphal town (Saikul: $F = 3.967$, $p < 0.05$; Imphal: $F = 2.486$, $p > 0.05$).

2. The relationship between infant as well as child mortality rates and mother's age group at marriage is not clearly perceptible in both the study areas, although there is an inverse relationship between the child mortality rate and mother's age group at marriage in Saikul sub-division ($r = - 0.07$, $p > 0.05$) **(Table 5.2.1)**.

3. Of all the socio-economic variables included in the regression model, mother's age at marriage is found to be positively associated with residence, i.e., rural/urban ($B = 0.343 \pm 0.094$, $p < 0.01$) and maternal education ($B = 0.178 \pm 0.049$, $p < 0.01$) **(Table 5.2.2)**. In other words, urban setting and higher level of maternal education is likely to delay mother's age at marriage in the present population.

ABO blood group mating types

1. ABO blood group incompatible mating among the Khongsai Kuki is slightly higher in Saikul sub-division (45.50%) than in Imphal town (43.65%). ABO blood group mating types seem to play no significant role in regulating the fertility rate in both the study areas **(Table 5.3)**.

2. Unlike in Imphal town, the infant mortality rate in Saikul sub-division is found to be significantly higher among ABO blood group incompatible types of mating than compatible types **(Table 5.3.1)**. The coefficient of correlation (r) is 0.14, $p < 0.05$ for Saikul sub-division and 0.11, $p > 0.05$ for Imphal town. However, the child mortality rate is significantly higher (Saikul: $r = 0.14$, $p < 0.05$; Imphal: $r = 0.18$, $p < 0.05$) among ABO incompatible matings than compatible matings in both the study areas **(Table 5.3.1)**.

Birth order

1. Birth order does not show any consistent pattern in respect of the infant and child mortality rates in both Saikul sub-division and Imphal town **(Table 5.4)**. The differences between the two areas in respect of both infant ($\chi^2 = 6.40$, d.f. = 5, $p > 0.05$) and child mortality ($\chi^2 = 3.54$, d.f. = 5, $p > 0.05$) rates are also not statistically significant.

Birth intervals

1. Greater mean birth intervals seem to play an important role in reducing the mean number of live births **(Table 5.5)**, despite the absence of significant differences in Imphal town (Saikul: $F = 3.12$, $p < 0.05$; Imphal: $= 1.46$, $p > 0.05$).

2. There is a significant negative relationship between the infant mortality rates and mean birth intervals in both Saikul sub-division ($r = -0.16$, $p < 0.01$) and Imphal town ($r = -0.21p$, < 0.05) **(Table 5.5.1)** indicating that the infant mortality rate decreases as the mean birth interval increases. In contrary to this, the coefficients of correlation (r) between the child mortality rates and mean birth intervals are not statistically significant in both the study areas (Saikul: $r = -0.02$, $p > 0.05$; Imphal: $r = 0.06$, $p > 0.05$) **(Table 5.5.1)**.

3. Of the many variables, birth intervals is significantly associated with household income ($B = 0.156 \pm 0.052$, $p < 0.01$) and family size ($B = -0.109 \pm 0.052$, $p < 0.05$) are significantly associated with birth intervals **(Table 5.5.2)**. In other words, mean birth interval is likely to increase as the household income increases, whereas it tends to decrease as the size of family increases.

Cause of infant and child mortality

1. Unknown/accident is the main cause of infant mortality in both Saikul sub-division (1.21%) and Imphal town (0.74%). The differences between the two areas in respect of the infant mortality rates according to their causes are not statistically significant

(Table 5.6). In case of the child mortality, 'other health problems' (i.e., malaria, fever, BP stroke, cancer, and congenital disease) are responsible for the highest number of child deaths (1.52%) in both Saikul sub-division and Imphal town (1.48%) **(Table 5.6)**. However, the differences between the two study areas in respect of child mortality rates are not statistically significant ($\chi^2 = 1.41$, d.f. = 4, $P > 0.05$).

2. The rural and urban differences in both infant and child mortality rates with respect to their causes are not statistically significant **(Table 5.6)**.

Socio-economic determinants of fertility and child mortality

Types of family

1. The mean number of live births per mother is found to be significantly higher (Saikul: $F = 4.850$, $p < 0.05$; Imphal: $F = 7.039$, $p < 0.05$) among nuclear families than that of the joint families in both Saikul sub-division and Imphal town **(Table 5.7)**. It is 3.89 ± 0.13 among nuclear families and 3.36 ± 0.22 among joint families in Saikul sub-division, whereas it is 3.26 ± 0.14 and 2.79 ± 0.36 respectively in Imphal town.

2. The correlation between infant mortality rates and types of family is found to be negative despite the absence of significant correlation in Imphal town (Saikul: $r = -0.12$, $p < 0.05$; Imphal: $r = -0.07$, $p > 0.05$) **(Table 5.7.1)**. Unlike infant mortality, the child mortality rate is positively correlated with types of family in both the study areas (Saikul: $r = 0.02$, $p > 0.05$; Imphal: $r = 0.04$, $p > 0.05$), although it is not statistically significant in both the areas. **(Table 5.7.1)**.

Size of family

1. The mean number of live births significantly increases from 1.76 ± 0.16 among small size family to 4.76 ± 0.18 among large size family in Saikul sub-division; and 1.68 ± 0.12 to 4.12 ± 0.32 respectively in Imphal town **(Table 5.8)**.The F - ratios are 92.717, $p < 0.001$ for Saikul sub-division and 45.509, $p < 0.001$ for Imphal town.

2. The infant mortality rate is inversely related to the size of families in Saikul sub-division as it varies from 8.96% among small size 1.41% among large size families. In Imphal town, it is recorded among medium (1.45%) and large size families (0.75%) **(Table 5.8.1)**. But, the coefficients of correlation (r) show no significant relationship between the infant as well as child mortality rates and size of family in both the study areas **(Table 5.8.1)**. So, size of family is not an important factor regulating the mortality rate in the present population.

Consanguineous and non-consanguineous marriages

1. With only 4.18% of consanguineous marriages in Saikul sub-division and 3.94% in Imphal town, the influence of consanguineous and non-consanguineous marriages on the fertility as well as infant and child mortality rates in the present population are not clearly perceptible **(Table 5.9 and 5.9.1)**.

Educational level of the mothers

1. Rural-urban setting seems to have a positive impact on mother's education in the present study as there are 14.33% of illiterate mothers in Saikul sub-division and none in Imphal town **(Table 5.10)**.

2. The mean number of live births **(Table 5.10)** per mother tends to decline significantly as the educational level of mothers increases in both Saikul sub-division ($F = 8.790$, $p < 0.001$) and Imphal town ($F = 4.483$, $p < 0.05$). In Saikul sub-division, it decline from 4.67 ± 0.30 among illiterate mothers to 2.89 ± 0.32 among higher secondary and above educated mothers, whereas in Imphal town, it decline from 3.71 ± 0.28 among primary to 2.77 ± 0.21 among higher secondary and above educated mothers.

3. The infant mortality rate tends to decline as the mother's educational level increases in both the study areas, although it is not significant in Imphal town (Saikul: $r = -0.18$, $p < 0.01$; Imphal: $r = 0.14$, $p > 0.05$) **(Table 5.10.1)**. In the case of child mortality rate, its relationship with maternal education is found to be significant negative in both the study areas (Saikul: $r = -0.25$, $p < 0.01$; Imphal: $r = -0.19$, $p < 0.05$) as it decline from 7.59% among illiterate mothers to 1.63% among secondary educated mothers in Saikul sub-division; and 4.62% among primary mothers to 0.69% among higher secondary and above educated mothers in Imphal town. No child death was recorded among higher secondary and above educated mothers in Saikul sub-division **(Table 5.10.1)**.

4. Maternal education is found to play an important role in regulating the fertility and mortality rates in the present population, although the influence is more significant in Saikul sub-division.

Educational level of the fathers

1. Only 4.27% of fathers in Saikul sub-division are illiterate, whereas there are none in Imphal town indicating that rural-urban setting plays an important role on paternal education like in the case of mothers **(Table 5.11)**.

2. The mean number of live births per father is inversely related to paternal education in Saikul sub-division, although there is no consistent pattern in Imphal town **(Table 5.11)**. The differences in live births among father's educational levels are statistically significant in Saikul sub-division ($F = 3.788$, $p < 0.05$), although the same is not in Imphal town ($F = 0.309$, $p > 0.05$).

3. The relationships between the infant as well as child mortality rates and paternal education are negative in both the study areas **(Table 5.11.1)**. In other words, the infant and child mortality rates tends to decline as the paternal educational level increases although their relationships are not statistically significant in Imphal town. The coefficients of correlation (r) are - 0.14, $p < 0.05$ for infant mortality and - 0.23, $p < 0.01$ for child mortality in Saikul sub-division, whereas these are - 0.14, $p > 0.05$ and - 0.08, $p > 0.05$ respectively in Imphal town).

4. The influence of father's education on the fertility as well as infant and child mortality rates is much more in Saikul sub-division rather than in Imphal town.

Occupation of the mothers

1. Agriculture, being their main occupation in Saikul sub-division, there are 88.82% of mothers who are cultivators in this area, whereas majority of the mothers in Imphal town are housewives (37.79%) and service holders (37.79%). There is no housewife in Saikul sub-division and no cultivator in Imphal town **(Table 5.12)**.

2. In Saikul sub-division, the mean number of live births per mother is highest among service holders (4.85 ± 0.53) followed by cultivators (3.75 ± 0.12) and other type of occupations (2.13 ± 0.32). In Imphal town, it is highest among other type of occupations (3.68 ± 0.23) which is followed by service holders (3.08 ± 0.23) and then housewives (2.98 ± 0.22). The differences in live births among mother's occupational groups are statistically significant in Saikul sub-division ($F = 14.553$, $p < 0.001$), although the same is not in Imphal town ($F = 0.448$, $p > 0.05$) **(Table 5.12)**.

3. The coefficient of correlation (r) shows that there is no significant relationship between the infant as well as child mortality rates and mother's occupation in both the study areas **(Table 5.12.1)**. However, the highest infant and child mortality rates are recorded among cultivators (Infant: 2.58%; Child: 3.73%) in Saikul sub-division and housewives (Infant: 1.39%; Child: 2.79%) in Imphal town (1.39%).

4. Mothers who are cultivators in Saikul sub-division and mothers who are housewives in Imphal town are expected to be less educated and hence recorded the highest infant and child mortality rates.

Occupation of the fathers

1. Similar to mother's occupation, majority of the fathers in Saikul sub-division are cultivators (72.56%) whereas majority of them in Imphal town are service holders (87.70%) **(Table 5.13)**.

2. The F- statistics shows that father's occupation has no significant influence on the mean number of live births in both the study areas, although it is highest among fathers who are cultivators (3.81 ± 0.13) in Saikul sub-division and service holders (3.29 ± 0.14) in Imphal town **(Table 5.13)**.

3. Although, father's occupation has a significant negative correlation with the infant mortality rates in Saikul sub-division ($r = -0.13$, $p < 0.05$), it has no significant impact on the infant mortality rate in Imphal town as well as the child mortality rates in both the study areas **(Table 5.13.1)**. However, the highest infant and child mortality rates are recorded among cultivators (Infant: 3.10%; Child: 3.90%) in Saikul sub-division and other type of occupation (Infant: 2.50%; Child: 7.50%) in Imphal town.

4. Further, father's occupation is found to play a significant role in Saikul sub-division when data for the infant and child mortality rates are pooled together, which is not so in the case of Imphal town.

Household Income

1. The fertility rate tends to increase as the monthly household income increases in both Saikul sub-division and Imphal town **(Table 5.14)**. The mean number of live births ranges between 3.54 among LIG to 4.15 among HIG in Saikul sub-division; and 2.93 to 3.61 respectively in Imphal town. The one way ANOVA shows that the differences in live births among household income groups are statistically significant only in Imphal town (Saikul: $F = 2.569$, $p > 0.05$; Imphal: $F = 3.580$, $p < 0.05$).

2. The infant mortality rates in both the study areas as well as the child mortality rate in Imphal town are inversely related to household income, despite the absence of statistical correlation **(Table 5.14.1)**. But, the child mortality rate in Saikul sub-division is recorded highest among MIG (4.64%) followed by LIG (4.08%) and HIG (1.17%).

3. The influence of household income is significant negative when data for the infant and child mortality rates are pooled together in Saikul sub-division ($r = - 0.12$, $p < 0.05$), indicating that household income can play a significant role in reducing the mortality rates in this area rather than in Imphal town. **(Table 5.14.1)**.

House types

1. There are only *kaccha* and *semi-pucca* type of house in Saikul sub-division, although there are *kaccha*, *semi-pucca* and *pucca* types in Imphal town. The differences in the mean number of live births among types of house are not statistically significant in both the study areas **(Table 5.15)**.

2. The infant rate is found to be highest among *kaccha* type of house in both the study areas, although it is not statistically significant in Imphal town (Saikul: $r = -0.13$, $p < 0.05$; Imphal: $r = -0.14$, $p > 0.05$) **(Table 5.15.1)**. Similarly, the child mortality rate is found to be higher among *kaccha* types (4.40%) than that of the *semi-pucca* types (2.07%) in Saikul sub-division, although the same is recorded only among *semi-pucca* (4.91%) and *pucca* types (2.08%) in Imphal town.

3. Pooling data for infant and child mortality rates, their relationship with house types is highly significant in Saikul sub-division ($r = -0.16$, $p < 0.01$), although the same is not in Imphal town ($r = -0.14$, $p > 0.05$) **(Table 5.15.1)**.

Main fuel for cooking

1. Firewood is the only fuel for cooking in Saikul sub-division, whereas Liquid Petroleum Gas (LPG) is the only fuel for cooking in Imphal town **(Table 5.16)**. Therefore, we could not find the relationship between the mortality rates and main fuel for cooking in the present study.

Main source of drinking water

1. Source of drinking water in Saikul sub-division includes village pipe water and PHE pipe water, whereas in Imphal town, these are PHE pipe water and 'others' (well, water tanker, etc.). Use of PHE pipe water is found to be associated with lower infant and child mortality rates in Saikul sub-division **(Table 5.17)** although there is no consistent pattern in Imphal town. The coefficient of correlation (r) also shows no significant relationship between the infant as well as child mortality rates and source of drinking water in both the study areas.
2. The coefficient of correlation (r) further shows that use of PHE pipe water can significantly decline the total mortality rates (pooling data for infant and child mortality) in Saikul sub-division ($r = 0.12$, $p < 0.05$) **(Table 5.17)**.

Types of toilet

1. The infant mortality rate is higher among households who used own pit type of toilet (Saikul: 2.62%; Imphal: 2.70%) than septic tank types (Saikul: 1.07%; Imphal: 0.82%) in both the study areas. The child mortality rate as well is higher among households who used own pit type (4.03%) than septic tank type (0.53%) in Saikul sub-division, although it is similar among both own pit type (2.70%) and septic tank type (2.72%) in Imphal town. **(Table 5.18)**. But, the coefficient of correlation (r) between the infant as well as child mortality rates and types of toilet used shows that their relationship is significant negative only in the case of child mortality rates in Saikul sub-division ($r = - 0.13$, $p < 0.05$).

2. Even after pooling data for infant and child mortality rates, their relationship with types of toilet used is found to be significant only in Saikul sub-division ($r = -0.13$, $p < 0.05$) indicating that types of toilet is not an important factor in influencing the mortality rate in Imphal town **(Table 5.18)**.

Actual and desire number of children

1. The desire number of children among the Khongsai Kuki married women is significantly greater than their actual number of children in both Saikul sub-division and Imphal town **(Table 5.19)**. The mean actual number of children is found to be 3.48 ± 0.12 children in Saikul sub-division and 3.11 ± 0.12 children in Imphal town, whereas the mean desire number of children are 4.23 ± 0.05 and 3.85 ± 0.08 children respectively. It may be mentioned that there are 9 mothers in Saikul sub-division and a single mother in Imphal town having no desire number of children.

2. The differences between the two areas in respect of actual and desire number of children is statistically significant (Actual: $t = 2.22$, $p < 0.05$; Desire: 4.04, $p < 0.001$) **(Table 5.19)**.

Preference on sex of the child

1. Being a patrilineal society, majority of the mothers, i.e., 81.80% in Saikul sub-division and 57.50% in Imphal town preferred male child over female child **(Table 5.20)**.

2. With only 0.60% of mothers in Saikul sub-division and 4.72% of mothers in Imphal town preferring female child, we could not find its impact on the fertility rate in this population. There are also 59 (17.62%) mothers in Saikul sub-division and 48 (37.79%) in Imphal town having no preference **(Table 5.20.1)**.

Family planning method

1. Awareness and adoption of family planning method are found to be higher in Imphal town compared to their Saikul counterparts. There are 92.12% of mothers in Imphal town and 82.02% in Saikul sub-division who were aware of family planning method. But, there are only 28.35% and 13.43% of couples respectively who were adopting it. The differences between the two areas in respect of awareness ($\chi^2 = 7.22$, d.f. = 1, $p < 0.01$) and adoption ($\chi^2 = 14.17$, d.f. = 1, $p < 0.005$) of family planning method are statistically significant **(Table 5.21)**. Adoption of family planning in the present population is very low as compared to those reported among Assamese Hindus (61.30%), Muslims (46.10%) and Christians (45.60%) (NFHS-3); and the Lois (41.76%) of Manipur (Chanu, 2007).

2. The most common source of family planning is 'others' category (media, elders and friends) in both the study areas (Saikul: 63.88%; Imphal: 50.39%). The χ^2 value i.e., $\chi^2 = 41.34$, d.f. = 3, $p < 0.005$ shows that the difference between the two study areas in respect of the source of family planning is highly significant **(Table 5.21)**.

3. The frequency of mothers having positive attitude toward family planning method is higher in Imphal town (72.03%) than in Saikul sub-division (60.89%), although the difference is not statistically significantly ($\chi^2 = 0.37$, d.f. = 1, $p > 0.05$) **(Table 5.21)**.

4. The mean number of live births is found to be similar among both adopters and non-adopters of family planning method in both the study areas **(Table 5.21.1)** which is a result of the higher desire number of children than their actual number by mothers of both Saikul sub-division and Imphal town as shown in **Table 5.19**.

5. The infant mortality as well as the child mortality rates are slightly higher among non-adopters than that of the adopters of family planning in both the study areas, although their relationships are not statistically significant **(Table 5.21.2)**. So, family planning method is not an important factor influencing the fertility and mortality rates in the present population.

Antenatal and post-natal care

ANC Characteristics

1. The frequencies of ANC attendance, number of ANC attendance and stage of pregnancy at first ANC attendance among mothers are all significantly higher in Imphal town compared to their Saikul counterparts **(Table 5.22)**. There are 97.58% of mothers in Imphal town and 86.18% in Saikul sub-division who were attending ANC during their pregnancies. The χ^2 - value between the two study areas in respect of ANC attendance, number of ANC attendance and stage of pregnancy at first ANC

attendance are: $\chi^2 = 12.38$, d.f. =1, $p < 0.005$; $\chi^2 = 90.21$, d.f. = 5, $p < 0.005$ and $\chi^2 = 24.29$, d.f. = 2, $p < 0.005$ respectively. So, mothers in Imphal town are far more advanced than their Saikul counterparts in respect of ANC characteristics.

2. Consumption of iron and folic acid tablet by mothers during pregnancy is significantly higher ($\chi^2 = 60.10$, d.f. = 1, $p < 0.005$) in Imphal town (79.03%) compared to Saikul sub-division (38.10%) **(Table 5.22)**. Tetanus toxoid injection during pregnancy is slightly higher in Imphal town (95.97%) than in Saikul sub-division (93.58%), although the difference is not statistically significant ($\chi^2 = 0.99$, d.f. =1, $p > 0.05$) **(Table 5.22)**.

3. The mean number of live births per mother is significantly higher among mothers who were not attending ANC during pregnancy in both Saikul sub-division ($F = 9.679$, $p < 0.01$) and Imphal town ($F = 9.155$, $p < 0.01$) **(Table 5.22.1)**.

4. The infant mortality rate is found to be higher among mothers who were not attending ANC in both the study areas, despite the absence of statistical relationship in Saikul sub-division (Saikul: $r = - 0.05$, $p > 0.05$; Imphal: $r = - 0.27$, $p < 0.01$) **(Table 5.22.2)**. But, the relationship between the child mortality rate and ANC attendance during pregnancy is significant negative in both the study areas (Saikul: $r = - 0.23$, $p < 0.01$: Imphal: $p = - 0.32$, $p < 0.01$). In other words, ANC attendance is an important factor in reducing the infant and child mortality rates in the present population **(Table 5.22.2)**.

5. Of all the variables included in the model, the coefficients of regression (B) of ANC attendance is negatively associated with maternal age (B = - 0.034 ± 0.016) and positively associated with paternal education (B = 0.066 ± 0.023) **(Table 5.22.3)**. In other words, mothers of the younger age groups are more likely to attend ANC during pregnancy, whereas higher educational level of the husbands is also related to ANC attendance during pregnancy.

6. The main reasons for not attending ANC during pregnancy are: financial burden (2.56%), far location of health centres (5.88%), did not feel necessary (5.57%) and no visit of ANM (1.23%) in Saikul sub-division whereas in Imphal town the only reason is did not feel necessary (2.42%) **(Table 5.22.4)**.

Mother's obstetric morbidity

1. The overall percentage of mothers having obstetric morbidity during pregnancy in the present population is higher in Imphal town (89.52%) than in Saikul sub-division (78.33%) **(Table 5.23)**.

2. The coefficients of regression (B) of mother's obstetric morbidity is positively associated with residence (B = 0.132 ± 0.058, $p < 0.05$), maternal education (B = 0.061 ± 0.029, $p < 0.05$) and ANC attendance (B = 0.234 ± 0.063, $p < 0.001$) among all the other factors included in the Model 1 **(Table 5.23.1)**. Among these factors, ANC attendance is found to be the most important factor influencing the obstetric morbidity. However, it is not clear why obstetric morbidity is significantly higher

among mothers who are highly educated and attended ANC during their pregnancy. But, it is also reported that mothers who attended ANC services have higher rate of obstetric morbidity due to the fact that such women are more aware of their health problems in consultation with health personnel (McDonagh, 1996).

Mother's health problem after delivery

1. The overall prevalence of mothers having health problems during the first week after delivery is 80.57% in Saikul sub-division and 83.74% in Imphal town **(Table 5.24)**.
2. Of all the independent factors included in the Model 1, only residence ($B = 0.143 \pm 0.063$, $p < 0.05$), maternal occupation ($B = - 0.050 \pm 0.024$, $p < 0.05$) and place of delivery ($B = - 0.177 \pm 0.061$, $p < 0.001$) are significantly associated with mother's health problem during the first week after delivery **(Table 5.24.1)**. In Model 2, we included only those factors which are significant in Model 1 as covariates and found the same result as in Model 1. In other words, mothers who are in urban area as well as whose delivery took place at home are more vulnerable to health problems during the first week after delivery.

Place of delivery

1. Use of medical facilities at the time of delivery is much higher in Imphal town (58.53%) compared to their Saikul counterparts (10.54%) **(Table 5.25)**.

2. Although place of delivery is not significantly correlated with the infant as well as child mortality rates in both the study areas, these rates are higher among mothers whose delivery took place at home rather than hospital/clinic **(Table 5.25)**.

3. Pooling data for the infant child mortality rates, their relationship with place of delivery is statistically significant in Imphal town ($r = -0.19$, $p < 0.05$), but not in Saikul sub-division ($r = -0.10$, $p > 0.05$) **(Table 5.25)**. So, place of delivery can be an important factor influencing the mortality rate in Imphal town.

Persons conducting delivery

1. Like in the case of place of delivery, use of health personnel during delivery is much higher in Imphal town (81.30%) than in Saikul sub-division (14.37%) **(Table 5.26)**.

2. The relationship between the infant mortality rate and persons conducting delivery is highly significant in Imphal town ($r = -0.27$, $p < 0.01$) which is not so, in Saikul sub-division **(Table 5.26)**. But, the child mortality rate in both the study areas is significantly higher among mothers whose deliveries were conducted by elderly persons than the health personnel (Saikul: $r = -0.14$, $p < 0.05$; Imphal: $r = -0.29$, $p < 0.01$) **(Table 5.26)**.

Mother's additional diet during pregnancy

1. The overall percentage of mothers having additional diet during pregnancy is very low in Saikul sub-division (12.07%) as compared to their Imphal counterparts

(57.25%). So, the F - ratio between the two areas is statistically significant (χ^2 = 52.56, d.f. = 1, 0.005) as well **(Table 5.27)**.

2. Fruit is the most common diet during pregnancy among the Khongsai Kuki mothers in both the study areas (Saikul: 10.22%; Imphal: 33.87%) **(Table 5.27)**. Besides, fresh milk, raw egg, meat/fish and nutrients are the other additional diets.

Mother's special diet after delivery

1. The overall percentage of mothers taking special diet after delivery is significantly (χ^2 = 5.56, d.f. = 1, $p < 0.025$) higher in Imphal town (86.18%) than in Saikul sub-division (58.92%) **(Table 5.28)**.

2. The most common special diet after delivery among the Khongsai Kuki mothers is chicken and its soup (Saikul: 57.01%; Imphal: 69.92%) **(Table 5.28)**. The other diet includes fruits, fresh milk, raw egg, beef soup and nutrients.

Immunization and child care

Feeding of colostrums

1. The frequency of mothers feeding colostrums to their children is higher than those who did not fed in both the study areas. But, comparing the two areas, feeding of colostrums is much higher in Imphal town (86.57%) as compared to their Saikul counterparts (64.78%) **(Table 5.29)**.

2. The relationship between the infant as well as child mortality rates and feeding of colostrums is not statistically significant in both the study areas **(Table 5.29)**. However, these rates are higher among mothers who did not fed colostrums in both the study areas, excepting the infant mortality rate in Imphal town.

Persons consulted for diarrhoea

1. Although, majority of mothers in both the study areas consulted doctor than that of the medicine man for treatment of diarrhoea, this frequency is slightly higher in Imphal town (83.58%) than in Saikul sub-division (73.04%) **(Table 5.30)**.

2. The infant as well as child mortality rates are found to be higher among mothers who consulted medicine man than that of the doctor in both the study areas, although their relationships are not statistically significant **(Table 5.30)**. However, pooling data for the infant and child mortality rates, their relationship with persons consulted for treatment of diarrhoea is highly significant in Saikul sub-division ($r = 0.16$, $p < 0.01$), although the same is not in Imphal town ($r = 0.23$, $p > 0.05$) **(Table 5.30)**. Therefore, consulting doctor for treatment of diarrhoea can significantly decline the mortality rates in Saikul sub-division.

Persons consulted for Pneumonia

1. Like in the case of diarrhoea, majority of the mothers in both Saikul sub-division (76.52%) and Imphal town (82.08%) consulted doctor than that of the medicine man

for treatment of Pneumonia. Comparing the two areas, it is higher in Imphal town **(Table 5.31)**.

2. Although, the infant as well as child mortality rates are found to be higher among mothers who consulted medicine man than to those who consulted doctor in the present population of both areas, its influence is significant only in the case of infant mortality (Saikul: $r = 0.15$, $p < 0.05$; Imphal town: $r = 0.38$, $p < 0.01$). In other words, consulting doctor rather than medicine man can significantly reduce the infant mortality rates in both the present study areas **(Table 5.31)**.

Immunization of the children

1. The overall percentage of immunization rate (polio, BCG, whooping cough and measles) is higher in Imphal town compared to their Saikul counterparts among both males (Saikul: 91.01%; Imphal: 95.92%) and females (Saikul: 92.02%; Imphal: 96.00%). But, the rural and urban differences are not statistically significant among both males ($\chi^2 = 0.05$, d.f. = 1, $p > 0.05$) and females ($\chi^2 = 0.03$, d.f. = 1, $p > 0.05$) **(Table 5.32)**.

2. In respect of sex differences, the overall percentage of immunization rate is slightly higher among females (Saikul: 92.02%; Imphal: 96.00%) than their male counterparts (Saikul: 91.01%; Imphal: 95.92%) in both the study areas **(Table 5.32)**.

3. Of the many independent factors, the coefficients of regression (B) of immunization of children is significantly associated with maternal education ($B = 0.036 \pm 0.020$, p

< 0.05) and household income ($B = 0.038 \pm 0.018$, $p < 0.05$). So, the overall immunization rate tends to increase as the maternal educational level and household income increases **(Table 5.32.1)**.

Reported child morbidity

1. The overall prevalence of child morbidity (below 15 years) is slightly higher among females than their male counterparts in both the study areas. It is 34.76% among males 38.37% among females in Saikul sub-division, whereas, it is 33.81% and 36.84% respectively in Imphal town **(Table 5.33)**. It indicates that female children are more vulnerable to illness than their male counterparts in the present population.

2. Comparing the two study areas, the overall prevalence of child morbidity is slightly higher in Saikul sub-division than in Imphal town among both males and females, although the they are not statistically significant (Males: $\chi^2 = 0.02$, d.f. = 1, $p > 0.05$; Females: $\chi^2 = 0.04$, d.f. = 1, $p > 0.05$) **(Table 5.33)**.

3. Of the many independent factors, the coefficients of regression (B) of the child morbidity is negatively and significantly associated with age of the children ($B = -0.034 \pm 0.004$, $p < 0.01$) and maternal education ($B = -0.046 \pm 0.022$, $p < 0.05$). In other words, the prevalence of child morbidity decreases as the age of children and their maternal educational level increases **(Table 5.33.1)**.

Conclusion

According to Sundbarg's classification of population, the present populations in both the study areas are of *progressive type*. The higher sex ratio in the post-reproductive age group compared to the preceding age groups indicates the higher average longevity in males than their female counterparts in both the study areas. The hypothesis that women who marry at an early age have on average, a longer period of exposure to pregnancy and a greater number of childbirths is confirmed by the present findings (NFHS-3) (IIPS, 2007). As reported in many human populations, the females in the present population get married earlier than their male counterparts (Khongsdier, 2005).

The demographic indicators like fertility as well as infant and child mortality rates in the present population are higher in rural area than their urban counterparts (UN, 1999; IIPS, 2007), although it is not statistically significant in the case of fertility and child mortality rates. The absence of statistical differences between the two study areas in respect of the fertility and child mortality rates including the reproductive wastage may be attributed to the similarities in ABO blood group incompatible mating types and tetanus toxoid injection during pregnancy, other than the various bio-social factors. However, the difference between Saikul sub-division and Imphal town with respect to the fertility and mortality rates may not be neglected especially with respect to the infant mortality rate which is significantly higher in Saikul sub-division. These differences are mainly due to the differences in demographic and bio-social factors such as maternal age

and age at marriage, mean birth interval, access to health care facilities, maternal and paternal education, obstetric morbidity, etc., as presented in Chapter IV and V.

The impact of various bio-social factors on fertility and mortality rates in the present study is found to be more in Saikul sub-division than in Imphal town as seen in chapter V. It is due to the fact that mothers in Imphal town are more advanced than their Saikul counterparts in almost every aspect. For example, all mothers in Imphal town are literate which is not so in the case of Saikul sub-division. Similarly, mothers in Imphal town have a greater score with respect to ANC characteristics than their Saikul counterparts. In contrast to many other findings (Caldwell, 1979; Lee, 1979; Reddy et al, 2006 and others), family planning is not an important factor in influencing the fertility and child mortality rates in the present population of both the study areas, as most of the couples were found to adopt family planning method only after attaining their desired number of children, which incidentally is higher than their actual number of children.

Policy Implications

The Registrar General of India (RGI), 2009 reported that the infant mortality rate in Manipur has been traditionally low; and in many surveys, it has been the lowest in the country recording 1.2%. Although, the infant mortality rate in the overall Manipur is very close to the present finding in Imphal town, it is much lower than the present finding in Saikul sub-division indicating the rural and urban difference in the state. With respect to the fertility rate, the present findings in both the areas are higher than the overall Manipur, i.e., 2.8 (RGI, 2010). So, there is a need to bring down the fertility and mortality rates, especially that of the Saikul sub-division. The people, especially in rural areas should not only be aware, but should also make use of these facilities. Although, awareness of family planning method is high in both Saikul sub-division and Imphal town, very few couples were found adopting it and therefore, reliable source of family planning is essential as it directly influence the fertility rate in every population.

The introduction of NRHM in Northeast India by the year 2005 had increased the total immunization rate of Manipur as much as above 90% (MOHFW, 2011). ANM who are posted in the available sub-centres along with the help of ASHA (Accredited Social Health Activist) under supervision of NRHM are reported to visit the villages in Saikul sub-division at least once in a month. But, this alone can never be expected to bring down the mortality rate as their duty is only to give immunization to the children, although reduction in child and maternal mortality rates is one among their many objectives. So, the planners and policy makers should improve the facilities like medical, education,

transportation, etc. to reduce the fertility and mortality rates in Saikul sub-division in particular and the rural areas of Manipur in general. Further, the people joining hands with the government, NGO's and media should improve the condition of the health centres or sub-centres and make sure that doctors and nurses are available. However, a more in-depth study is suggested to find out the other possible factors that can influence the fertility and mortality of the Khongsai Kuki in Manipur, including the reasons for higher reproductive wastages besides having lower infant and child mortality rates than the other neighbouring populations.

REFERENCES

Adak, D.K. 1996. Infant and Early Childhood Mortality among the Khasis of Shillong (Meghalaya): Bio-Cultural Observations. In: *Communities of North-East India*, F. A. Das (ed). New Delhi: A Mittal Publication.

Adetunji, J.A. 1994. Infant mortality in Nigeria: Effects of place of birth, mother's education and region of residence. *Journal of Biosocial Science*, 26(4): 469-77.

Adhikari, R. 2010. Demographic, socio-economic and cultural factors affecting fertility differentials in Nepal. *BMC Pregnancy Childbirth*, 10(1): 19.

Adlakha, A.L. and C.M. Suchindran. 1985. Factors affecting infant and child mortality. *Journal of Biosocial Science*, 17(4): 481-96.

Ahmed, S. 1985. Rural-urban differentials in marital fertility in four Muslim populations. *Journal of Biosocial Science*, 17: 157-66.

Akmam, W. 2002. Women's Education and Fertility Rates in Developing Countries, With Special Reference to Bangladesh. *Eubios Journal of Asian and International Bioethics*, 12: 138-143.

Akpotu, N. E. 2008. Education as correlate of Fertility Rate among the Families in Southern Nigeria. *Journal of Human Ecology*, 23 (1): 65-70.

Andoh, S.N. et al. 2007. Association of household demographic variables with child mortality in Cote D'voire. *Journal of Biosocial Science*, 39: 257-65.

Ansari, A.S. 1986. *Socio-Economic Development in Tribal Area of Manipur*. New Delhi: B.R. Publishing Corporation.

Arnold, F., M. Kim Choe and T.K. Roy. 1998. Son Preference, the Family-building Process and Child Mortality in India. *Population Studies*, 52(3): 301-315.

Assad, F.1983. Measles: Summary of worldwide impact. *Review of infectious diseases*, 5(3): 452-459.

Barua, S.1982. Bio-demographic factors associated with offspring mortality among the Hajongs of Meghalaya. *Journal of Indian Anthropological Society*, 17(2): 143-146.

Benefo, K. D. and T. P. Schultz. 1994. Determinants of Fertility and Child Mortality in Côte d'Ivoire and Ghana. *World Bank*: 1-91.

Bhasin, M.K. and S. Nag. 2007. Demography of Tribal Groups of Rajasthan: 3. Levels, Differentials and Trends in Fertility. *The Anthropologist*, 9(10): 47-56.

Bhatia, J.C. and J. Cleland. 1995. Determinants of maternal care in a region of South India. *Health Transition Review*, 5(2): 127-142.

Bhuyan, K.C. 2000. Differential in child mortality by fertility in Northeast Libya. *The Indian Journal of Statistics*, 62 (2): 317-326.

Biswas, R. K. and A.K. Kapoor. 2003. Fertility profile of a primitive tribe, Madhya Pradesh. *Anthropologist*, 5(3): 161-167.

Bloom, S.S. et al. 1999. Does antenatal care make a difference to safe delivery? A study in urban Uttar Pradesh, India. *Health Policy and Planning*, 14(1): 38-48.

Bongaarts, J. et al. 2001. Population growth and policy options in the developing world. Perspective on overcoming Hunger, Poverty, and Environmental Degradation. *Population Council*: 61-65.

Breierova, L. and E. Duflo. 2004. The impact of Education on Fertility and Child Mortality: Do Fathers Really Matter Less Than Mothers? *National Bureau of Economic Research*, Working Paper No. 10513.

Brown, R. 2001. *Statistical Account of Manipur*. New Delhi: A Mittal Publication.

Bulanto, R.A. et al. Boser. 1993. Effective Family Planning Programme. Washington DC: *World Bank*.

Caldwell, J.C.1979. Education as a factor in mortality decline. An examination of Nigerian data. *Population Studies*, 33(3): 395-413.

Caldwell, J.C. 1990. Cultural and Social Factors Influencing Mortality Levels in Developing Countries. *Annals of the American Academy of Political and Social Sciences*, 510: 44-59.

Cao, X. 2007. Does policy relaxation increase contraceptive flexibility: short-acting contraceptive use in China?

http paa 2007. Princeton.edu download.aspx? submissionId = 70470.

Casterlin, J., E. Cooksey and A.F. Ismail. 1989. Household Income and Child Survival in Egypt, *Demography*, 26(1): 15-24.

Census of India. 2001. Provisional Population Totals: India.

Chandhiok, N. et al. 2006. Determinants of antenatal care utilization in rural areas of India: A cross-sectional study from 28 districts (An ACR task force study). *The Journal of Obstetrics and Gynecology of India*, 56(1): 47-52.

Chanu, T. J. 2007. A study of reproductive and child health among the Lois of Imphal valley. *Unpublished PhD Thesis, Department of Anthropology*, North-Eastern Hill University, Shillong.

Chattopadhyay, A. and B. Goswami. 2005. Are urban poor doing better than their rural counterpart in India? A study of fertility, family planning and health. *Demography of India*, 24: 299-312.

Chaudhury B. S., I.K. Rahman and M.A. Maleque. 2000. Impact of some biosocial variables on infant and child mortality. *Demography India*, 29(2): 211-221.

Chen, C.L., A.K. Chowdhury and S.L. Huffman. 1980. Anthropometric assessment of energy-protein malnutrition and subsequent risk in mortality among pre-school children. *American Journal of Clinical Nutrition*, 33: 1836-1845.

Choe, M.K. et al, D. Sahu and Jagdish Chand. 1998. Identifying Children with High Mortality Risk. *NFHS Bulletin No. 12.*

Chowdhury, Q.H., R. Islam and K. Hossain. 2010. Socio-economic determinants of neonatal, post neonatal, infant and child mortality. *International Journal of Sociology and Anthropology*, 2(6): 118-125.

Dabral, S. and S.L.Malik. 2005. Demographic study of Gujjars of Delhi: VI. Factors affecting. Fertility, Infant Mortality and Use of BCM. *Journal of Human Ecology*, 17(2): 85-92.

Das, B.M. 1993. Physical Anthropology of the tribes of Northeast India. In: *New Perspective in Physical Anthropology*, P.K. Seth and S. Seth (ed.). New Delhi: M.D. Publications Pvt. Ltd.

Das, B.M. and P.B. Das. 1985. Child mortality among rural Assamese. *Bulletin of the Anthropological Survey of India*, 31(3&4): 14-29.

Das, F.A. and S. Mithun. 2010. Opportunity for natural selection among some selected population groups of Northeast India. *Indian Journal of Human Genetics*, 16(2): 61-66.

Das, R. and G. Majumder. 2003. Pregnancy wastage and child mortality among the Bihari Harijans of Guwahati, Assam. *South Asian Anthropologist*, 3(2): 203-213.

Datta, J.M. 1972. Demographic notes on Harappan skeleton. In: *Human Skeletal Remains from Harappa*, P. Gupta et al, (ed.). Calcutta: Anthropological Survey of India.

Devdas, R.P. and N. Jaya. 1984. *A textbook on child development.* New Delhi: S.G. Wasani for Macmillan India Ltd.

Dey, P. and B.N. Bhattarcharya. 2002. Determinations of Child Immunization in Fourless-Developed States of north India. *Journal of Child Health Care*, 6(1): 34-50.

Dey, S. and S. Goswami. 2009. Fertility patterns and its correlates in North East India. *Journal of Human Ecology*, 26(2): 145-152.

DHS Report. 2007. Fertility and Family Planning. *Nauru 2007 Demographic and Health Survey.*

Dodoo, Ni-Amoo, F. 2001. "Fertility preferences and contraceptive use: a profitable nexus for understanding the prospects for fertility decline in Africa". Workshop on *Prospects for Fertility Decline in High Fertility Countries.* Population Division: United Nations Secretariat, New York. 9 – 11 July.

Doungel, H. 1992. Sociological Study of the Customary Laws of the Kukis. *Unpublished MPhil. Thesis, Department of Sociology*, North-Eastern Hill University, Shillong.

Driver, E.D. 1963. *Differential fertility in Central India.* Princeton.

Dwivedi, S.N., and S. Rajaram. 2004. Some factors associated with number of children ever born in Uttar Pradesh: A comparative results under multiple regression analysis and multilevel analysis. *Indian Journal of Community Medicine*, 29(2): 72-76.

Elamin, M. and K.C. Bhuyan. 1999. Differential Fertility in North Eastern Libya. *The Journal of Family Welfare*, 45(1): 12-22.

Findley, S.E. 2005. A suggested framework for analysis of urban-rural fertility differentials with an illustration of the Tanzanian case. *Population and Environment*, 3: 3-4.

Fitaw, Y. et al. 2004. Impact of child mortality and fertility preferences on fertility status in Ethiopia. *East African Medical Journal*, 81(28): 300-306.

Forste, R. 1994. The effects of breast-feeding and birth spacing in infant and child mortality in Bolivia. *Population Studies*, 48(3): 497 - 541.

Friede, A. et al. 1987. Young maternal age and infant mortality: The role of low birth weight. *Public Health Reports*, 102(2): 192-199.

Garcia, M. and E. Kennedy. 1994. Assessing linkages between body mass index and morbidity in adults: evidence from four developing countries. *European Journal of Clinical and Nutrition*. (Suppl. 3), 48: 90 - 97.

Gharami, Kr. and S.N. Sharma. 2007. Household Environment on Infant and Child Mortality with special reference to Kol Tribe of Madhya Pradesh. *Indian Journal of Physical Anthropology & Human Genetics*, 26(1): 155-163.

Ghosh, A.K. 1976. The Kota of Nilgiri Hills: A demographic study. *Journal of Biosocial Science*, 8: 17-26.

Ghosh, R. and P. Bharati. 2010. A study on the determinants of infant and child mortality in periurban areas of Kolkata city, India. *Asia Pacific Journal of Public Health*, 22(1): 63-75.

Glass, B. 1956. On the evidence of random genetic drift in human populations. *American Journal of Physical Anthropology*, 14: 541-555.

Gogoi, D. 2008. Population Genetics of the Mishmis of Arunachal Pradesh. *Unpublished Ph.D. Thesis, Department of Anthropology*, North-Eastern Hill University, Shillong.

Goni, A. and A.H.M. Ramatullah. 2005. On the decline in fertility: A comparative study among SAARC countries. *Man in India*, 85(1&2): 93-102.

Goswami, T.1985. *Kuki Life and Lore*. Haflong, Assam: Sreeguri Press.

Gualtieri, C.T. et al. 1985. ABO incompatibility and parity effects on perinatal mortality. *Social Biology*, 32(1-2): 129-131.

Gubhaju, B. et al. 1991. Socio-Economic, Demographic and Environmental Determinants of Infant Mortality in Nepal. *Journal of Biosocial Sciences*, 23: 425-435.

Haque, Md.M. et al. 2010. Women Empowerment and its Impact on Fertility in Bangladesh. *Demography India*, 39(1): 21-34

Hussian, I.Z. 1970. Educational status and differential fertility in India. *Social Biology*, 17: 132-139.

International Institute of Population Sciences (IIPS) 2000. Northeastern States (Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland and Tripura). *National Family Health Survey-2*. Bombay: Population Research Centre.

International Institute of Population Sciences (IIPS) 2000. Immunization Coverage in India. *National Family Health Survey-2*, 1998-1999. Bombay: Population Research Centre.

International Institute of Population Sciences (IIPS) 2000. Knowledge of Family Planning Methods. *National Family Health Survey-2*, 1998-1999. Bombay: Population Research Centre

International Institute of Population Sciences (IIPS). 2007. India Reports. *National Family Health Survey-3*, 2005-2006. Mumbai: IIPS.

International Institute of Population Sciences (IIPS). 2007. Infant and Child Mortality. *National Family Health Survey-3*, 2005-2006. Mumbai: IIPS.

International Institute of Population Sciences (IIPS). 2007. Morbidity and Health Care. *National Family Health Survey-3*, 2005-2006. Mumbai: IIPS.

Iyer, S and M.F.G. Monteiro. 2004. The risk of child and adolescent mortality among vulnerable populations in Rio De Janeiro, Brazil. *Journal of Biosocial Science*, 36(5): 523-546.

Jain, K.A. and P. Visaria.1988. *Infant mortality in India*. Differentials and determinants. New Delhi: Sage publication.

Jones, S. et al. 1995. *Encyclopedia of Human Evolution*. The Cambridge: Cambridge University Press.

Kabir, M. et al.1995. Infant and child mortality levels and trends in Bangladesh. *Journal of Biosocial Science*, 27(2): 179-192.

Kabir, M. and M. M. Uddin. 1997. Fertility Transition in Bangladesh Trends and Determinants. *Asia Pacific Journal*, 2(453).

Kannan, K.S. and V. Nagarajan. 2008. Factors and Multiple Regression Analysis for Human Fertility in Kanyakumari District. *The Anthropologist*, 10(3).

Kapoor, S. 2009. *Infant Mortality in India*: District-Level Variations and Correlations.

Khakhar, A. and N. Gulati. 2000. A study of never users of contraceptives from an urban slum of Delhi. *Indian Journal of Community Medicine*, 25(1): 26-30.

Khan, T. and R. E. Ali Khan. 2010. Fertility Behaviour of Women and Their Household Characteristics: A Case Study of Punjab, Pakistan. *Journal of Human Ecology*, 30(1): 11-17.

Khiloni, L. 2009. Fertility performance of the Anal women of Lambung Village, Chandel district, Manipur. *The Anthropologist*, 11(4): 277-280.

Khongsdier, R. 1992. Some demographic traits among the Pnar of Sutnga and Moopala in Jaintia Hills District of Meghalaya. *Journal of Anthropological Survey of India*, 42: 199-206.

Khongsdier, R. 1993. Fertility differentials among the War Khasi of Meghalaya. *Journal of Anthropological Survey of India*, 42: 199-206.

Khongsdier, R.1995. Prenatal and postnatal mortality in the War Khasi of Meghalaya. *Journal of Human Ecology*. 6(3): 201-204.

Khongsdier, R. 1995. A Study on Nutritional and Health Status in relation to some Bio-social Factors among the War Khasi of Meghalaya. *Unpublished Ph.D. Thesis, Department of Anthropology*, North-Eastern Hill University, Shillong.

Khongsdier, R. 2002. Fertility and Mortality differentials among the War Khasi of Meghalaya. In: *Tribal Studies in North East India*, S. Sengupta (ed.). New Delhi: A Mittal Publication.

Khongsdier, R. 2005. *Demographic Genetics of an Indian Population*. Itanagar & New Delhi: Himalayan Publishers.

Kishore, S. and S. Parasuraman. 1998. Mother's Employment and Infant and Child Mortality in India. *NFHS Subject Report No. 8.*

Koko, U. 1987. "Children Health: Tomorrow's Wealth". *Indian Journal of Paediatrics*, 54(1): 33-24.

Kshetriya, G.K. et al.1993. Fertility and mortality in Bison Horn Madias of Dantewara Tehsil of Bastar District, Madhya Pradesh. *Journal of Human Ecology*, 4(2): 93-96.

Kullu, H. 2006. Migration and fertility: comparison between Austria and Poland. *Population, Space and Place*,12: 147-70.

Ladusingh, L. and C. H. Singh. 2006. Place, Community Education and Child Mortality in North East India. *Population, Space and Place*, 12: 65-76.

Lawler, S.D. and L.J. Lawler. 1951. *Human Blood Groups and Inheritance*. London: William Heinemann Ltd.

Lee, R.B. 1979. The! Kung San. Cambridge: Cambridge University Press.

Lehler, E. 1984. The impact of child mortality on spacing by parity. A cox-regression analysis. *Demography*, 23: 323-337.

Letamo, G. 1996. Contributions of the proximate determinants to fertility change in Botswana. *Journal of Biosocial Science*, 28(1): 325-338.

Limbu, D.K. 1996. The Semsa: A Population Genetical Study. *Unpublished Ph.D. Thesis, Department of Anthropology,* North-Eastern Hill University, Shillong.

Luther, N.Y. 1998. Mother's tetanus immunization is associated not only with lower neonatal mortality but also with lower early-childhood mortality. *National Family Health Survey Bulletin No. 10.*

Macassa, G. et al. 2003. Inequalities in child mortality in Mozambique: Differentials by parental socio-economic position. *Social Science & Medicine*, 57: 2255-64.

Mace, R. 2008. "Reproducing in cities". *Science*, 319(5864): 764-766.

Mahadevan, K. 1986. *Mortality, biology and Society; Analytical framework and conceptual model.* New Delhi: Sage Publication.

Maheo, L.M. 2004. *The Mao Naga Tribe of Manipur-A Demographic Anthropological Study.* New Delhi: A Mittal Publications.

Majumdar, G. 1996. Some aspects of fertility of Mahatos of Midnapore, West Bengal. *Journal of Human Ecology*, 7(2): 151-153.

Majumder, A.K. 1991. Breast-feeding, birth interval and child mortality in Bangladesh. *Journal of Biosocial Science*, 23(3): 297-312.

Martin, L.C. et al. 1983. Co-variates of Child Mortality in the Philippines, Indonesia and Pakistan: An Analysis based on Hazard Models. *Population Studies*, 37(3): 417-432.

Masset, E. and H. White. 2003. Infant and Child Mortality in Andhra Pradesh: Analysing changes over time and between states. *Unpublished.*

McDonagh, M. 1996. Is antenatal care effective in reducing maternal morbidity and mortality? *Health Policy and Planning*, 11: 1-15.

Mengistu, G. 1989. Fertility and Child Mortality in rural Ethiopia: Gadar and Hararge regions. *Journal of Biosocial Science.* 21(1): 115-121.

Merrick, T.W. 1983. Access to Piped Water and Early Childhood Mortality in Urban Brazil, 1970-1976. *World Bank Staff Working Paper, no. 594*, Washington D.C.

Ministry of Health and Family Welfare. 1991. *Family Welfare Programme in India*: Year Book, 1989-90. New Delhi: Department Health and of Family Welfare, MOHFW.

Ministry of Health and Family Welfare. 2011. *State Program Implementation Plan 2011-12.* Manipur: Department Health and of Family Welfare, MOHFW.

Misao, P. 1995. *The Early life of Kuki-Chins.* Manipur Past and Present. In: *The Ordeals and Heritage of a Civilization (Nagas and Kuki-Chins)*, N. Sanajaoba (ed.). New Delhi: A Mittal Publications.

Mondal, Md. et al. 2009. Factors Influencing Infant and Child Mortality: A Case Study of Rajshahi District, Bangladesh. *Journal of Human Ecology*, 26(1): 31-39.

Mourant, A.E. 1954. *The Distribution of Human Blood Groups.* Oxford: Blackwell Scientific Publication.

Mukherjee, N. 2002. Study on Demography and Growth pattern among the Khasi Children of Shillong. *Unpublished Ph.D. Thesis, Department of Anthropology*, North-Eastern Hill University, Shillong.

Murrey, B. et al.2005. Estimates of fertility and mortality differentials among the Lotha Nagas of Nagaland. *Anthropologist*, 7(1): 45-52.

Nag, G. 2006. Determinants of fertility in Norway. Department of Bergen, University of Norway.

Nanda, S. 2005. Demography and Ethnography of Fertility Behaviour: A study of Non-Industrial Population in India. *Journal of Human Ecology*, 18(4): 301-302.

Narahari, S. 2007. Consanguinity, Reproductive Performance and Selection Potential among the Khond and Savara of Andhra Pradesh. *Indian Journal of Physical Anthropology & Human Genetics*, 26(1): 149-154.

Noble, J. and M. Potts. 1996. The fertility transition in Cuba and the Federal Republic of Korea: The impact of organised family planning. *Journal of Biosocial Science*, 28(1): 211-225.

O' Toole, J. and R.E. Wright. 1991. Parental education and child mortality in Burundi. *Journal of Biosocial Science*, 23(3): 255-262.

Pandey, G.D. & P.P. Talwar. 1987. Some aspects of marriage and fertility and mortality in rural Uttar Pradesh. *Demography India*, 2: 301.

Pant, P.D. 1991. Effect of education and household characteristics on infant and child mortality in urban Nepal. *Journal of Biosocial Science*, 23(4): 437-443.

Pardeshi, G.S. et al. 2011. Trends in Choosing Place of Delivery and Assistance during Delivery in Nanded District, Maharashtra, India. *Journal of Population and Nutrition*, 29(1): 71-76.

Pathak, K.B. et al. 1998. Accelerating India's Fertility Decline: The Role of Temporary Contraceptive Methods. *NFHS Bulletin No. 9.*

Pathak, P.K. 2007. Rich-poor gap in utilization of delivery care services in India. *International Institute of Population Sciences* (IIPS 1992-2005), Mumbai.

Paul, S. 2007. Infant and child mortality in Uttar Pradesh. *International Institute of Population Sciences* (IIPS 1992-2005), Mumbai.

Pedersen, J. 2000. Determinants of infant and child mortality in West Bank and Gaza Strip. *Journal of Biosocial Science*, 32(4): 527-546.

Prakash, D.S.R.S. et al. 2010. Mean Age at Menarche among Four Endogamous Populations of Coastal Andhra Pradesh. *The Anthropologist*, 12(1): 65-66.

Preston , S.H. 1978. "Introduction." In: *The Effects of Infant and Child Mortality on Fertility*, S.H. Preston (ed.). New York: Academic Press.

Pumgula and S. Sengupta. 2002. Menarche and Menopause among Ao Naga women of Nagaland, India. *Journal of Human Ecology*, 13(4): 327-328.

Raj, H. 2010. *Fundamentals of Demography*. Delhi: Surjeet Publications.

Ramabhadran, V.K. and V.S.Swami. 1982. Measures of mortality from Indian Sample Registration System. In: *Studies on Mortality in India*, K.E. Vaidyanathan (ed.). Gandhigram: Institute of Rural Health and Family Planning.

Raza, M. and S. Nangia.1984. *Atlas of the child in India*. New Delhi: Concept Publishing Company.

Reddy, B.K. and C. S. Reddy. 2006. Demographic profile of Yadavas. A Backward Caste Population of Andhra Pradesh. *Anthropologist*, 8 (3): 167-169.

Reddy, K.R. 2005. Fertility and Mortality among the Scheduled Caste Madigas of Andhra Pradesh, India. *Research Communications. Current Science*, Vol. 88(10).

Reddy, K.S.N. and G. Sudha. 2010. Factors Affecting Fertility and Mortality: A Case Study among the Setti Balija Community of Andhra Pradesh. *The Anthropologist*, 12(4): 271-275.

Reddy, T.P.K. et al. 1993. Consanguinity and inbreeding effects on fertility and mortality among Malas of Chittoor District, Andhra Pradesh. *Journal of Human Ecology*, 4(2): 97-103.

Registrar General and Census Commissioner, India (RGI).1971. *Fertility Differentials in India*. New Delhi. Office of the Registrar General.

Registrar General and Census Commissioner, India (RGI).2009. *Sample Registration System*, New Delhi. Office of the Registrar General.

Registrar General of India. 1981. *Census Highlights*. New Delhi. Office of the Registrar General.

Registrar General of India. 2004. *Census Highlights*. New Delhi. Office of the Registrar General.

Registrar General of India. 2010. *Sample Registration System*: Databook for DCH. New Delhi, Office of the Registrar General.

Roberts, D.F. 1956. A demographic study of a Dinka Village. *Human Biology*, 28: 323-349.

Rosenzweig, M.R. and T.P. Schultz. 1982. Child mortality and fertility in Colombia: Individual and Community effects. *Health Policy Education*, 2(3-4): 305-48.

Sembajawe, I.S.L. 1977. Fertility and Child Mortality, Level and Differentials among Yoruba of Western Nizeria. *Unpublished Ph.D. Thesis*, Australian National University, Canberra.

Sengupta, S. and K. Chakravarty. 1995. Family type, fertility and mortality: A study among the Ahoms of Assam. *Journal of Human Ecology*, 6(3): 197-200.

Sen, S. 1992. *Tribes and Castes of Manipur (Description and Select Bibliography)*. New Delhi: A Mittal Publications.

Sharma, S.N. and A. K. Jain. 2006. Morbidity and mortality among traditional prostitutes of the Beria Caste of Sagar district, Madhya Pradesh, India. *Indian Journal of Physical Anthropology and Human Genetics*, 25(1): 119-122.

Singh, S. J. 2006. Ethnic Variations in Fertility Patterns among Four Communities of Manipur. *Journal of Human Ecology*, 20(1): 1-9.

Singh, U.P. 2003. Trends of mortality among Bhoksa tribe of Uttaranchal. *The Oriental Anthropologist*, 3(1).

Singhi, S. et al. 1989. Determinants of infant and child mortality in rural Haryana. *Indian Journal of Pediatrics*, 56(6): 753-763.

Soni, N. and B.M. Mukherjee. 2009. A Study on Foetal Wastage and ABO Blood Groups Incompatibility among the Gonds of Garriyaband, Chhattisgarh, India. *Anthropologist*, 11(3): 229-231.

Statistical Abstract Manipur. 2008. Imphal: Directorate of Economics & Statistics, Government of Manipur.

Stephen, K. 1988. Infant and child mortality in Eastern Africa: Causes and differentials. *National Centre for Development Studies*, Australian National University.

Stockwell, E.G. and F. W. Goza. 1996. Racial differences in the relationship between infant mortality and socioeconomic status in metropolitan Ohio, U.S.A. *Journal of Biosocial Science*, 28(1): 73-84.

Stolnitz, G.J. 1965. Recent mortality trends in Latin America, Asia and Africa: Review and interpretation. *Population Studies*, 19: 117-138.

Strickland, S.S. and S. J. Ulijaszek. 1993. Body mass index, ageing and differential reported morbidity in adults: evidences from four developing countries. *European Journal of Clinical and Nutrition*, 47: pp. 9 - 19.

Strickland, S.S. and V.R. Tuffrey. 1997. *Form and Function: A study of Nutrition, Adaptation and Social Inequality in Three Gurung villages of the Nepal Himalayas*. Smith – Gordon and Co. London.

Suchindran, C.M. and A.L. Adlakha. 1984. Effect of infant mortality on subsequent fertility of women in Jordan: a life table analysis. *Journal of Biosocial Science*, 16(2): 219-229.

Suleman, C.1982. Mortality from tetanus newnatrum in Punjab (Pakistan). *Pakistan Pediatric Journal*, 6(2-3): 152-156.

Thong, M.K. et al. 2005. A population based study of birth defect in Malaysia. *Annals of Human Biology*, 32(2): 180-187.

Udjo, E.O. 1996. Is fertility falling in Zimbabwe? *Journal of Biosocial Science*, 28(1): 25-35.

UNICEF. 1973. *Statistical profile of children and youth in India*. New Delhi: UNICEF.

United Nations, UN. 1999. *The Demographic Yearbook Historical Supplement 1948-1997. CD-Rom (DB-CD)*. United Nations: New York.

Vaidyanathan, K.E.1972. *Studies on mortality in India*. Gandhigram, Tamil Nadu: The Gandhigram Institute of Rural Health and Family Planning.

Varea, C. et al. 1996. Determinants of contraceptive use in Morocco: Stopping behaviour in traditional populations. *Journal of Biosocial Science*, 28(1): 1-13.

Varte, R. 2006. Health and Nutritional status of the Hmars of Aizawl District, Mizoram. *Unpublished Ph.D. Thesis, Department of Anthropology*, North-Eastern Hill University, Shillong.

Velkoff, V.A. and J.E. Miller. 1995.Trends and differentials in infant mortality in Soviet Union, 1970-90: How much is due to misreporting? *Population studies*, 49(2): 241-258.

Verma, A. 2002. Socio-cultural correlates of infant mortality in a primitive tribe. *Journal of Human Ecology*, 13 (3): 203-207.

Wahab, A. and M. Ahmad. 1996. Biosocial perspective of consanguineous marriages in rural and urban Swat, Pakistan. *Journal of Biosocial Science*, 28(1): 305-313.

WHO. 1967. *International Classification of Diseases.* Geneva: World Health Organization.

WHO. 2000. A strategic assessment of reproductive health in the Lao People's Democratic Republic. *Department of Reproductive Health and* Research: World Health Organization.

WHO. 2008. Under-Five Mortality Rate. *Statistical Information System*: World Health Organization.

Yadav, S.S. and V.S. Badari. 1997. Age at effective marriage and fertility: An analysis of data for North Kanara. *The Journal of family Welfare*, 43(3): 61-66.

Yasmin, J. M. N. and C. G. N. Mascie-Taylor. 1996. Consanguinity and its relationship to differential fertility and mortality in the Kotia: A tribal population of Andhra Pradesh, India. *Journal of Biosocial Science*, 28(1): 171-180.

APPENDIX

INTERVIEW SCHEDULE

For the Doctoral Thesis on

BIO-SOCIAL DETERMINANTS OF FERTILITY AND CHILD MORTALITY AMONG THE KHONGSAI KUKIS OF MANIPUR

Department of Anthropology

North Eastern Hill University

Shillong

DEMOGRAPHY

Sl. No..... Date of investigation: .....

Locality/village: ..... District: .....

State: .....

1. Name of the informant: .....

   Age: ..... Sex: ..... Date of birth: .....

   Tribe: ..... Sub-tribe: .....

   Place of birth: ..... Place of residence: .....

   Monthly income:

2. Name of the spouse of informant: .....

   Age: ..... Sex: ..... Date of birth: .....

   Tribe: ..... Sub-tribe: .....

   Place of birth: ..... Place of residence: .....

   Monthly income:

HOUSEHOLD CENSUS

Total number of the family members: ..... (i) Males: ..... (ii) Females: .....

Please specify the following:

Sl. No.	Names	Sex	Age in (yrs.)	Relation to Head	Marital Status	Age at marriage	Religion	Education	Occupation	Place of Occupation	Place of Birth	Age at Death	Income/ Wage/Salary
1.													
2.													
3.													
4.													
5.													
6.													
7.													
8.													
9.													
10.													
11.													
12.													
13.													

**UM=Unmarried, M=Married, W=Widow, S=Separated, D=Divorce*

MORBIDITY OF CHILDREN

Self-reported morbidity by parents of younger children:

Types of diseases	Order of Children									
	I	II	III	IV	V	VI	VII	VIII	IX	X
Cold and Cough										
Respiratory disorders										
Diarrhea/dysentery										
Malaria										
TB										
Fever										
Others										
Present Health Status										

**Morbidity is the diseases or sickness that caused within a month or 28 days time.*

FERTILITY AND MORTALITY

1. Reproductive history

Sl. No.	Particulars		Name of the mother
1.	Age at marriage (years)		
2.	Age at menarche (years)		
3.	Age at menopause		
4.	Number of living children	Male	
		Female	
		Total	
5.	Number of infant deaths (up to 7 days)	Male	
		Female	
6.	Number of infant deaths (up to 8-28 days)	Male	
		Female	
7.	Number of infant deaths (up to 29 days – below 1 year)	Male	
		Female	
8.	Number of child deaths (1-4 completed years)	Male	
		Female	
9.	Number of child deaths (5 and above years)	Male	
		Female	
10.	Number of abortion		
11.	Total number of pregnancies		
12.	Duration between the last two pregnancies (years/months)		

**Abortion is expulsion of fetus before 28 weeks of pregnancies.*

2. Please specify the following:

Sl. No.	Name of the children	**Live Births**							**Fetal Loss**					Congenital disease
		Living Children			Deceased Children									
		Sex	Age	Marital Status	Sex	Age at death	Year of death	Cause(s) of death	Age	Sex	Date of loss	MC	SB	
1.														
2.														
3.														
4.														
5.														
6.														
7.														
8.														
9.														
10.														
11.														
12.														

- *MC=Miscarriage, SB=Still Birth*

(i) Are you expecting a baby now? Yes/No/Don't know.
(ii) If yes, in what month of pregnancy are you?
(iii) Do you think you can have more children? Yes/No/Don't know.
(iv) If no, why?

BIO-SOCIAL DETERMINANTS

1. ABO and Rh blood group of the parents: (a) Father: ..... (b) Mother: .....
2. Types of family: Nuclear/Joint/Any other (Please specify)
3. **Household Income**

   (a) Income from salary per month (if any): .....

   (b) Income from rental (if any): .....

   (c) Pension per month (if any): .....

   (d) Crop 1, Total amount of harvested per year and price per kg: .....

   (e) Crop 2, Total amount of harvested per year and price per kg: .....

   (f) Crop 3, Total amount of harvested per year and price per kg: .....

   (g) Income per year/month from any other source: (Please specify): .....

   (h) Total household income per year (cash/kind): .....

   (i) Total household expenditure per year: .....

4. **Household Characteristics:**

   (a) Residence: Own/Rented/Others

   (b) Types of residence: *Kaccha*/*Pucca*/*Semi-pucca*/Others (Please specify)

   (c) Kitchen separated: Yes/No. If yes, what is its size: .....

   (f) Types of toilet: No toilet/Septic tank/Drainage/Own pit.

   (g) Types of cooking: Smoke emitting *chullah*/Stoves/Smokeless *chullah*/LPG stove/Firewood

   (h) Source of light: Electricity/Kerosene/Other.

   (i) Source of drinking water: Unprotected Well/Protected Well/Hand pump/Pond Reservoir/Streams/Rivers/PHE Pipe water/Pipe water.

5. Is there any consanguineous relation with your husband/wife? Yes/No
   If yes, please specify whether: first cousin/second cousin/any other.
6. Is there any physical deformity in any member of your family? Yes/No.
   If yes, please specify.

7. **Family Planning**

(a) In your opinion, what should be the ideal size of your family?

Mention number of boys and girls: Boys: ..... Girls: .....

(b) Are you satisfied with the number of boys you have?

© If no, how many sons do you desire to have?

(d) Are you satisfied with the number of daughters you have?

(e) If no, how many daughters do you desire to have?

(f) Do you have any preference to the male/female child? Yes/No.

(g) If yes, please give reason in order of preference.

If no, why?

(h) Do you know that the sex of the child can be medically known accurately? Yes/No.

(i) If yes, in order to have a child of the desire sex, would you approve abortion of fetus?

(j) If no, why? (i) Non-ethical (ii) immoral (iii) against religion (iv) fear of criticism (v) you can afford the child (vi) it does matter

(k) Under what circumstances, would you approve abortion?

(i) medical advice (ii) limiting family size (iii) try to have a child of the desire sex.

(l) Are you aware of family planning method? Yes/No.

(m) If yes, tell your attitude toward family planning.

Positive/Negative: .....

Reasons: .....

(n) Is family planning advices readily available to you? Yes/No.

(o) If yes, please specify the sources.

(p) Is it difficult in getting pill, etc. for family planning?

(q) Whom do you generally consult for any family planning advice?

(r) Do/Did you/your husband adopt any family planning measure(s)? Yes/No.

(s) If no, why?

8. **Antenatal and Post-natal care** *(women having pregnancy in the past years):*

(a) Did you go for check up during pregnancy? Yes/No/No response.

If yes, please specify the following:

Order of pregnancy	Place of visit: (Hospital/ Private Doctor/Dai/ ANM/Other)	Number of visits	First abdominal check up (month)	Place of delivery- hospital/home/ other	Who conducted the delivery- Doctor/ANM/dai/ elderly ladies/other
1st					
2nd					
3rd					
4th					
5th					
6th					
7th					
8th					
9th					
10th					
11th					
12th					

(b) Who advice you for check up?

(c) Medicine facilities/any health centre/clinic nearby.

(d) For those who do not go for check up: Reasons for no anti-natal check up - lack of knowledge/no visit of ANM/financial burden/socio-cultural barriers/far distance of hospitals/did not feel necessary/not permitted by husband, family members/financial burden/others/no response.

(e) During pregnancy, did you take any of the followings?

Pregnancy order	Weight (kg)	Blood pressure	Iron/folic acid tablet	Tetanus injection
1st				
2nd				
3rd				
4th				
5th				
6th				

7th				
8th				
9th				
10th				
11th				
12th				

(f) During pregnancy did you face any health problems? If yes, - swelling of hand, feet/paleness/weakness/tiredness/dizziness/visualdisturbance/bleeding/convulsion s/no movement of fetus/not feeling comfortable/vomiting/fever/other/none.

(g) Was the delivery normal? Yes/No

If no, what are the problems? - Premature birth/obstructed labor/prolonged labor/breach presentation/other.

(h) During first week of delivery are you suffering from any health problems? Yes/No. If yes: fever/excess bleeding/dizziness/severe jaundice/low abdominal pain/vomiting/other.

(i) Did you take any additional diet during pregnancy? Yes/No.

(j) Any special diet after delivery:

9. **Immunization and child care** *(mothers having child born in the last 5 years)*

(a) Name of the index child.

(b) Are you fed colostrums? Yes/No.

(c) Is your child presently in breast feed? Yes/No.

(d) Do you have vaccination card? - Yes (seen)/Yes (not seen)/No.

(e) In case of diarrhea, what did you do? - nothing/home remedy/ORS/consult a doctor/any other

(f) In case of pneumonia, what did you do? – nothing/home remedy/consult health worker/ medicine man/consult doctor/any other.

(g) Was the following vaccine given to your child? Yes/No.

If not, then, give reasons for not vaccinated.

	Polio	BCG	Whooping	Measles
	ICh, IICh, IIICh	ICh, IICh , IIICh	ICh IICh, IIICh	ICh, IICh, IIICh
Yes				
No				
Not Remember				

(h) Have you visited hospital in the last three months? Yes/No.

(i) Did they provide you medicines from hospital? Some/all/none.

(j) Reasons for not utilizing hospital facilities; far distance/non-availability of doctor/rare availability of doctor/no distribution of medicines/ treatment not effective/prefer private doctor /did not feel necessary/other.

BIO-DATA

1. Candidate's Name : Mr. Letminthang Khongsai
2. Father's Name : Mr. Satlam Khongsai
3. Mother's Name : Mrs. Kimnu Khongsai
4. No & date of Registration (Ph.D.) : 1072 of 01.11.2006
5. Date of Birth : 26th March, 1982
6. Nationality : Indian
7. Religion : Christianity
8. Marital Status : Married
9. Educational Qualifications:

Name of Examinations	Year of Passing	Board/University	Division/Position	Percentage
H.S.L.C.	1997	B.S.E.M. (Manipur)	IInd Division	55.66
H.S.S.L.C.	1999	C.H.S.E.M. (Manipur)	IInd Division	54.20
B.Sc.	2002	Manipur University	Ist Division, 1st Position	65.44
M.Sc.	2005	North Eastern Hill University, Shillong	Ist Division, 3rd Position	68.25
NET	2005, 2007 and 2008	Union Grants Commission	-	-

10. Area of Study : Bio-social Anthropology