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 ($\chi^2$) 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 ($B = 0.343$ ±
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: \( F = 1.46, \ p > 0.05 \)).

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%). 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 ($4.85 \pm 0.53$) followed by cultivators ($3.75 \pm 0.12$) and other type of occupations ($2.13 \pm 0.32$). In Imphal town, it is highest among other type of occupations ($3.68 \pm 0.23$) which is followed by service holders ($3.08 \pm 0.23$) and then housewives ($2.98 \pm 0.22$). 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 ($3.81 \pm 0.13$) in Saikul and service holders ($3.29 \pm 0.14$) in Imphal (Table 5.13).

2. Although, father’s occupation has a significant negative correlation with the infant mortality rates in Saikul ($r = -0.13$, $p < 0.05$), 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.
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 $3.48 \pm 0.12$ children in Saikul sub-division and $3.11 \pm 0.12$ children in Imphal town, whereas the mean desire number of children are $4.23 \pm 0.05$ and $3.85 \pm 0.08$ 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 \( (\chi^2 = 7.22, \text{ d.f.} = 1, p < 0.01) \) and adoption \( (\chi^2 = 14.17, \text{ d.f.} = 1, p < 0.005) \) 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 $\chi^2$-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: $r = -0.32$, $p < 0.01$).

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 feed 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 doctors 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 ± 0.004, p < 0.01) and maternal education (B = -0.046 ± 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


