Chapter - IV
Measurement of Fertility and
Mortality Differentials
Some basic points are taken into account while selecting the social factors of fertility differentials in the region of our selection, the Aligarh district. First point is that apart from availability and suitability of data, factors should be brief and effective. Secondly, they should be of current significance and indicative of current trends and attributes of social processes. Thus the present analysis is concerned with the selected social factors of fertility differentials, such as religion, education, economy and residence.

The religion of a person seems to play a prominent role in governing his attitude towards the size of his family. Of late, almost all prominent religions of the world have been assisting governments in dealing with the menace of population growth. Among them Islam has been found to exercise opposition to the concept of deliberate attempt to control population growth. Kingslay Davis¹ observed that birth rates of Muslims are significantly higher than their neighbours Hindus. Similarly, in the west, the fertility of Roman Catholics has been found to be higher than protestents. Van Hack² and Day³ have observed that minority
groups tend to increase their family size to be equal in numbers to the majority. Such ideas have been at work in India also.  

Place of residence have been found to be an important factor in differential fertility factors. The different ways of life associated with residence in different kinds of areas affect family size. Farmers reside in the open country and rural areas, and college students are drawn to towns and cities. Because of these relationships urban areas have great impact on rural areas, significant differences would be expected in couples living in cities, towns and villages in all aspect of social life including fertility. Various studies have been made to estimate the urban influence on fertility in rural areas.

Education is a planned process which is devised to give certain information and develop certain skills. For an effective control of fast growing population size, appropriate education among female is absolutely essential. Many studies have shown that success in controlling fertility rate is very difficult to achieve without female literacy, studies have shown that education is the single most important variable which accounts for a large reduction in fertility, in those countries which already experienced fertility decline. Bogue also found education, the single most
important variable in explaining fertility decline in selected countries.

Income is one of the important variables for measuring the level of economic growth of a nation. The higher the income level the better is expected to be the welfare status of the society. With the increase in income, parents opt for higher quality children rather than the numbers, devoting more of their time and income to their health and education.

4.1 METHODOLOGY

The major objective of this study, based on sample survey, is to estimate fertility levels, differentials and fertility trends in Aligarh district. The estimates in this chapter are based on the complete birth histories of ever-married women aged 14-49 as provided by them. To facilitate the complete and accurate reporting of births several procedures were followed. The respondents were separately asked about the number of daughters and sons who were still living with them, those living elsewhere and those who died. They were also asked about the year of their marriage and time taken before the first child was born. Enquires were made about their educational status, number of years spent in
school, whether they were housewives or gainful workers, engaged in services or business. They were also enquired about the educational status of their husbands and children. As population size depends both on fertility and mortality, an important question about the number of children who died before reaching age 5 years, was also enquired about.

For conducting the survey, help of fellow research students was sought. Intensive questioning and probing was done for extracting accurate information from the respondents. In addition any available documents such as immunization card, ration card etc. were checked, that may provide important information. Finally for any interval of four or more years between births, reasons were recorded, for long interval to help in identifying any live births that might have been omitted during the time period.

Despite, all the measures undertaken to improve quality of the data, the most common deficiencies in all sample surveys, namely omission of recording some births (especially births of children, who died at a very young age) and of determining the date of birth separately, may have remained in this survey too. This problem was especially found to be acute in rural areas where female literacy rate is quite low. This survey will henceforth be
called Aligarh District Fertility Survey (ADFS-2002) or only Aligarh Survey for brevity.

Questionnaire

A two tier questionnaire (appendix) was used in the survey. The married women’s questionnaire consisted of two parts. The first part contained thirteen questions. It was designed to collect information from eligible women, that is ever-married women aged 14-49 years. First 5 questions, concerned information about age, marital status, age at marriage and year of widowhood, separation or divorce. In the next five questions, we tried to get information about married women’s economic status, whether she engaged herself in any gainful employment or was just a housewife, her as well as her husband’s educational status, years spent in school/college and university. The next three questions were concerned about number of ever born children, their sex, their educational status, number of children who died before age 5 and after how many years of marriage first child was born.

In the second part of the questionnaire, sixteen questions were asked about various aspects of family planning. The respondents were asked to tick any of the five choices ranging
from strongly agree (SA), agree (A), undecided (UD), disagree (DA) to strongly disagree (SDA). It was a set of 16 wide ranging questions, about their views on the acceptability, necessity and viability of family planning programme, for the welfare of their families and the country. Specific questions were asked about their religious beliefs regarding birth control and limiting family size. Apart from extracting information about their views on various aspects of family planning, we tried to collect data about methods adopted by married couples to keep family size limited and within desirable limits. Specific question about sterilization and use of any other method, were asked from husbands instead of wives.

Part C of the questionnaire contained questions regarding sex distribution of the family, number of earning members, nature of employment monthly income etc. Queries about religion, age of husband and wife at marriage, whether migrant or non migrant, family structure (whether joint or nuclear). Lastly information was sought about availability of medical (Unani, Ayurvedic, Modern) facility in the locality.
Sample Design, sample size and allocation

The sample design for this survey is a systematic, two stage stratified sampling for the households. The sample for the survey of Aligarh district was designed to provide statistical estimates for the district as a whole, for urban and rural areas, for Hindu-Muslim populations, for educated and illiterate. The universe in this case consisted of all rural and urban areas of the district.

The overall target sample size was set at completed interviews with eligible (14-49) married women. The target was set considering the size of the district, time and resources available for the survey and the need for separate estimates for various characteristics separately. The district was subdivided into four contiguous areas according to their geographical characteristics.

The Rural Sample: The Frame, Stratification and Selection

The 31st March 2001 list of inhabited villages in Aligarh district served as the rural sampling frame and a two stage sample design was adopted with the selection of villages in the first stage and household in selected villages in the next stage. The first level of stratification was geographic with the district subdivided
into twelve blocks, considered different regions. The blocks are listed below:

1- Tappal
2- Chandous
3- Khair
4- Javan
5- Lodha
6- Dhanipur
7- Gaunda
8- Iglas
9- Atrauli
10- Bijoli
11- Gangiri
12- Akrabad

The following table gives number of villages as on 31 March 2001 in different blocks.

Table 4.1a: Number of Villages

<table>
<thead>
<tr>
<th>Blocks</th>
<th>Inhabited</th>
<th>Not Inhabited</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>1- Tappal</td>
<td>86</td>
<td>5</td>
<td>91</td>
</tr>
<tr>
<td>2- Chandous</td>
<td>92</td>
<td>2</td>
<td>94</td>
</tr>
<tr>
<td>3- Khair</td>
<td>96</td>
<td>-</td>
<td>96</td>
</tr>
<tr>
<td>4- Javan</td>
<td>108</td>
<td>1</td>
<td>109</td>
</tr>
<tr>
<td>5- Lodha</td>
<td>136</td>
<td>6</td>
<td>142</td>
</tr>
<tr>
<td>6- Dhanipur</td>
<td>98</td>
<td>-</td>
<td>98</td>
</tr>
<tr>
<td>7- Gaunda</td>
<td>83</td>
<td>-</td>
<td>83</td>
</tr>
<tr>
<td>8- Iglas</td>
<td>103</td>
<td>-</td>
<td>103</td>
</tr>
<tr>
<td>9- Atrauli</td>
<td>109</td>
<td>3</td>
<td>112</td>
</tr>
<tr>
<td>10- Bijoli</td>
<td>84</td>
<td>7</td>
<td>91</td>
</tr>
<tr>
<td>11- Gangiri</td>
<td>99</td>
<td>2</td>
<td>101</td>
</tr>
<tr>
<td>12- Akrabad</td>
<td>84</td>
<td>3</td>
<td>87</td>
</tr>
</tbody>
</table>

| Total:    | 1178      | 29            | 1207   |

(Source: District Statistical Bulletin (2001), Table 5, p. 18)
In the Rural Sample frame, villages five kms. away from urban centres were considered. The villages in each block were divided into three strata according to the number of households in them.

**Stratum 1**: Villages with 750 or more households and more than 5 kms. away from urban centre.

**Stratum 2**: Villages with less than 750 households but more than 300 households.

**Stratum 3**: Villages with less than 300 households.

The next level of stratification was implicit and consisted of ordering the villages by the proportion of females to be selected. The overall sampling fraction, the probably of selecting a woman was computed as

\[ f = \frac{n}{N} \]

Where,

- \( n \) = number of women to be interviewed
- \( N \) = population of eligible women in the village

Operation of listing of household, was carried out in each of the selected primary sampling units four weeks prior to the data
collection. This list provided the necessary frame for selecting household, at the second sampling stage. The household, to be interviewed were selected from the household lists using systematic sampling with equal probability. A random sample was selected using random number table.

**The Urban Sample: The Frame, Stratification and Selection**

For the urban sampling frame, the list of census enumeration blocks provided by the Registrar General of India for 1991 and updated by District Population Office upto 31 March 2001 served as the sampling block. The Aligarh district information bureau booklet provided the details of urban centres in the district. There were thirteen urban centres in the district, the Aligarh city plus twelve block centres.

In the first level of stratification, all the urban centres were sub-divided into three strata according to direction of location. In the first strata the district headquater was taken and in another two strata, urban centres in northeastern and southwestern parts were clubbed. Apart from Aligarh in stratum one, the other two strata consisted of 7 and 5 urban centres respectively.
Strata 1: Aligarh city.

Strata 2: North-Eastern part of the district consisting of 7 urban centres.
: Tappal, Chandaus, Khair, Jawan, Lodha, Gaunda and Iglas.

Strata 3: South-Western part of the district consisting of 5 urban centres.
: Dhanipur, Atrauli, Bijoli, Gungeri and Akrabad.

In Aligarh city, two localities one predominantly Muslim (Jamalpur) and other predominantly Hindu (Vishnupuri) were selected randomly. A random sample of 50 household in each locality was selected for interview. Exhaustive questionnaire was presented to married woman and filled in presence of the male members in the family.

Similarly from stratum 2 and 3, one urban centre was randomly selected. From stratum 2 Jawan was selected and from stratum 3 Akrabad was selected. In second stage of sampling, primary sampling units, the household were again randomly selected.

The listing of households in selected places was done awarding them serial numbers. A random sample of 547 households
was selected from urban frame, using random number tables. A total of 1422 sampling units were selected including 875 households from Rural sample frame. It turned out that in the selected samples the religion wise breakup was 912 Hindus and 510 Muslims. The literacy breakup of the sample turned out to be that, it included 320 illiterates, 328 having education below High School and 774 above High School. The following table gives the sample breakup with regard to different characteristics.

Table 4.1b : Sample Sizes

<table>
<thead>
<tr>
<th>Income</th>
<th>Sample Size</th>
<th>Religion/Residence</th>
<th>Sample Size</th>
<th>Education</th>
<th>Sample Size</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. &lt;1000</td>
<td>400</td>
<td>Hindu</td>
<td>912</td>
<td>Illiterate</td>
<td>320</td>
</tr>
<tr>
<td>B. 1000-2000</td>
<td>300</td>
<td>Muslim</td>
<td>510</td>
<td>&lt; High School</td>
<td>328</td>
</tr>
<tr>
<td>C. 2000-5000</td>
<td>500</td>
<td>Rural</td>
<td>875</td>
<td>&gt; High School</td>
<td>774</td>
</tr>
<tr>
<td>D. &gt;5000</td>
<td>222</td>
<td>Urban</td>
<td>547</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Total</td>
<td>1422</td>
<td></td>
<td></td>
<td></td>
<td>1422</td>
</tr>
</tbody>
</table>

(Source: Aligarh Survey)

Prominent Characteristics

Before presenting the findings with respect to fertility and related aspects, a brief examination is necessary of the socio-
economic background of the household and ever-married women. Apart from socio-economic characteristics of the household, the survey collected data on minimum educational levels considered necessary for children as well as nature of financial support expected from children.

In rural areas, cultivation and agricultural labour were the major source of livelihood, as one would expect. Cultivation was the main source of income for about 65 percent of households. The rest received salary/wage income, or were engaged in cottage industries, livestock, trade/business. Most of the households were engaged in more than one economic activity.

More than 35% of the households did not own any agricultural land. The proportion of landless household was relatively high in north-eastern part than the south-western part. It was found that the amount of land owned has not changed significantly during the last ten years. However as a result of buying and selling and land reforms, about 10 percent of landless households gained land, while as much 5 percent of households land holdings decreased.
About 58% of the households in the sample had a per-capita monthly income of less than rupees fifteen hundred. A large number of households from 70 to 80 percent in rural areas earned income from cultivation or from agricultural labour or both.

4.2 FERTILITY DIFFERENTIAL

By Religion

Followers of all prominent religions are present in Aligarh district. Hindu constitute overwhelmingly 84.9% of the total population of the district. Muslims stand at second place with 14.63%, Christians are at 0.09%, Sikhs at 0.16%, Budhists at 0.10%, Jains at 0.12% of the total population. It would be of great interest to analyse fertility differential between the two major communities, Hindus and Muslims in the district on the basis of average number of children per family.

In the country as a whole, the fertility differential by religion are quite significant. According to NFHS-I (1992-93)\(^6\), the TFR is 3.3 among Hindu women, 4.4 among Muslim women and 2.7 among women of the all other religions combined (Christian, Sikhs, Buddhist, Jains and others). Unlike the differentials by other factors, fertility differentials by religion do not show a systematic pattern of variation from high fertility states to low
fertility states (Kulkarni 1996). Although Muslims have higher fertility than Hindus in all states, the Hindu-Muslim differential is comparatively small in Rajasthan, Madhya Pradesh, Uttar Pradesh, Goa, Gujarat, Andhra Pradesh and Tamil Nadu. It is comparatively large in Delhi, Haryana, Himachal Pradesh, Punjab, Bihar, Orissa, West Bengal, Assam, Maharashtra, Karnataka and Kerala. The fertility of women of other religions is lower than the fertility of either Hindu women or Muslim in all states except Himachal Pradesh and Assam. It is possible that religious differentials in fertility may be explained to some extent by socio-economic characteristics of interviewed individuals.

Table 4.2 shows the average number of children/family by religion for India, U.P. and Aligarh district, according to different surveys.

Table 4.2: Average number of children per family by religion

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Hindu</th>
<th>Muslim</th>
<th>Others</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>4.84</td>
<td>4.7</td>
<td>5.83</td>
<td>4.07</td>
</tr>
<tr>
<td>Uttar Pradesh</td>
<td>5.97</td>
<td>5.93</td>
<td>6.43</td>
<td>4.41</td>
</tr>
<tr>
<td>*Aligarh Survey</td>
<td>4.54</td>
<td>4.241</td>
<td>4.844</td>
<td>NA</td>
</tr>
</tbody>
</table>

(Source: NFHS, Subjects Report No. 9, May 1998, *Based on Survey by the author)
The figures for Uttar Pradesh and India are taken from exhaustive study on Fertility in India based on NFHS (1992-93), Aligarh District figures are based on the survey conducted by the author. It is quite evident that average for the India (4.7) is much less than average for Uttar Pradesh (5.93) in Hindu families. Aligarh district figure, as obtained in our survey for the same category is (4.241) further lower than overall figure (5.93) for the entire state.

The all India average number of children per Muslim family (5.83) is less than the state average, which stands at 6.43. This average for the Aligarh district for Muslim families is quite lower (4.844) than the state average, which stands at 6.43. The apparent reason for this differential seems to be that Aligarh is centre of higher learning because of existence of a central university and other degree colleges and institutions. Apart from the fact that almost ten years have passed at the time of Aligarh Survey as compared to NFHS which was conducted during 1992-93.

The figure 4.1 shows bar diagram for average number of children per family religion wise, according to table no. 4.2.
The big difference in U.P. and Aligarh district may also be explained by overall decrease in fertility in the last decade. The
decadal (1991-2001) growth rate has declined by eight points as compared to previous decade (1981-1991) in the district.

Test of significance of difference of Means

Method

Testing of the significance of the apparent difference in means of two populations, is quite important. It tells us whether the apparent difference is real one or just due to sampling fluctuations. The sampling or standard error plays a very important part in reaching the conclusion that whether the difference is due to real causes. It is obvious that difference between the average number of children per Hindu family (4.241) and average number of children per Muslim family (4.844) is quite apparent and it shows that fertility differential due to religion is quite significant factor. The test can establish quite satisfactorily and mathematically whether the difference is really caused by religious approach of people and whether Hindu and Muslim religions bear an impact on the fertility differential.

We set up the null hypothesis that there is no significant difference in the average number of children per Hindu and pre Muslim family and the samples do not come from altogether
different populations as far as fertility is concerned. The alternative hypothesis states that the difference is quite significant and can be attributed to the religions which people follow. Statistically it is written as,

To test $H_0: \mu_1 = \mu_2$
against

$H_1: \mu_1 \neq \mu_2$

Where,

$\mu_1$ & $\mu_2$ being the population averages of Hindus and Muslims respectively.

The test statistic is

$$Z = \frac{|\overline{X}_1 - \overline{X}_2|}{SE(\overline{X}_1 - \overline{X}_2)} \sim N(0,1)$$

$Z$ follows the standard normal distribution

S.E. stands for standard error

$$S.E. (\overline{X}_1 - \overline{X}_2) = \sqrt{\frac{S_1^2}{n_1} + \frac{S_2^2}{n_2}}$$

$\overline{X}_1$ denotes the mean number of children/Hindu family as obtained in the sample

$\overline{X}_2$ denotes the mean number of children/Muslim family as obtained in the sample.
$S_1$ standard deviation for Hindu families

$S_2$ standard deviation for Muslim families

After calculations, we get

\[ S_1 = 1.4 \quad \& \quad S_2 = 1.9 \]

\[
Z = \frac{|4.214 - 4.844|}{\sqrt{\frac{1.4^2}{900} + \frac{1.9^2}{600}}} = \frac{.63}{.023 + .0601}
\]

\[ = \frac{63}{.083} = 7.59 \]

The critical value of $Z$-statistic is 1.96 at 5% level of significance. Since the tabulated value of $Z$ (1.96) is much less than the calculated value of $Z$ (7.59), the null hypothesis is rejected at 5% level of significance, implying that barring 5% error in the result owing to sampling fluctuations, the result is 95% correct. The rejection of null hypothesis implies the acceptance of the alternative hypothesis. The acceptance implies that there is real difference in fertility owing to religious beliefs of the people. We conclude that being follower of Islam has direct bearing on higher fertility than the belief in Hinduism and that Hindu religion suppresses fertility than Islam.
By Education

Education has been considered to be the most effective tool of controlling fertility and thereby expansion of population. To find out the role of education on fertility behaviour in Aligarh district, sampling units were asked about their educational level. Three categories were devised to stratify the respondents according to their education. The first category was of illiterate, in the second category people with equal to or less than high school educated were placed in (<middle) category and respondents educated more than high school level were placed in the third category.

As stated in the beginning of the chapter, out of the total sample of 1422 respondents, selected after two stage sampling, 320 were illiterates, 328 belonged to second group with less than high school education and 774 belonged to third group with more than high school education. The following table provides average number of children ever born to married women in these categories. Third row of the table gives the average as obtained in the Aligarh Survey. The first and second rows give the corresponding figures for India and U.P. state as recorded by NFHS-1 conducted in 1992-93.
Table 4.3: Average number of children/married woman

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>I Category</th>
<th>II Category</th>
<th>III Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>India</td>
<td>4.84</td>
<td>5.26</td>
<td>4.50</td>
<td>3.13</td>
</tr>
<tr>
<td>U.P.</td>
<td>5.97</td>
<td>6.24</td>
<td>5.38</td>
<td>4.08</td>
</tr>
<tr>
<td>Aligarh Survey</td>
<td>4.925</td>
<td>5.9</td>
<td>4.855</td>
<td>4.02</td>
</tr>
</tbody>
</table>

(Source: NFHS Subjects Report May 1998, Number 9, Aligarh Survey, 2000-02)

It can be easily seen that at all India level, the difference in the average number of children/family is quite significant between illiterate and third category while the corresponding difference is not that large between these categories in Uttar Pradesh. This difference is still smaller in the Aligarh survey which shows that illiterate people in the district are quite aware of the concept of family planning and thus fertility has gone down in all categories of people. Even the illiterates are quite aware of dangers of higher fertility in the district, as compared to State and National levels.

Fig. No. 4.2 shows the data given in table number 4.3, in the form of bar diagrams, which make the differential more visible and easy to comprehend.
The basic cause of lower fertility in Aligarh district as compared to India and U.P. state is that the fertility has fallen...
more rapidly during the last ten years when NFHS-1 was conducted in 1992-93. Further, more people have been adopting family planning methods to control fertility in recent years.

**By Residence**

Fertility differential by residence is a matter of great interest around the world. In the Indian subcontinent, there are great socio-economic differences between the people living in Rural areas and the Urban areas. Since educational facilities in urban areas are much higher than in rural areas, where educational apparatus is almost non-existent, there is a great difference in educational level between rural and urban residents. The same is true of economic differential between them. Since the rural economy is almost totally dependent on agriculture, most of rural people work as agriculture labourers, except for a handful of people who are land owners. Their per capita income is much lower than their urban counterparts. The people in urban areas have far more access to government jobs than rural people. In addition, most of the industries are located in cities and towns and thus urban people have far greater channels and opening in jobs as well as in business, than the rural populace.
To estimate, the fertility differential between the urban and rural areas, we conducted the survey in both the areas. Our sample consisted of 547 urban respondents and 875 rural respondents. It was quite easy to extract information even from rural married women, as family planning and population explosions are the burning topics both in rural and urban areas these days. Since people are facing problems everywhere, in hospitals, railway and bus stations, crossroads and schools. Due to population explosion, human fertility has become a hot topic everywhere irrespective of rural/urban divide.

The average number of children ever born to married women in age group 15-49 was obtained and recorded in the following table.

The following table (4.4) shows the average number of children born to ever married women in age group 15-49 according to characteristic Residence. Apart from Aligarh district figures which were obtained by the author, the U.P. state and India figures were recorded as obtained in NFHS-1.
Table 4.4: Rural-Urban Differential

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Urban</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>India*</td>
<td>4.84</td>
<td>4.16</td>
<td>5.13</td>
</tr>
<tr>
<td>U.P.*</td>
<td>5.97</td>
<td>5.18</td>
<td>6.19</td>
</tr>
<tr>
<td>Aligarh Survey</td>
<td>4.925</td>
<td>4.01</td>
<td>5.84</td>
</tr>
</tbody>
</table>

(Source: NFHS-1, Subject Reports, 1998)

The significant point to be noted here, is that average fertility in Aligarh district is quite lower than all India as well as U.P. state, both in Rural and Urban areas. Over all fertility in Rural areas is higher than Urban areas. In urban areas of Aligarh, it is found to be 4.0 which is 1.17 points and 0.15 point lower than U.P. and India, respectively. It is diagrammatically represented in the figure no. 4.3.
Fig. 4.3: Rural-Urban Differential

(Source: Table no. 4.4)
By Income:

The economic status and fertility of families have been a subject of interest for many demographers. In the urban settings, economic status and fertility have generally been inversely related. Although class differences in the fertility of urban couples in industrialised societies seem to be diminishing, the basic reverse relationship, persists (Ryder and Westif, 1971\textsuperscript{12}; Johnson, 1960\textsuperscript{13}). This negative association is also generally found in rural areas of western societies (Duncan, 1956\textsuperscript{14}, (Beegle, 1956)\textsuperscript{15}, (Riteley and Stokel, 1961)\textsuperscript{16}. To make such a statement about rural communities in developing world is quite difficult.

A number of studies have found a positive relationship between economic status and fertility in countryside (Noestein, 1963)\textsuperscript{17} found that fertility differentials by Economic class in rural China were unimportant. However to the extent they occur, they indicate a direct association between fertility and economic status (Stys, 1957)\textsuperscript{18} examining the relationship between the size of Polish peasant families and the size of householdings concludes that rich peasants have much larger families than those who are poor. (Direver, 1965)\textsuperscript{19} found a direct association between landownership and fertility in his rural sample of Mysore households. (Nag, 1978)\textsuperscript{20} in his study of fertility differential in a cluster of villages in West Bangal.
concludes that the fertility was positively related to economic status of husband.

There are other studies also, in rural communities of the developing countries which indicate either an inverse or no relationship between economic status and fertility. In a study of fertility of Muslim couples in a sample of Lebanese households, the fertility did not differ by socio-economic status, instead a slight inverse relationship was found between fertility and economic status of Christian couples. In a demographic survey of some villages in rural southern Iran, an inverse association between household income and fertility is reported (Eftekhar, et al., 1973). In a similar evidence of Punjab India, it was found that high ranking Jat women who had been married through their whole child bearing period had an average of 7.0 live births, and the low ranking scheduled caste women averaged 8.2 (Potter, et al., 196). (Wyon and Gordon, 1971).

No decision regarding an inverse or otherwise relationship between income and fertility can be made in view of conflicting reports. However, the results of our survey in the Aligarh district revealed that income is directly related with low fertility. It was found that people with monthly income more than Rs 5,000, placed in higher group, had lesser average number of children than people in
lower groups. In a sample of 1422 respondents, the income distribution was found as under

<table>
<thead>
<tr>
<th>Category</th>
<th>Monthly Income (Rs.)</th>
<th>No. of respondents</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>less than 1000</td>
<td>400</td>
</tr>
<tr>
<td>B</td>
<td>between 1000 &amp; 2000</td>
<td>300</td>
</tr>
<tr>
<td>C</td>
<td>Between 2000 &amp; 5000</td>
<td>500</td>
</tr>
<tr>
<td>D</td>
<td>more than 5000</td>
<td>222</td>
</tr>
</tbody>
</table>

The following table gives the average number of children per family according to income groups.

Table: Average Number of Children per family by income

<table>
<thead>
<tr>
<th>Income Group</th>
<th>Average No. of Children</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>6</td>
</tr>
<tr>
<td>B</td>
<td>6</td>
</tr>
<tr>
<td>C</td>
<td>5</td>
</tr>
<tr>
<td>D</td>
<td>4</td>
</tr>
</tbody>
</table>

The above data is represented in the following figure.
Fig. 4.4: Average Number of Children per family by income
4.3 CHILD MORTALITY DIFFERENTIALS

By Religion

The child mortality, death of children before age five has an important bearing on the overall population pressure on the country and ultimately the fertility potential. A very important question about the number of children who died before age five was asked in the questionnaire. The sex of the deceased child was also enquired into, which sheds light on sex discrimination information. Female infanticide being a very significant social phenomenon and a reality of Indian society, the question was asked directly and people somehow divulged the sex of the deceased children. This information was most difficult to extract.

Analysis of mortality differential on the basis of religion could be an interesting subject for population geographers. The average number of children who died before age 5 in Hindu families was much higher than Muslim families. For Muslim families it turned out to be 1.04 and for Hindu families it was 1.69.

Test of Significance

Again this apparent difference in the average has to be statistically tested for being the real difference or the mortality
differential is due to sampling fluctuations only. For this, normal test of difference of means has to be applied, since the sample are quite large and asymptotic normal behaviour of the variable is assured and justified. The hypothesis to be tested is that there is no significant difference in the means or the samples have been drawn from same population. In other words the child mortality in both the Hindu and Muslim populations is same despite apparent difference in sample averages. The alternative hypothesis being that there is real difference in average child mortality religion wise. The test statistic is

\[ Z = \frac{|\bar{y}_1 - \bar{y}_2|}{SE(\bar{y}_1 - \bar{y}_2)} \sim N(0,1) \]

\( \bar{y}_1 \) = sample mean of Hindu population = 1.69

\( \bar{y}_2 \) = sample mean of Muslim population = 1.04

\( SE(\bar{y}_1 - \bar{y}_2) = .945 \)

\( SE(\bar{y}_1 - \bar{y}_2) \) stand for standard error of the difference in sample means. The variable \( Z \) follows standard normal distribution and its critical value at 1% level of significance is 2.56.

The calculated value \( Z \) is,
\[ Z = \frac{(1.69 - 1.04)}{0.945} = 0.6879 \]

The calculated value of \( Z \) (0.6879) is less than the critical value of \( Z \) (2.56) at 1% level of significance. Thus the hypothesis is accepted and we conclude that there is no significant difference among child mortality between Hindus and Muslims despite the apparent difference in sample means.

The figure 4.4 shows average number of children aged below five years who died in Muslim and Hindu families according to our survey.
Fig. 4.5: Average child mortality

By Sex

Child and infant mortality rates reflect a country's level of socio-economic development, quality of life, and are used for monitoring and evaluating population welfare and health programmes and policies. Questions on the number of death occurring to residents in each household during a particular time
period have been included in demographic surveys in many countries and have often resulted in a substantial underreporting of deaths. In most countries male death rates are higher than female death rates, at nearly all ages, except south Asia, which has higher death rates for female over much of the age span (Tabutin et al., 1995)\(^{24}\); (Preston, 1989)\(^{25}\) In Uttar Pradesh, according to both NFHS-2 and the SRS (Sample Registration System, maintained by Registrar General) death rates are higher for females than for males among children under age 5. An estimated CDR for Uttar Pradesh is 10.2 deaths per 1000 population based on NFHS-2 data (1997-98), almost the same as the 1997 SRS rate of 10.3. This suggests that the completeness of reporting of deaths in NFHS-2 is about the same as in the SRS. But there is a big difference in the child mortality in NFHS-2 and SRS (1997) both in male as well as female. For males it is 21.1 in NFHS-2 but it is 27.3 in SRS (1997). Similarly for female it is 23.7 in NFHS-2, whereas it is much higher, 35.3 in SRS (1997). As compared to U.P. estimates, our estimates for Aligarh district, as a result of the survey, for males and female are 24.2 and 30.5 respectively. Table 4.5 shows child mortality by sex.
### Table 4.5: Child Mortality by Sex

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td>NFHS-2 (1997-98)</td>
<td>22.4</td>
<td>21.1</td>
<td>23.7</td>
</tr>
<tr>
<td>SRS (1997) U.P.</td>
<td>31.1</td>
<td>27.3</td>
<td>35.3</td>
</tr>
<tr>
<td>Aligarh Survey</td>
<td>27.35</td>
<td>24.2</td>
<td>30.5</td>
</tr>
</tbody>
</table>

(Source: NFHS-2, SRS & Aligarh District Survey)

**By Residence**

According to NFHS-2, children in rural areas of U.P. experience a 55% higher death rate than urban children. It is established that the under five mortality rate has been falling at about the same rate in rural and urban areas. The overall infant mortality rate declines shortly with increasing education of mothers from a high of 105 deaths per 1000 live births to illiterate mothers to a low of 45 deaths per 1000 live births for mothers who have at least completed high school.

Rural mortality rates are considerably higher than urban mortality rate. Both infant and child mortality rates are more than 50% higher in rural areas than in urban areas. During the period five years before the survey, all mortality rates declined in rural
U.P. Under 5 child mortality rates declined in urban areas faster in rural areas (30%) than in urban areas (26%), according to NFHS-2.

According to the Aligarh Survey (2000-02) conducted by the author, the child mortality rate for the Aligarh district is 75.2 deaths per 1000 live births in urban areas as compared to 110.4 deaths per 1000 live births of the children below age 5, in rural areas. Both these rates are lower than all U.P. rates for child mortality in rural as well as urban areas. The decline may be explained by the simple fact that NFHS-2 was conducted about 5 years earlier than our survey.

**Table 4.6: Child Mortality by Residence**

<table>
<thead>
<tr>
<th></th>
<th>Urban</th>
<th>Rural</th>
</tr>
</thead>
<tbody>
<tr>
<td>U.P.</td>
<td>85.8</td>
<td>129.5</td>
</tr>
<tr>
<td>Aligarh Survey</td>
<td>75.2</td>
<td>110.4</td>
</tr>
</tbody>
</table>

(Source: NFHS-2, page 128, Aligarh District Survey)
The above data is represented in the following figure

![Graph showing child mortality by residence in the U.P. Aligarh district.

Fig. 4.6: Child Mortality by Residence

4.4 INDICATORS OF CHILD HEALTH CARE

Childcare medical centres are almost non-functional in the district, especially in rural areas. In most of the villages, only traditional medication is available in the form of old-time Vaids, Hakims, and a few registered medical practitioners, who have
absolutely no knowledge of nature of child diseases. Even the most common disease namely cholera, cannot be treated in villages. The other important factor being the ignorance of parents about seriousness of child diseases. They bring children to especial child clinics in the cities only at the last stage and due to poverty, most of them are unable to buy costly medicines.

NFHS-2 provides estimates of infant and child mortality and factors associated with the survival of young children in U.P. According to all UP survey conducted during 98-99, the infant mortality rate was 87 deaths at age 0-11 months per 1000 live births. The rate decreased from one hundred per 1000 live birth in NFHS-1 conducted in 1992-93. Uttar Pradesh has the highest level of infant mortality among all states except Meghalaya. The child mortality rate, 39 death at age 1-4 years per 1000 children recorded in NFHS-2 was 15 percent lower than the corresponding rate in NFHS-1. Despite improvement in child survival in recent years, 1 in 12 children still die in first year of life and 1 in 8 die before reaching the age five.

Promotion of maternal and child health have been one of the most important objectives of the family welfare programme in India. The Government of India took steps to strengthen maternal
and child health services as early as the first and second Five Year Plans (1951-56 and 1956-61). In 1992-93 the child survival and safe motherhood programme continued the process of integration by bringing together several key health activists. The programme seeks to integrate maternal health, child health with reproductive programmes for both women and men.

Child survival programmes should focus on specific groups of children with particularly high infant and child mortality rates, who live in rural and backward areas. Along with various socio-economic groups, efforts to promote child survival, need to concentrate on very young mothers and mothers whose births are closely spaced. Efforts to extend the use of temporary contraceptive methods for delaying and spacing births would help reduce infant mortality as well as fertility. Promotion of maternal and child health should be most important part of child health programmes. It should encourage women deliver in a medical facility or if at home, with assistance from a trained professional and to receive checks ups after delivery. According to NFHS-2 only 15% of births in U.P. were delivered in a medical facility. Seventy five percent were delivered in the woman’s own home and 10 percent in parents home. Trained health professional assisted
with the delivery in only 22 percent of the cases. Thirty five percent of deliveries were assisted by a dai (traditional birth attendant) and 43 percent were attended only by relatives, friends and other persons who were not health professionals. Although child immunization is an important component of child survival programmes in India, with efforts focusing on five preventable but serious disease, tuberculosis, diphtheria, tetanus, polio and measles, the results are not that encouraging. In U.P. only 21 percent of children age 12-23 months are fully vaccinated, another 49 percent have received some but not all of the recommended vaccinations and 30 percent have not been vaccinated at all. Immunization coverage has improved somewhat since NFHS-1 (1992-93) when 43 percent of children had not received any vaccination at all. Three most important causes of infant mortality have been identified in U.P., they are, fever, acute respiratory infection and diarrhea. Knowledge of appropriate treatment even for diarrhea is very low among the mothers. Only 36 percent of children received some form of oral rehydration therapy. The percentage of children who received some form of rehydration therapy has somewhat increased since NFHS-1. Undernourishment of both mother and child, has remained a very important cause of mortality in India as a whole. Overall 49% of women in U.P. have some degree of
anemia. It is a very serious problem among women in every population group. 

During the survey in Aligarh district, it was found that a large majority of medical assistance seekers went to private practitioners rather than the Government Health Care Centres, complaining that government staff does not give them proper attention and they have to travel long distances (from rural areas to urban centres) for procuring proper medicines. It were mostly the RMP's who supplied fictitious (mostly) drugs to the patients. In government health centres, which are few and sparsely located, the question of distribution of drugs does not simply arise. All the government supplied drugs and medicines are sold to private medical practitioners. Unless government takes appropriate and stringent measure for improving the medical facilities in rural areas, the problem of child mortality will continue to be grave, thereby affecting the human fertility.

Table 4.7 records the block-wise government primary health care centres per lakh of population, in the Aligarh district for the years 1990-91 and 2000-01.
Table 4.7: Medical Facilities in Aligarh District

<table>
<thead>
<tr>
<th>Sl.No.</th>
<th>Block</th>
<th>1990-91</th>
<th>2000-01</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tappal</td>
<td>1.9</td>
<td>1.9</td>
</tr>
<tr>
<td>2</td>
<td>Chandus</td>
<td>2.7</td>
<td>3.4</td>
</tr>
<tr>
<td>3</td>
<td>Khair</td>
<td>2.8</td>
<td>2.8</td>
</tr>
<tr>
<td>4</td>
<td>Javan</td>
<td>2.3</td>
<td>2.8</td>
</tr>
<tr>
<td>5</td>
<td>Lodha</td>
<td>2.5</td>
<td>2.5</td>
</tr>
<tr>
<td>6</td>
<td>Dhanipur</td>
<td>2.8</td>
<td>2.1</td>
</tr>
<tr>
<td>7</td>
<td>Gonda</td>
<td>2.2</td>
<td>2.2</td>
</tr>
<tr>
<td>8</td>
<td>Iglas</td>
<td>3.1</td>
<td>1.6</td>
</tr>
<tr>
<td>9</td>
<td>Atrauli</td>
<td>2.4</td>
<td>4.3</td>
</tr>
<tr>
<td>10</td>
<td>Bijauli</td>
<td>4.5</td>
<td>5.3</td>
</tr>
<tr>
<td>11</td>
<td>Gangiri</td>
<td>1.5</td>
<td>1.5</td>
</tr>
<tr>
<td>12</td>
<td>Akrabad</td>
<td>3.3</td>
<td>1.6</td>
</tr>
</tbody>
</table>

(Source: District Statistical Bulletin, 2001, p.20)
Table 4.7 shows only a small improvement in the primary health centres in nine of the twelve blocks. While it is very distressing to note that in three blocks viz. Dhanipur, Iglas and Akrabad the number of primary health centres per lakh population has actually gone down during the last decade. In Dhanipur block it was 2.8 in 1990-91 but it has gone down to 2.1 in 2000-01. In Iglas block it was 3.1 in 1990-91, the number has actually decreased to 1.6 per lakh population, almost a 50% decline in the important facility as primary health centre. Similarly in Akrabad block the number of primary health centres per lakh population was 3.3 in 1990-91, but the number stands at 1.6 in 2000-01, a decrease of more than 50% in the facility.
References:


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