INTRODUCTION
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FERTILITY

Intensive research in the field of human fertility has assumed tremendous importance in recent years. There is dire need to stabilize the growth of population by controlling the rate of fertility. While the fertility rate is still high, the mortality rate has come down substantially due to improvement in health facilities and thus the rate of growth of population has gone up. With advances in the field of medicine and public health, there would be a further decline in the mortality rate (Kaur, 2000).

Fertility is influenced by number of factors such as age at marriage, use of contraceptives, age at menarche, age at menopause, breast feeding and amenorrhea and socio-economic factors like income, education and occupation. Bongaarts (1980) described a framework and termed these socioeconomic factors as indirect determinants because they influenced fertility indirectly, though one or more of the proximate determinants. Income and education, being predominant among the socio-economic factors, assume special significance. These studies contributed to variations in the level of fertility were essential for initiating planned efforts to control fertility.

Fertility being biological phenomena is influenced by a number of factors in the social environment. The term fecundity denotes the ability to reproduce. Fecundity deals with the absolute capacity of a couple or woman to bear children whereas fertility refers to the actual reproductive performance whether applied to an individual or a group. In other words fertility refers to the actual reproductive performance whether applied to an individual or a group. In other words fertility refers to the actual number of children born per woman of child bearing age. Fertility results in addition of numbers, a low birth rate could lead to a declining population where as a high birth rate could lead to a declining population where as a high birth rate could lead to explosive growth.

Some of the factors that influence fertility are age at marriage, education, status of women, sex preference, income and occupation, age at menarche and menopause, breastfeeding and amenorrhea and behavioral attitudes of different populations. Fertility preferences are the indicators of general attitude and possible future course of fertility. Also, the acceptance of family planning is closely dependent on it. Demographic factors like age at marriage, present family size, gender preference (Mahadevan, 1979; Bhasin, 1990; Asari and John, 1998; Chachra and Bhasin,1998; Bhasin and Nag, 2002) and socioeconomic factors like education, occupation, contraceptive practice, etc. (Bhatia,1970; Asari and John, 1998) were reported the determinants of desired family size.
SOCIOECONOMIC FACTORS

Age at Marriage

Age at marriage is considered to be one of the most important variable affecting fertility behavior, particularly in non contraceptive society. Marriage is an event that marks the beginning of the period of potential child bearing. Choudhary (1984) found that the late age at marriage might affect in cumulative marital fertility by shortening the duration of marriage within the reproductive span and also propensity to use contraception was positively associated with age at marriage. An earlier age at marriage implies an earlier initiation of childbearing, which in turn implies either a higher level of lifetime fertility or a longer period of exposure to the risk of unwanted childbearing once the desired family size has been attained. In every society, entry into marriage signifies a considerable change in the role and status of the woman and in some societies, an early age at marriage inhibits further educational attainment or employment. In the absence of active fertility control, the total number of births women bear through the reproductive period is largely a function of the age at which childbearing begins. Younger ages at first birth are typically associated with the younger ages at the achievement of desired family size, and as a consequence, a longer period of exposure to unwanted births if fertility is imperfect. The timing of childbearing has an impact on variables other than fertility itself. Infant and child mortality tend to be higher among children born to women under age 20 and over age 35.

In countries like India marriage is nearly universal and early, especially of females, and signals the onset of childbearing as cohabitation outside marriage was uncommon (Talwar, 1967). Child marriages i.e. marriages before the onset of puberty was widely prevalent in India and is still present to some extent in rural India. The Government of India prescribed the minimum marriage age of 21 years for boys and 18 years for girls (Special Marriage Act, 1954).

Chaudhary (1984) and Jolly (1981) had shown the important relationship between fertility and age at marriage. The Bangladesh study reported the relationship between marriage and childbearing at an early stage among rural women that sustained a high level of fertility. The Bangladesh study on the relationship between three aspects of female status (education, work experience and age at marriage) and the use of contraception and fertility has shown that the most important factor explaining fertility behavior is age at marriage. The higher the age at marriage, the lower was fertility when all other factors were held constant (Choudhary, 1984). According to Jolly (1981) India’s birth rate could be reduced to half if the minimum age at marriage for girls is raised to 25 years and are given at least 10 years of schooling.
Marriage is a life course transition with long term consequences. Marrying at younger age, especially for women, can define the nature, content and structure of future roles, often truncated the developments of preferences for participation in alternative roles (e.g., education and earnings) because of the familial activities (Jasso and Rossi, 1977; Scanzoni, 1977; Presser, 1994).

**Education**

Education was found to exhibit a stronger and more consistent relationship to fertility than does any other single variable. Multivariate analysis of education – fertility relationship across nations yielded strong negative correlation (Pick *et al.* 1988 and Johnson, 1993). Bogue (1967) studied the reasons of fertility decline in Western Europe and found that education had the highest predictive power in explaining the fertility differentials. Jolly (1981) conducted a study in Delhi and also demonstrated a significant negative relationship between the level of education and fertility performance.

Female education in particular shows a consistent negative association with fertility and numerous linkages between female education and fertility have been documented (Birdstall, 1977; Jain *et al.* 1985; Dodoo, 1992). Cleland and Rodriguez (1988) also found that the wife’s education had a slightly stronger influence on fertility than husband’s education. They also noted that in countries with low levels of development the impact of primary schooling was initially positive and only became negative among women who had completed a certain level of schooling. Only when primary school was completed did greater fertility control suppressed the loss of traditional birth spacing behavior associated with exposure to modern education. A United nations study in rural Maharashtra (1993) supported the role of female education as a determinant of fertility change. They also noted that age at marriage exhibited particularly pronounced differences by education. The mean age at marriage for women with a middle school education was almost two years higher than that for uneducated women. Hence it is no surprise that most of the observed differentials in fertility by education resulted from delayed marriage. Education affects a wide variety of factors each of which has been shown to have an influence on fertility. Education affects fertility both indirectly and directly (Holsinger, 1976).

One of the most important affects of rising education on fertility is indirect through its influence on age at marriage. Education delays age at marriage and thereby reduces the total the total possible number of child bearing years of the wife. Education also affects fertility by reducing infant and child mortality, where infant and child mortality rates are low birth rates are also low. Educated couples are more likely to immunize their children, live under improved sanitary conditions and to buy antibiotics for control of disease. Education enhances girls’ prospects for obtaining employment.
outside the home that competes with bearing and raising children as a carrier. Educational facilitates the acquisition of information on modern contraceptives devices and use. Education increases exposure to mass media and printed materials concerning family planning.

Education also has a substantial direct effect on individual’s attitudes, values and beliefs towards small family size. Psychologically education frees one from tradition, creates modern values and heightened aspirations all of which are conducive to birth control and small family. Education can jointly act with variants such as industrialization and urbanization. The regression study on socioeconomic determinants of fertility in Mexico had revealed the level of education to be a major and negative influence on fertility (Pick et al. 1988).

Thus education is a direct and powerful indicator of the status of women. However, education depresses the fertility by raising the age at marriage, strengthening the propensity to be in labor force, fostering the favorable attitude towards small family size norm and improving awareness and usage of family planning methods.

**Gender Preference and old age Security**

A Sloka of Atharvaveda says ‘the birth of a girl, grant it elsewhere. Here grant a son’. Thousands of year later, this saying stands very true in modern times as well, when despite the so called modernity, industrialization, literacy and equality parents still pray this (Audio-visual review, 1991). One of the most significant feature of the 20th century had been the dramatic declined in fertility and explicated preference for smaller families in most parts of East and South Asia; this rather than reducing, had exacerbated the preference for a son, leading to an increased discrimination against daughters (Pal and Chadhuri, 2009).

An analysis of sex preference of children is important from the sociological as well as demographic perspective. The degree of boy preference can thus serve as a rough but useful index of the status of women in society (Bhatia, 1982). In South Asian societies there is a universal attitude for son preference, for economic; religious or social reasons. Adult Sons are expected to provide economic support to their parents (Das, 1984). Sons are believed to be the carriers of lineage. Women tend to stop childbearing only after they had given birth to the desired number of sons (Vlassof, 1990). Old age security also motivates higher fertility (Vlassof and Vlassof, 1980 and Goody et al. 1981). The percent of women, at each parity, using contraception tends to increase with the number of living sons, suggesting preference for sons. In India, gender disparity is common, especially in rural areas where at least one son is preferred. According to census 2001 there were 35 million female are missing as compared to male population, which was 2 million during 1991 where
the sex ratio had declined from 940 in 1992-93 to 925 in 1998-99 female per thousand males. Advances in technology and diagnostic facilities had opened up avenue for girl haters leading to serious disturbances in sex-ratio as a result of female feticide. Desire for male child manifested so blatantly that parents have no qualms about repeated, closely spaced pregnancies, premature deaths and even terminating child before it is born. Birth of female child was perceived as a curse with economic and social liability. The percent of women, at each parity using contraception tended to increase with number of living sons (Nag, 1991), suggesting preference for son. Old age security also motivated higher fertility (Vlassof and Vlassof, 1980; Goody et al. 1981).

**Income and Occupation**

Data on income-fertility relationship demonstrate that income is indeed strongly related to fertility though the relationship is said to be a complex and perplexing one. Fertility and income has been regarded as an issue of high importance in developed countries. A popular concept is the idea that the fertility-income relationship takes the form of an inverted U. This notion was first raised by Birdsall (1980) and subsequently displayed in the 1984 World Development Report. Many studies have taken into account the role of income in relation to fertility. Sinha (1957), Anand (1966) and Shrinivasan (1967) found that fertility decreases as income increases because income of the family reduces fertility by providing modern amenities of life with varied opportunities of recreational activities. Reddy (1984) finds that income is directly related to favourable attitudes towards family planning methods thus results in decrease fertility.

At initial stages the economic theory on the effect of income on fertility assumed that a child is a good like most consumer goods. Becker (1960) in his “demand model” of fertility behavior viewed children as “consumer goods” and as with other goods an increase in income resulted in an increase in the “quality” and “quantity” of children. The higher the income, the higher the age at marriage. Higher age at marriage shortens the reproductive span which in turn, reduces the fertility rate (Kaur, 2000).

Other researchers found fertility to be negatively related to female earnings (Becker, 1981; Schultz, 1985). Greater female participation in labor force had been suggested as a means of reducing fertility (Collver, 1966; Berelson, 1969). Sander (1991) studied that fertility behavior in United Nations for four periods confirmed that economic factors, particularly the earning ability of women affect fertility, an increase in the earning ability of women results in an increase on the price of children thereby reducing fertility.
Socioeconomic status refers to factors that contribute to the social and economic position of a person in a community and may include education, occupation and income. Human behavior, including fertility behavior is greatly influenced by the socioeconomic status of an individual. Lower fertility is more pronounced among the higher occupational groups than agricultural laborers tend to have very high fertility levels whereas the service sectors have lower fertility levels (Pandey, 1987).

Ubaidur Rob (1992) reviewed socioeconomic determinants of fertility observed that the majority of the studies have cited a negative relationship between fertility and female employment. A number of studies have reported no relationship and few of positive relationship have been found. Kasarda (1971) found that fertility decreased when female participation increases in work. Chaudhary (1978) found that work experience had very little or no effect on fertility in Bangladesh. He attributed this to the compatibility of the role of being mother and worker in rural areas. However according to the Bangladesh Fertility Survey it was found that women who have worked outside their home often have lower than those who have not worked at all. At all ages, women who had ever worked for salary or wages or were engaged in other gainful pursuits had lower average parity than those who had solely attended to their domestic duties (United Nations, 1981). Chaudhary (1978) found in a survey in Dacca that urban working women had fewer children than their counterparts who were not in any gainful occupation. In areas where women have a substantial productive role. Fertility may be lower because women marry later and they have a base of power other than reproduction (Miller, 1981; Safilios-Rothschild, 1982). Duza and Baldwin (1977) also found that the fertility decline in Tunisia, Sri Lanka and Malaysia could be attributed to rising age at marriage as the result of enhanced educational and occupational opportunities. Hirschman (1985) found that premarital employment in the non-farm sector resulted in a 1.5 to 2 years delay in age at marriage relative to women who had not worked before marriage or whose work had consisted of familial or farm labor.

Family Planning Methods and Contraceptive Prevalence

India was the first country to have an official family planning programme, which was initiated in 1952. All eight five year plans since 1951 has emphasized on family planning but greater emphasis was given to family planning only after third five year plan. The first five-year plan recognized that India had a population policy. The Second Five-Year plan highlighted the need for a large and active programme aimed at restraining population growth as a high rate of population growth is bound to affect adversely India’s development and living standards per capita. In keeping with the democratic traditions of the country, the Family Welfare Programmes seeks to promote on a
voluntary basis, responsible and planned parenthood through voluntary and free choice of family planning methods, best suited to individual acceptors.

The national family planning programme at first adopted a clinical approach in 1963, the integrated approach was adopted in 1966. With this, the family planning programme found an integral part of maternal and child health and nutrition services. The Indian family planning programme emphasized the rhythm method during its initial stages. Diaphragms and contraceptive jelly and later on foam tablets were also promoted as methods of family planning. The Intrauterine Contraceptive Device (IUD) was introduced into programme as method of family planning in 1968 and the Social marketing programme of condoms and of pills in 1987.

According to International Institute for Population Sciences (IIPS) (1997) the national family planning program, which was established in 1952, has played an important role in India’s fertility decline. When the program began, there was little awareness or use of modern birth control methods. Four decades later, the 1992-93 National Family Health Survey (NFHS) found nearly universal knowledge of family planning, with 96 Percent of married women ages 13 To 49 Years having heard of at least one modern method and almost 41 Percent, or almost 70 million women, sing contraception. Eighty-nine percent of married women who practiced family planning in India relied upon modern contraceptive methods. Female sterilization, the method which is strongly promoted by India’s Family planning program, was by far the most widely used method. Nearly 67 Percent of married women who were using contraception, or 47 Million women, had been sterilized compared with an average of only 30 Percent for the entire world. Spacing methods, primarily available through the private sector, were used by a small proportion of users: The pill by 3 percent, IUD By 5 percent, and condom by 6 percent.

The small family norm is widely accepted (the mean ideal family size currently reported by young people is 2.5 children) and general awareness of contraception is universal (99%) awareness of a contraceptive method. India’s Total Fertility Rate (TFR) declined from six children per woman in the 1960s to just under three children, 2.85, at present. (Data health Survey, India: 1992/1993; 1998/1999; India Reproductive Health Profile, 2003). Several studies have indicated that usage of contraception increases with an increase in female labor force participation (Cook et al. 1977 Shah et al. 1981). However other studies have found non-significant relationship between employment and economic activities and contraceptive use (Chaudhary, 1984).

According to NFHS-3, Knowledge of contraception is nearly universal: 98 percent of women and 99 percent of men age 15-49 know one or more methods of contraception. Over 94 percent of women and men know about female sterilization. Male sterilization, by contrast, is known only by
79 percent of women and 87 percent of men. Ninety-three percent of men know about condoms, compared with 74 percent of women. More than four in five women and men know about contraceptive pills. Knowledge of contraception is widespread even among adolescents: 96 percent of young women and 97 percent of young men have heard of a modern method of contraception.

The determinants of contraceptive behaviour are numerous. Acceptance of contraception by a couple has been found to be governed by the couple’s socio-cultural background. A number of factors in the social context influence a couple’s conception of ideal family size. Education (both of husband and wife) is an important determinant of family planning acceptance. Education leads to greater use of contraception and consequently to lower fertility (Coale, 1965, Berelson, 1976).

Numerous studies have highlighted the important role of husband’s education in contraceptive usage (Conception and Plieger, 1968; Nayar and George, 1972; Jain, 1975; Datta and Gupta, 1981). Education has long lasting implications for women’s lives. It serves as a source of knowledge and cognitive skills that enhances economic opportunities and social mobility and as a socialization process that shapes attitude, values, and aspiration (Visaria, 2002). Education has an impact on women’s reproductive desires and behaviors. Chadhury (1984) studying the relationship between female status and use of contraception in Bangladesh found education to be the most strongly correlated with use of contraception. The contraception use increases with each increase in educational level, rising from eight percent for women with no education to forty two percent at the highest level. Traditionally, it has been argued that women’s schooling may affect contraceptive use in a number of ways by delaying the age of cohabitation, by using of contraceptives methods more effectively than uneducated women in turn reducing the number of unanticipated pregnancies (Pal and Peace, 2000).

Utilization of health sources for antenatal care or delivery tends to have a positive affect on contraceptive use. Exposure to mass media is strongly related to the use of contraceptive methods. However, the magnitude of this effect varies considerably by state and in some states there is no effect. (National Family Health Survey Subject Report, 1996 and NFHS-3). According to NFHS-2 and NFHS-3 family planning services and supplies in India are provided primarily through a network of government hospitals and urban family welfare centers in urban areas and Primary Health Centre (PHC) and sub-centers in rural areas. Family planning services are also provided by private hospitals and clinics and Non Governmental Organizations (NGO). From time to time, sterilization camps are organized to provide sterilization services. Pills and condoms are also available in pharmacies, and condoms are also available in shops. Information on sources of modern contraceptives can help family planning managers evaluate their programmes.
Moni Nag (1991) reviewed data on sex preference from India, Bangladesh and Pakistan observed that for almost all the data sets, the percent of woman of each parity using contraception tends to increase with the number of living sons. Rahman (1998) found strong and significant effects of gender preference on contraceptive use. Specifically, parents have a strong preference for sons and a moderate preference for daughters. He revealed contraceptive acceptance and continuation rates to be higher among couples who have at least one surviving son than among couples who have no son; rates steadily increased with the number of surviving sons. Acceptance and continuation of contraceptives are lower, however, among couples who have only sons than among those who have children of both sexes in Matlab, Bangladesh.

(Choudhary, 1984; Sunil and Pillai, 2004) found a positive relationship between age at marriage and use of contraception. The use of contraception is higher among women who were married at later age as compared to those who were married at very early stages of their life. Ann (1987) in a study in Malaysia found that the most important determinant of contraceptive prevalence was contraceptive knowledge, indicating the expected relationship, i.e. greater knowledge of efficient contraceptive methods result in greater contraceptive practice. She also found Infant mortality rate to be negatively correlated to contraceptive practice. Jejeebhoy (1984) found that success of family planning program is largely a function of improvements in child health. Thus family planning program is a voluntary programme, whose ultimate purpose is to reduce population growth, by encouraging people to form small families in their own interest.

**BIOLOGICAL FACTORS**

**Age at Menarche and Menopause**

Menarche – the first menstruation is a well defined milestone that denotes the functional development of the female reproductive system, although a few initial cycles are an ovulatory. Menarche can be defined as the occurrence of the first menstrual cycle. Menarche is a biological term which was first introduced by Kish (1910). As a biological phenomenon, it gets expression in women’s body which points out an important stage of life cycle. Menarche indicates the specific stage of first periodical regular flow of blood from womb in all the healthy normal females. At a particular level of biological developments, the girls begin to menstruate for the first time which is continued for a period of four to five days. The menstrual cycle is usually one of twenty eight days and the estimated blood loss is between 50ml. to 200 ml. (Barua, 1996).

Menarche is a clear indication of puberty and much of the adolescent growth spurt has already passed by the time of its onset (Prakash and Pathmanathan, 1992). Many interrelated factors
(socioeconomic status, geographic environment etc.) may exert an influence on maturation (Eveleth and Tanner, 1976). Improvement of the environmental factors has caused a progressive trend towards earlier menarche in some populations (Danker-Hopfe, 1986). The relationships of menarcheal age with various aspects of growth have been investigated. For instance investigations by Tanner (1962), Marshall and De Limongi (1976) have shown that age at menarche is synchronized with skeletal development.

Age at menarche is generally taken to be a significant event in women’s life and many communities mark the occasion with special rituals. Age at menarche may indirectly determine the age at first birth. Earlier age at menarche implies earlier pregnancy and childbirth. This is particularly seen in societies which has a low age at marriage. In India women’s mean age at menarche ranges from 12 to 15 years (Gondotra and Das, 1982 and Kumar, 1988).

When menstruation finally ceases the women is said to have attained menopause. Age at menopause has important bearings on fertility as it signifies the end of reproductive period. Menopause varies considerably from female to female. Depending on a number of factors, menopause occurs at varying ages with certain age. (Amundsen and Diers, 1973 and Bhaduri, 1975). In developed countries the range is from 47 to 50 years (McMohan and Worchester, 1966 and Gray, 1979).

With increasing age, various morphological and physiological changes are accompanied in women’s life. The reproductive life of women ends with varying degree of suddenness with the menopause – a largely human phenomenon (Potts and Selman, 1979). In other words, menopause is considered as the most critical biological event in the body and from this stage, the reproductive function of women is completely ceased by consequently arresting the menstruation flow of blood and ovulation (Sengupta and Rajkhowa, 1996; Kalita and Sengupta, 1997). Sometimes, the term ‘menopause’ is acquainted as the symbolic end of women-hood because the women who attained menopause are not capable for conception. Malnutrition, low socio-economic factors, environmental and genetic factors, rural urban residence, family size, etc. may be attributed to the possible reasons for determining the menopausal age of women (Frisch, 1974; Bongaarts, 1980; Beall, 1983; Sengupta and Rajkhowa, 1996; Majumdar, 2001; Biswas and Kapoor, 2003).
Breastfeeding and Amenorrhea

Human lactation has developed several unique features. Breast feeding is a common practice, although the prevalence and duration varies from the society to society. Breastfeeding is generally related to a number of socioeconomic and demographic factors such as, economic status, age and parity, sex of child, place of residence, education of the parents, work status of the mother and use of contraception.

Amenorrhea or the temporary stoppage of menstruation after birth is responsible for indirectly prolonging or spacing childbearing. This is a natural hormonal tendency of women after childbirth. The duration of these an ovulatory and post partum amenorrhic periods differ from individual to individual and depends on the social and biological environment. When the nutritional status of the women is good the period of amenorrhea is reduced. The period of lactation also plays an important role. The temporary absence of menstruation after a birth is often called lactational amenorrhea because it is now well established that breastfeeding is the principal determinant of amenorrhea. Breast-feeding is believed to be a major determinant of prolonged post partum amenorrhea, the time between a birth and resumption of menses, in societies where it is nearly universal, prolonged and of high intensity (Howie and McNeilly, 1982; Srinivasan et al., 1984; Santow, 1987; Singh, 1990; and and Singh, 1993; and Singh et al., 1994). Without breastfeeding the average amenorrhea interval is short, usually 1.5-2.0 months (Leridon, 1977). In countries with prolonged breast feeding birth intervals are usually longer because prolonged duration of amenorrhea. Amenorrhea affected not only by the duration of breastfeeding but also, and perhaps more importantly, by the type and intensity of breastfeeding. Breastfeeding mothers usually give little or no food to their infants during the first week after birth. Supplemental food are introduced slowly, increasing in quantity over time as the amount of breast milk demanded by the infant reduces. The timing of decrease in the mother’s milk production is probably the principal determinant of the onset of menstruation.

The duration of breastfeeding is more in developing countries and rural areas. According to the national Family Health Survey children of more ‘modernized’ women (urban women, educated women, and those who are exposed to mass media) have shorter durations of breastfeeding than other children, but children of working women come disproportionately from rural areas where breastfeeding durations are relatively long. Women can resume menstruation as early as two months after childbirth or as late as three years postpartum, with a broad range of intermediate durations of lactational amenorrhoea between these extremes (Konner and Worthman, 1980; Jones, 1989; Wood, 1994). Several studies have shown that prolonged breastfeeding reduce fertility through delaying
ovulation and menstruation following childbearing (Potter et al., 1965; Berman et al., 1972 and Ginneken, 1974). The great variation in the duration of lactational amenorrhoea has often been interpreted to reflect the wide diversity in nursing behavior across populations: the more intensive the breast-feeding, the longer the impact on fertility (Wood, 1994).

Although lactation has an important fertility reducing effect, it is less effective as a birth spacing method than modern contraceptives because the effectiveness of lactation during amenorrhea in preventing pregnancy is low as compared to the former. The resumption of menstruation cannot be delayed indefinitely by breast feeding. After certain period, menstruation returns irrespective of whether or not the child is being breast fed thereafter (Cronin, 1968).

**Mortality**

Mortality is responsible for reduction in numbers. The speed with which a population grows is determined by the level of the death rate conjointly with the level of the birth rate. Throughout the history of mankind human population was subjected to a very high death rate which existed in equilibrium with a high birth rate.

Mortality rates show variation by age and sex. Mortality has a very unequal impact on the various age groups. It strikes very hard at the very youngest and the oldest members of the population. Mortality is high in the first year of life, then declines, is very low till the mid thirties and then starts to increase in an accelerating rate until by age sixty it becomes high and by age seventy extremely high. Age specific mortality rates from a distinct curve. Male generally have a higher age specific death rate than females, with some exceptions in developing countries. Various measures are employed in the analysis of mortality. The process of mortality can be measured by the Crude Birth Rate (CBR), Infant Mortality Rate (IMR) and Child Mortality Rate (CMR) (Bhende and Kanitkar, 2003).

**Crude Death Rate (CDR)**

The Crude Death Rate (CDR) is the most simple and the most commonly used measure of mortality, which can be calculated as a ratio of the total deaths of a specified year to the total mid-year population per 1000 live births. An important use of the crude death rate is that it tells about the natural increase in population.
Infant Mortality Rate (IMR)

It can be expressed as the number of infant deaths per 1000 live births. In most underdeveloped countries a high Infant Mortality Rate (IMR) exists which reflects on poor medical care and poor sanitation and infact IMR can be used as a sensitive development index.

IMR can be divided into two phases (upto four weeks) and post neonatal (four weeks-eleventh months). Demographers have regarded neonatal mortality to be dominated by “endogenous” factors such as birth injuries and congenital disorders and post neonatal period to be dominated by exogenous or environmental factors. By inference post neonatal mortality should decline more rapidly than neonatal mortality and this is what happened in developed countries. Later on it was seen that exogenous factors dominate infant mortality only for the first three or possibly four days and that during the remainder of the first month exogenous factors are just as important as during the last eleven months.

Differential Infant and Child Mortality

Various Factors contribute to differential regional infant and child mortality. Dyson and Moore (1983) grouped the main states of India into two basic demographic regions: the north and the south including the states of the east. Lower infant and child mortality in the south were attributed to “difference in the kinship structure and female autonomy”. Nag (1983) attributed the lower mortality in Kerala “mostly to its higher social development and partly to its favorable environmental and hygienic conditions.” Development of social services such as education, health and transport through public policy measures was designated as social development.

Health inequalities between and within countries is a matter of growing concern internationally (Marmot, 2005). In 2001-05, the life expectancy at birth for female living in urban Kerala was 76.7 year whereas the corresponding figure for females in rural Madhya Pradesh was only 56.0 years (ORG, 2001). Thus, the maximal regional life expectancy gap in India constituted about 21 years. Life expectancy differentials are even more striking in case of socio-economic status as the mortality burden falls disproportionately on economically disadvantaged and lower-caste groups (Subramanian et al. 2006; Dyson & Moore, 1983). Many authors observe a clear north-south demographic division which is reflected by almost all demographic indicators including infant and child mortality (Dyson & Moore, 1983; Murthi, 1995). Some recent studies confirm that excess female child mortality in India varies considerably across regions reaching its highest levels in the north (Arokiasamy, 2004; Subramanian et al. 2006). Much less is known about principal regularities of regional differentials in all age mortality and, especially, in adult mortality. In his fundamental
study on mortality trends and patterns in India, Bhat (1987) found that although southern states experienced significantly lower levels of child mortality, adult mortality appears to be somewhat lower in the north-western parts of the country. The study confirmed that regional differentiation in adult mortality is significantly smaller than that of child mortality. He also found that there is a notable variation across the states in the speed of mortality reductions: the fastest decline in mortality between 1951-1961 and 1971-1981 occurred in southern state of Karnataka, whereas the slowest progress during the 1971-1981 period was observed in eastern state of Orissa (Bhat, 1987). Mosley and Chen (1984) have identified five proximate determinants through which child survival is influenced: maternal factors (age, parity and birth interval), environmental contamination, nutrient deficiency, injury and personal illness control. Jain (1985), Talwar (1988) and Nag (1988) have classified proximate determinants according to the time at which they operate - at conception, during gestation, during the neonatal and during the post neonatal period. According to Jain (1985) individual level variables (individual productivity as measured by education and occupation), household level variables (income) and community level variables (ecological setting, health system) all influence infant and child mortality.

An inverse association exists between socioeconomic status and infant mortality (Woodbury, 1925; Adamchak and Flint, 1983; Eberstein and Parker, 1984; Stockwell et al., 1988). Stockwell and Wicks (1984) conducting a study in Ohio found a similar pronounced inverse relationship existing between infant mortality and a wide variety of socioeconomic variables. Infact all the variables examined by them, the one factor that emerged as the strongest and most consistent determinant of census tract variations in infant mortality was the proportion of the low income family. Flegg (1982) analysed 46 underdeveloped countries and found that both average income and income equality have strong effects (positive and negative, respectively) on infant survival.

The relatively few studies focusing on the relationship between infant mortality and income at the household level in developing countries found consistently negative associations. These studies vary only in terms of explanatory power attributed to income in relation to other factors (United Nations, 1985). Goyal (1990) found a negative association between infant deaths and standard of living index. Defo (1994) studying factors impinging on the survival of children in Cameroon found household income playing an important role. Kost et al., (1992) have concluded that higher mortality observed among low status groups is not a result of greater concentration of poor reproductive patterns of those groups. Instead higher status groups probably have more resources available for combating the negative effects of the same high risk reproductive patterns.
They also found that the two sets of factors tend to affect mortality during different times in a child’s life. In general, socioeconomic factors do not appear to be associated with neonatal mortality, while reproductive factors dominate only in the neonatal period and the rest of first six months.

The association of women’s education with infant and child mortality has been highlighted in numerous studies (Caldwell, 1979; Cochrane et al., 1980; Martin et al., 1983; Hobcraft et al., 1984; Pebley and Stupp, 1987; Caldwell et al., 1990; Gupta, 1990; United Nations, 1994). In Indonesia and Pakistan Martin et al., (1983) found that children born to women in the highest category of education faced lowered risk of mortality after the first month of life.

The inverse effect of education on child mortality is generally attributed to the fact that education facilitates the use of modern health care; it is also responsible for acquisition of information related to family planning. The later, through its effects on spacing and timing of births and pregnancies, acts to delay adolescent childbearing which is a risk factor of infant and child mortality (Caldwell, 1986)

A number of biological factors also influence infant mortality. Gupta (1990) found that in rural Punjab birth intervals play an important role in child survival. Consistent with previous study in China (Ren, 1994) found that lower infant survivorship to be associated with higher parity birth, young age of mothers, lack of breast milk, and low birth weight babies. Kost et al., (1992) studied reproductive factors like mother’s age at birth, birth order, and a four category variable constructed to represent both birth interval length and the survival status of the previous birth, found these factors dominate in the neonatal period and the rest of the first six months.

In India the IMR has been found to be much lower in urban areas (Sample Registration System (SRS), Fertility and Mortality Indicators, 1992). According to Ren (1994) in China infant survivorship was also influenced by the geographical location in which families resided. He attributed higher infant survivorship in urban area to the fact that urban areas was associated with the higher level of socioeconomic development, such as easy access to medical facilities whereas rural areas was virtually deprived of these facilities. Child care practices are another important determinant of infant and child survival. According to Jain (1985) poverty, type of birth attendant and triple vaccination are the three important determinants of infant mortality.

Other household and background characteristics also have an important bearing on infant and child mortality. According to Defo (1994) housing characteristics are expected to exert an impact on mortality because these conditions are closely related to the risk of exposure to infectious agents and the extent to which residents are protected from environmental hazards. The majority of relevant
studies of the impact of housing conditions on mortality have focused on the presence and type of water supply, the type of lavatory facilities, the power source and the type of building materials used to construct the house. Babies born in joint families and in the families with crowded homes had greater risk of mortality during the neo-natal period (Vajpayee and Govila, 1987).

**Migration**

Human migration denotes any movement by humans from one district to another, sometimes over long distances or in large groups. People who migrate called migrants. Different types of migration include daily human commuting, permanent migration, for the purposes of permanent or long-term stays. Industrialization encouraged migration wherever it appeared. (Manning, 2005 and McKeown, 2004). In general migration is divided into two groups of factors: Push and pull factors. Push and pull factors are those factors which either forcefully push people into migration or attract them. A push factor is a flaw or distress that derives person away from a certain place and a pull factor is something concerning the country to which a person migrates. It is generally a benefit that attracts people to a certain place. The push factors are due to having not enough jobs, few opportunities, poor medical care and loss of wealth etc. where a person lives and pull factors include better job opportunities, better living conditions, better education, good industrial opportunities and better medical care where a person migrates.

A migrant is defined as a respondent who has moved between any combination of rural and urban areas in the ten years (NFHS, 1992/93). Migrants are agents of change, economically and socially. Migrations reinforce tradition structure and create new identity. Predominant cause of migration is the economic factor. (Zachariah, 1969: Das et al., 1975). Better living conditions in the city are significantly motivating factors (Pal, 1974). The migrants try to save money, to pay off their debts, purchase lands, build houses and often go in far conspicuous consumption (Das et al, 1975). Both rich and poor are equally prone to migration. The rich migrate willing for better and comfortable life, while poor people migrate due to economic hardship (Sexana, 1977). Migration induces change not only in the life of migrants but also in the life of people in the place of their origin, because occasional return of migrant to their native village provide opportunity for social interaction between mobile and immobile people leading to the process of cultural diffusion. Therefore, migrants act as social change (Valnjkar, 1966). Research in India has emphasized that the poorest and landless are more likely to migrate and that migrant households are socioeconomically and educationally better placed than other (Connel et.al., 1976). In India in Uttar Pradesh all except the large land owners have high rates of migration (Oberai. A.S. et. al, 1989). Migration is the part of social structures and migration movements are consistent with social norms.
and rules. But migration also influences social structures and norms. The effect of the migration on social change are diverse. They can both reinforce ‘Traditional norms’ and establish new practices (Hann, 2000).

Microlevel studies of migration in India paint a different picture, however there has been sharp increase in population mobility in terms of long term and temporary migration (Deshingkar and Andreson 2004). Micro studies documenting large and increasing number of internal migrants suggest that the true figure is 30 million and rising. Migrant destinations are towns, cities and industrial zones (Deshingkar, 2006). Migrant Jobs tend to be in factories, agro processing plants or working as porters, domestic servants, bus conductor, rickshaw pullers, street hawkers, petty traders and construction workers. Migrants often willing to take on jobs that others cannot or do not want to do (those that are dirty, degrading and dangerous). The work is commonly poorly paid and their wages are low to make a living (Deshingkar, 2005). Workers from backward states like Bihar and Uttar Pradesh routinely migrate to the developed green revolution state of Punjab for the transplant and harvesting season (Deshingkar 2003). Migration helps the place where migration takes place by solving the problem of labor shortage and maintain development strength. (Peng and Cheng, 2005).

Migration brings better economic conditions for the migrants and exposes them to broader modernization affects including the attitudes of the migrants towards children and family are changed not only because of their better socio-economic conditions but are also influenced by local population trends and use of modern conception.(Shapiro, 1991; Timeaus and Graham, 1989). All these multifaceted influences bring about noticeable changes especially in the health standards heading to improvement in fertility and mortality behavior.

Ludhiana with the population of about three million is an important industrial centre of Punjab (Census, 2001). It has always been a major attraction for the migrants in search of their livelihood and has about twelve to fifteen lakh migrant workers from Uttar Pradesh and Bihar. Uttar Pradesh, especially the eastern part has highest rates of migration and keeping this in mind the present study has been planned to assess the fertility and mortality rates among these migrants.