CHAPTER II
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REVIEW OF LITERATURE

An attempt is made to give a brief review of the work done in the fields of fertility and reproductive health.

2.1 AGE AT MARRIAGE

Nuptiality plays a significant role in determining the level of fertility and population growth. In most societies reproduction is confined within marriage, so the process of human reproduction starts from the onset of marriage or menarche, which ever is later. However, changes in marriage pattern have played significant role in many developed countries (Coale & Tye, 1961; Hajnal, 1965; Van de Walle, 1972; Coale, 1974). In the demographic literature, age at marriage has been considered as one of the proximate determinants of fertility (Davis and Black, 1956; Bongaarts, 1982).

There are two schools of thought on the effects of age at marriage on fertility. One is that it has a major impact on fertility because in many societies, age at marriage is same as the age of entry to sexual relations and thus the female reproductive span is determined by the age at marriage. In some situation, age at marriage may have no effect on fertility. First, if women starts reproduction from the onset of menarche
without formal marriage. Second, if fertility is controlled within marriage by using contraceptive or other means, then age at marriage may not have much effect on fertility.

Age at marriage affects fertility by changing the fertility schedule and family building pattern (Ridley and Sheps, 1966). Many studies have found that age at marriage and fertility are negatively correlated (Bumpass, 1969; Jolly, 1981; Vaidyanathan, 1989). Rising age at marriage has played an important role in fertility decline in several South East Asian countries (Jones, 1978). According to Elamin and Bhuyan (1999), without using family planning method, fertility can be lowered to some extent by increasing age at marriage and simultaneously providing employment outside home. But according to Srinivas (1977) increased age at marriage plays a secondary role in controlling fertility.

Busfield (1972) observed that age at marriage varies among different cultural groups. Maitra (2004) examined the effect of socio economic characteristics on age at marriage and on total fertility rates in Nepal and found that an increase in age at marriage significantly reduced total fertility of women.

2.2 PROXIMATE DETERMINANTS OF FERTILITY

According to Davis fertility has always been socially controlled in every kind of society so that natural fertility could not reach the
biological maximum and it creates a large gap between fertility and fecundity.

In general, the biological and behavioral factors through which socio economic, cultural and environmental variables affect fertility are called intermediate fertility variables. In 1956, Davis and Black first identified the mechanism through which socio economic and cultural and human behaviour interact with the biological factors. They developed the framework of intermediate variables and suggested 11 intermediate variables through which socio economic and cultural factors affect fertility.

John Bongaarts (1978) refined the eleven intermediate variables suggested by Davis and Black and used only four variables namely - induced abortion, lactational infecundability, marriage and contraception on fertility and termed as proximate determinant of fertility and presented a simple model with these variables for analysing the relationship between intermediate fertility variables and the level of fertility. Bongaarts (1981, 1982, 1983) revised and refined this model several times. Bongaarts and Potter (1979) and Menken (1979) had considered theoretically the effect of spousal seperation, when the period of seperation was long.

There have been a lot of studies done on proximate determinants of fertility, using Bongaarts model. Odimegwu and Zerai (1996) examined
the proximate determinants of fertility of a Nigerian ethnic group “Igbo”.
This study explained that in spite of the effect of delayed marriage and other proximate determinants, Igbo’s fertility was still high. Singh et al. (1998) found that lactational infecundability was the main fertility-inhibiting factor in rural Uttar Pradesh and though fertility was high but it was declining, because the demand for contraception has increased in Uttar-Pradesh. Contraception plays the most prominent role in reducing fertility in Bangladesh (Islam et al., 1998). Visaria (1999) estimated the values of the proximate determinants of fertility for major states of India by examining NFHS data (1992-93). From this analysis, it is evident that among the four proximate determinants, contraception has played highest role to reduce fertility in many states except Uttar Pradesh and Bihar. Sapkota (2000) has investigated the effect of proximate determinants on fertility in Nepal. This investigation reveals that fertility is still high in Nepal and lactational infecundability is the main inhibitor of fertility. Decrease in the age specific proportion of women who are married and increase in contraceptive use are the two most important mechanisms by which fertility has declined from 3.1 to 1.9 children per woman in Addis Ababa (Sibanda et al., 2003). Nath et al. (2004) has studied the effect of proximate determinants on fertility reduction of an urban society of Assam.
2.3 EDUCATION OF WOMEN:

In many countries, woman's education has a significant effect particularly on fertility. Higher educational attainment has helped to get new ideas about marriage and family. After all, women's education may affect fertility in many different ways such as it increases the age at marriage, it provides new attitude and practice of family planning programme. Cochran (1979) revealed that mass schooling is associated with high fertility at the initial stage, but as the process continues, mass schooling decreases fertility. Mass education is a sure means of reducing population growth (Bogue, 1969; Simon, 1974). According to Holsinger and Kasarda (1976), education may influence fertility directly by changing attitudes and behavioural pattern of individuals. Many studies have shown that the educated women were taking the advantage of medical termination of pregnancy (MTP) (Rao and Panse, 1975; Rao and Kanbargi, 1980; Jamshedji and Kokate, 1990, Khan et al., 1990). Higher education is always associated with low fertility. By analysing the four Latin American countries, Weinberger, Lloyd and Blanc (1989) concluded that improvements in female education alone could lower fertility by 40-67 percent. The primary constraints on contraceptive use among poor women are their lack of knowledge and misconception about family planning methods (Basu, 1984). Female education is the most important factors affecting age at marriage in Kerala. In general the effect
of male education is less important than the effect of female education on age at marriage (Das and Dey, 1998). There is a beneficial effect of the education of the other women in the community. Such a community level contribution was seen in recent analyses of fertility from Africa (Kravdal, 2002).

2.4 POST PARTUM AMENORRHEA

The postpartum amenorrhea (P.P.A) is the period of temporary sterility immediately following the termination of pregnancy during which no conception is possible. Breast feeding practices have a major impact on fertility and it acts as a natural birth spacer. The period of temporary absence of menstruation after a birth is called lactational amenorrhea. This amenorrhea period is highly correlated with the time and extent of breast feeding practices prevailing in different societies and is an important determinant of fertility.

It is well established that breastfeeding is the principal determinant of amenorrhea in the societies where breast feeding is universal, prolonged and of high intensity (Howie and McNeilly, 1982; Srinivasan et al., 1989; Singh et al., 1989; Singh, 1990; Nath et al., 1993). Khan (1990) revealed that the practice of breast feeding is almost universal and lengthy in India. Particularly in rural areas women breast feed their children exclusively for up to 8 months and in some cases even for 12 months. Nath et al. (1993) reported that the life table median duration of
breast feeding of the Assam survey is 16 months. Their exists a positive correlation between breast feeding and amenorrhea (Perez et al., 1971; Jain et al., 1979). The variation in the duration of lactation amenorrhea are strongly correlated with the breast feeding practices (Van Ginnecken, 1974, 1978). But the degree of correlation is different for different populations due to varying pattern of breast feeding practices. The average amenorrhea interval is usually 1.5 to 2 months in the absence of lactation (Leridon, 1977).

Models on breast feeding and post partum amenorrhoea have been developed on the basis of data from different population (Bongaarts and Potter, 1983; Lesthaeghe and Page, 1980) and their prediction on the declination pattern of duration of post partum amenorrhoea and the duration of breast feeding was similar to the results obtained by Salway et al. (1993), utilizing the data from rural Matlab (Bangladesh). The duration of amenorrhea is closely associated with the duration of breast feeding and thus with postpartum sexual abstinence. Bongaarts and Potter (1983) have found that generally amenorrhoea period varies from one month to 2 years. It is well established that birth intervals and breast feeding are closely related and it increases the intervals between births and thereby lowers fertility (Ferry et al., 1980). Breast feeding increases the length of infertile period (Millman et al., 1993). Hence it plays an important role in controlling fertility (Vitzthem, 1994). According to
Smith (1985), each additional month of breast-feeding increases the average birth interval by 0.25-0.50 month. Many studies have showed that in non contraceptive society, birth intervals are determined principally by the duration of breast feeding (Bongaarts and potter, 1983; Smith, 1985; Nath et al.,1993,1994a, 1994b). Cleland et al.(1984) reported that PPA associated with breast feeding reduces total fecundity by 30 to 33 percent, whereas contraception reduces total fecundity only 5 to 20 percent. According to caste, social status and education of the female, duration of post partum amenorrhoea varies. Females belonging to a higher social status group usually have shorter duration of PPA (Lunn et al., 1980 ; Bhattacharya et al.,1995); whereas Singh (1990) found longer duration of PPA in low social status group or in poorly nourished mothers. Huffman et al.(1987) observed that maternal education is negatively correlated with the postpartum amenorrhoea. Maternal education and socio-economic condition of the household have significant effect on the duration of exclusive breast feeding and higher the level of education and socio-economic condition of the mother, the shorter the duration of breast feeding (Nath et al.,1997). The duration of breast feeding decreases significantly with an increase in the mother’s educational level and thus education does not reduce fertility (Elamin et al.,1999). It is seen in the data of Uttar Pradesh and Tamil Nadu that improvement in education, family income and urbanisation tends to
shorten the period of breast feeding and abstinence and thus reduce the post partum infecundability (Sinha et al.,2000). Several studies concluded that breast feeding has important effects in reducing early child mortality (Retherford et al.,1989; Miller et al.,1992; Nath et al.,1994b). But while analysing the data from 12 Latin American countries, Palloni and Millman (1986) observed no significant relationship between breast feeding and child survivability. Guz and Hobcraft (1991) studied the effect of breast feeding beyond menstruation by using life table techniques and stochastic analysis and observed that continued breast feeding inhibits fertility after menstruation. By multivariate hazards modelling, for Indian women, similar conclusion have been drawn by Singh et al.,(1993). Nath et al.(1994b) revealed that continued breast feeding after menstruation lowers fertility rate, increases birth intervals and hence fecundity. Breast feeding can delay the resumption of post partum menstruation, but it alone should not be considered as a method of contraceptive. It is necessary to use modern forms of contraception in family planning (Tilaki, 2002).

Several studies have been carried out to describe the distribution of post partum amenorrhea. Talwar (1965) and Yadava (1966) assumed that amenorrhea period distribution follows asymmetric triangular and chi-square distribution respectively. However Srinivasan (1966) assumed that amenorrhea period follows a discrete triangular distribution. On the other
hand Saxena and Pathak (1977) fitted a mixture of the two truncated Chi-square distributions. Barret (1969) derived the distribution of post partum amenorrhea as a modified Pascal distribution. Ginsberg (1972, 1973) developed a general stochastic model using the data available on the length of partial and complete breast feeding. The model depends largely on age and socio economic, cultural and educational background of the respondent. Lesthaeghe and Page (1980) derived a logit model to describe lengths of amenorrhea. Potter and Kobrin (1981) suggested a generalisation of Barrett’s distribution to fit distribution with smaller variances. They also proposed a mixed geometric negative binomial distribution. Pathak and Pandey (1984) fitted the mixture of the two displaced geometric distributions by using the simple information on the duration of post partum amenorrhea. Ford and Kim (1987) proposed a mixture of type I extreme value distribution to describe the distribution of post partum amenorrhea period. Tiwari (1990) developed two distributions to describe the mechanism of variation in the length of post partum amenorrhea period. The first distribution considered the intensity of resuming menses after a live birth to a women as time dependent, and the second distribution assumed that the intensity parameter varies among the women following a type III gamma distribution.
2.5 TOTAL FERTILITY

The analysis of fertility trend has been usually done by crude birth rate and total fertility rate (TFR). But TFR has several drawbacks in providing true fertility change. It is affected by changes in the timing of childbearing in years. Ryder (1964, 1980, and 1983) studied extensively to remove the distortions in the TFR caused by these tempo effects. Later Bongaarts and Feeney (1998) proposed a simple equation for calculating an adjusted total fertility rate (TFR'). Their model based on birth order specific period data provides an elegant and useful tool to explain the extent to which timing delays in childbearing have depressed total period rates in the past. They modified the conventional period total fertility rate for eliminating the tempo distortion from the observed TFR. Bongaarts (1999) examined the role of tempo effects in the fertility declines of less developed countries. He indicated that trends in the total fertility of many less developed countries are likely to be distorted by tempo effects. But Bongaarts and Feeney formula has received a lot of criticism. According to Kim and Schoen (2000), the mathematical basis of TFRadj (TFR') holds only under very restrictive conditions. It is quite volatile in the presence of modest fertility fluctuation. Van Imhoff and Keilman (2000) observed that the Bongaarts and Feeney procedure was not adequate to solve the tempo distortion problem. Zeng and Land (2001) derived a new formula for adjusting bias in observed changes in the period tempo of
fertility. It is an extension of Ryder’s basic translation equation. By incorporating variance effects, Kohler and Philipov (2000) independently derived an adjustment formula. Philipov and Kohler (2000) applied the TFR adjustment to Bulgaria, the Czech Republic, Hungary, Poland and Russia. Substantial differences between adjusted and the observed TFR indicates tempo effects in the recent decline of fertility in these countries. Lesthaeghe and Willems (1999) concluded that Bongaarts and Feeney method works very well retrospectively in diagnosing the effects of changes in quantum and tempo.

2.6 BIRTH INTERVAL

For detection of current changes in natality patterns of women the study of birth intervals are important. The data on birth intervals are taken as indicator of reproductive performance and it reflects the differential pattern of reproduction (Sheps and Perrin, 1964). Birth intervals can be categorised into two broad types, namely (i) Closed birth interval which is the interval between the successive live births of a woman, (ii) open birth interval which is the time elapsed from the date of birth of most recent child prior to the survey date and the date of survey.

The closed birth interval is a good index of fertility as it indicates at what spacing women have children. Henry (1956) showed that the
fertility of a woman is inversely related to her mean closed birth interval. Later on, Henry (1961) used this interval as a sensitive index of fertility.

Realising the usefulness of birth intervals data demographers had undertaken a number of analytical studies in the past (D’Souza, 1974; Potter and Parker, 1964; Rodriguez, 1984; Srinivasan, 1980). Several probability models have been developed to describe the variation in the length of birth intervals (Sheps and Menken, 1973; Singh et al., 1979; Bhattachaya et al., 1988; Pandey et al., 1990).

Srinivasan (1966) had developed an analytical model for the probability distribution of the closed birth interval by considering the interval as the sum of four components i.e. (i) postpartum amenorrhoea, (ii) waiting time, (iii) the period of pregnancy and post termination amenorrhea and (iv) gestation period. Singh et al. (1979) derived a model for the closed birth interval of a women with specified marital duration. Singh et al. (1983) developed a parity dependent model for closed birth interval. Pathak (1983) developed a continuous time probability model for describing variation in any closed birth interval of a women of a specified marital duration. Pathak and Pandey (1990) demonstrated the use of stochastic models to study the systematic component of variation in the distribution of closed birth interval with some bio social components. Singh (2000) derived a probability model to describe the variation in the length of any order of closed birth intervals of
female of large marital duration, considering the variation in the length of
PPA.

2.7 MOST RECENT BIRTH INTERVAL

High illiteracy prevailing in the underdeveloped countries leads to
non sampling errors because of recall lapse on the part of the respondent
(Rindfuss et al., 1982). On the other hand, most recent birth interval
(MRBI), which is defined as the interval between last and last but one
birth prior to the survey date, seems to be less affected by such memory
biases. Thus it is more effective for analysis of fertility changes among
married women compared to other closed birth interval (Srinivasan, 1967;
Singh et al., 1988; Mukherjee et al., 1991). Nath et al. (1994c) studied the
most recent birth interval of a traditional society of Assam and found that
covariates such as age at marriage of woman, parity of the mother,
survival status of the last but one birth and family income have significant
effects on the duration of this interval. Poole (1971), Sheps and
Menken (1972) studied theoretical distribution of last closed birth
interval. Singh et al. (1988) had derived a parity dependent probability
distribution for the most recent birth interval and later they developed a
model regardless of parity. Pandey et al. (1998) developed a stochastic
model for the study of last closed birth interval with some bio social
component.
2.8 REPRODUCTIVE HEALTH

Sai and Nasim (1988) revealed that the reproductive health framework overcomes the narrow confines of family planning to cover all aspects of human sexuality and reproductive health needs during the various stages of women’s lives. Jejeebhoy (1997) reported that information on the reproductive health situation continues to be incomplete and patchy in India. Several studies have already revealed the relationship between socio-economic developments, particularly enhancement of economic opportunities and education for women and the improvement in reproductive health, fertility reduction (Cochran 1979) and child survival (Cleland 1988). Maternal mortality and maternal morbidity are the most sensitive indicators of the status of women in a society. Education is the key element for improving the status of women (Vaidyanathan, 1988). Improvements in the status of women exert negative effects on fertility (Jejeebhoy, 1991).

The various components of maternal and child health care are antenatal care, natal care, postnatal care, breast feeding, weaning and nutrition of the mother and child. Many studies revealed that women who got antenatal, natal and postnatal services have fewer undernourished children (Ramachandran, 1989; Punhani and Mahajan, 1989; Xu et al., 1995). Basu (1990) observed that even if physical environment were poor, better antenatal and natal care would reduce morbidity and
mortality among children. The newly constructed reproductive health index is more appropriate for measuring the status of the family planning than the reproductive health status of women (Ramanathan, 1998). Quadeer (1998) examined the concept of reproductive health as it emerged in the 1980s and its consequence for health research and family planning programs in India.

Infant and child mortality are closely associated with national socioeconomic development (Shin, 1975) as well as the social class of parents (Antonovsky and Bernstein, 1977). Children born to very young mothers are at higher risk of being severely undernourished (Rajaretnam and Hallad, 2000). In India, emphasis on fertility control reduces the study of infertility, which is a serious aspect of reproductive health and it has some bad consequences (Jejeebhoy, 1999).