HIGH-RISK BIRTHS IN INDIA: A STUDY BASED ON NFHS-1 AND NFHS-2 DATA

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MASTER OF PHILOSOPHY

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CERTIFICATE

I, Bhaskar Kanungo, certify that the dissertation entitled **"HIGH RISK BIRTHS IN INDIA – A STUDY BASED ON NFHS-1 AND NFHS-2 DATA"** for the degree of **MASTER OF PHILOSOPHY** is my bonafide work and may be placed before the examiners for evaluation.

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Dedicated to

My Teacher

&

My Parents

Acknowledgement

Although "Thanks" is a poor expression of the deep sense of gratitude one feels in the heart, yet there is no other better way to express it.

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Chapter I

Introduction

"When fathers as well as mothers are convinced about the support required for healthy pregnancies and child development, harmful health practices can be eliminated – UNICEF"

High Risk Births (HRB) is the pregnancy related risk where the probability of death for both mother and child is high. If any one of the following conditions apply it is considered as HRB.

(1) ***Age Risk*** - The age of the mother is either less than 18 or more than 34 years;

(2) ***Order Risk*** - The woman has already three or more than children; and

(3) ***Interval Risk*** - The birth interval between two births is less than 24 months. (NFHS, 1995 Govindasamy et al., 1993, Burkhalter et al. 1991).

HRB can either be a single risk or multiple risk. Single risk means the concerned birth falls in any one of the risk category mentioned above, while multiple risk denotes the combination of any two or all of the above mentioned birth risks. The findings of several studies (Boerma and Bicego, 1992; Kwast, 1989; Fauveau et al., 1988; Fortney et al., 1988; Boerma, 1987; Hobcraft, 1987; Palloni and Millman, 1986; Hobcraft et al., 1985; Kwast et al., 1985), corroborates the high rate of maternal, infant and child mortality due to the above mentioned factors in various developing countries. The complex setting and the interaction of social, economic, biological, and demographic factors in developing countries often act detrimental to maternal, infant and child survival (Govindasamy et al., 1993). Govindasamy et al., (1993) in their study observed:

> "... 76 percent of women in North Africa and 72 percent of women in sub-Saharan Africa were classified as being in a high-risk group; this compares with 57 percent in Asia and 53 percent in Latin America and the Caribbean. The largest category in all four regions was the combination of high parity and older maternal age...The

existence of these demographic characteristics does not, by themselves, pose a risk to the mother and/or her children. It is only when a woman with one or more high-risk characteristic gives birth that they potentially become dangerous....Two of the single risk factors are associated with excess infant and child mortality: mortality is increased by 64 percent for children born to young mothers and by 50 percent for those with short birth intervals."

I.I HRB: The extent of the problem in India

India has made enormous progress in the field of health services since independence but still maternal, infant and child mortality rates are quite high. The average maternal mortality ratio in India for 1996-97 has been estimated as 540 deaths per 100,000 live births (NFHS-2). This ratio is one of the highest in the world. A large number of children die during the neonatal period, postnatal period, first year of life or before reaching age 5 despite a decline in infant and child mortality (Westley and Mishra, 2001). Figure 1.1 shows the probability of neonatal mortality (NNM)[1] in the states of India. The probability of NNM in India as a whole declined from 48.6 per 1000 live births in NFHS-1 to 43.4 per 1000 live births in NFHS-2, a decline of 5.2 points. Among the states, Madhya Pradesh (54.9), Uttar Pradesh (53.6) and Rajasthan (49.5), have the highest probability of NNM in NFHS-2. NNM in Rajasthan, Punjab, and Madhya Pradesh has increased from 37.2, 31.2, and 53.2 per 1000 live births in NFHS-1 to 49.5, 34.3, and 53.2 per 1000 live births in NFHS-2 respectively. Postneonatal mortality (PNM)[2] in India registered a decline from 29.9 per 1000 live births in NFHS-1 to 24.2 per 1000 live births in NFHS-2. Figure 1.2 shows Orissa followed by Haryana registered the highest decline of nearly 15 and 13 points for PNM between NFHS-1 and NFHS-2.

Figure 1.3 presents the probability of infant mortality (IM)[3] among the various states of India. IM in India declined from 78.5 per 1000 live births in NFHS-1 to 67.8 per 1000 live births in NFHS-2, an average rate of decline of nearly 11 infant deaths per 1000

[1] The probability of dying in the first months of life (IIPS, 2000)
[2] The probability of dying after the first month of life but before the first birthday (IIPS, 2000).
[3] The probability of dying before the first birthday (IIPS, 2000).

live births. Andhra Pradesh and Orissa registered a decline of nearly 36 and 31 infant deaths per 1000 live births in between the NFHS-1 and NFHS-2, Rajasthan, and Madhya Pradesh registered 86.1 and 80.4 infant mortality in NFHS-2, an increase of nearly 8 and 1 point in comparison to NFHS-1.

Figure 1.4 shows the probability of child mortality (CM)[4] in India. India as a whole registered 29.3 child mortality per 1000 live births in NFHS-2 in comparison to 33.4 in NFHS-1 survey. Highest CM (55.6 per/1000 live births) was recorded in Madhya Pradesh, followed by Uttar Pradesh (39.2) and Rajasthan (37.6). Kerala recorded the lowest child mortality of 2.6 per 1000 live births in NFHS-2. Child mortality in Madhya Pradesh increased from 49.3 in NFHS-1 to 56.4 in NFHS-2.

Among the countries of the world, India ranked 49th in under-5 mortality[5] in the world (UNICEF, 2001). Figure 1.5 shows the probability of under-five mortality rate (UFM) in India. The national level UFM was 109.3 per 1000 live births in NFHS-1. This registered a decline of 14.9 per 1000 live births in NFHS-2. Madhya Pradesh recorded highest UFMR of 137.6 per 1000 births followed by Uttar Pradesh (122.5) and Rajasthan (114.9) in NFHS-2 survey. Kerala in the same period accounted for the lowest UFM, i.e., 18.8 per 1000 births. UFM in Madhya Pradesh and Rajasthan increased from 130.3 and 102.6 in NFHS-1 to 137.6 and 114.9 in NFHS-2 respectively.

A similar situation prevails in some of the developing countries. Realizing the importance of improving health among women and children international organizations have taken a lead to highlight this issue. The World Summit for children (1990) emphasized on maternal health and stressed on the importance of health for children. It called for reduction of maternal death to half by the year 2000. The Cairo Conference (1994) on Population and Development stress that women's health, including reproductive health, was essential for sustainable development. These were among other initiatives taken at international level to enhance the maternal health, which has direct influences on the probability of child survival.

[4] The probability of dying between the first and fifth birthday (IIPS, 2000).
[5]The probability of dying before fifth birthday (IIPS, 2000).

In India, reduction in maternal, infant and child mortality has been given a priority by the Ministry of Health and Family Welfare. Various specific programmes were launched for enhancing maternal and child health since 1951 (Choe, et al, 1999). However as the above data clearly show the probability of infant and child mortality is high in India.

In order to reduce the probability of child mortality in India, it is important to understand the factors that affect HRB. Such an analysis helps us in developing policy interventions to reduce HRB. In this paper, we examine the factors that influence HRB for currently married women in India.

Table 1.1 shows the percentage of births in any high-risk[6] category for both NFHS-1 and NFHS-2 survey. The same is represented graphically in figure 1.6. The percentage of last birth in any high risk in India has remained almost same in NFHS-1 and NFHS-2. In India, however, HRB varies from state to state. The any risk has increased from NFHS-1 to NFHS-2 in the states of Jammu by 8.8 percent points, Meghalaya (8.6 percent points), Nagaland (8.4 percent points), Madhya Pradesh (6.1 percent points), Uttar Pradesh (4.3 percent points), Manipur (2.7 percent points), Gujrat (0.9 percent points), and Bihar (0.5 percent points). West Bengal recorded maximum decline in any risk category, i.e., from 58.4 percent in NFHS-1 to 41.2 percent in NFHS-2, showing a decline of 13.6 percent points. It is followed by Assam, which recorded a decline of 11.2 percent points, Tripura (8.9 percent points), Arunachal Pradesh (7.4 percent points), Goa (6.4 percent points) and Maharastra (5.9 percent points). Other states observed a decline of less than 5 percent points between NFHS-1 and NFHS-2. We use the data for all the states in our analyses but as described later regional variation in HRB are also examined.

[6] Any high-risk includes single risk and multiple risk.

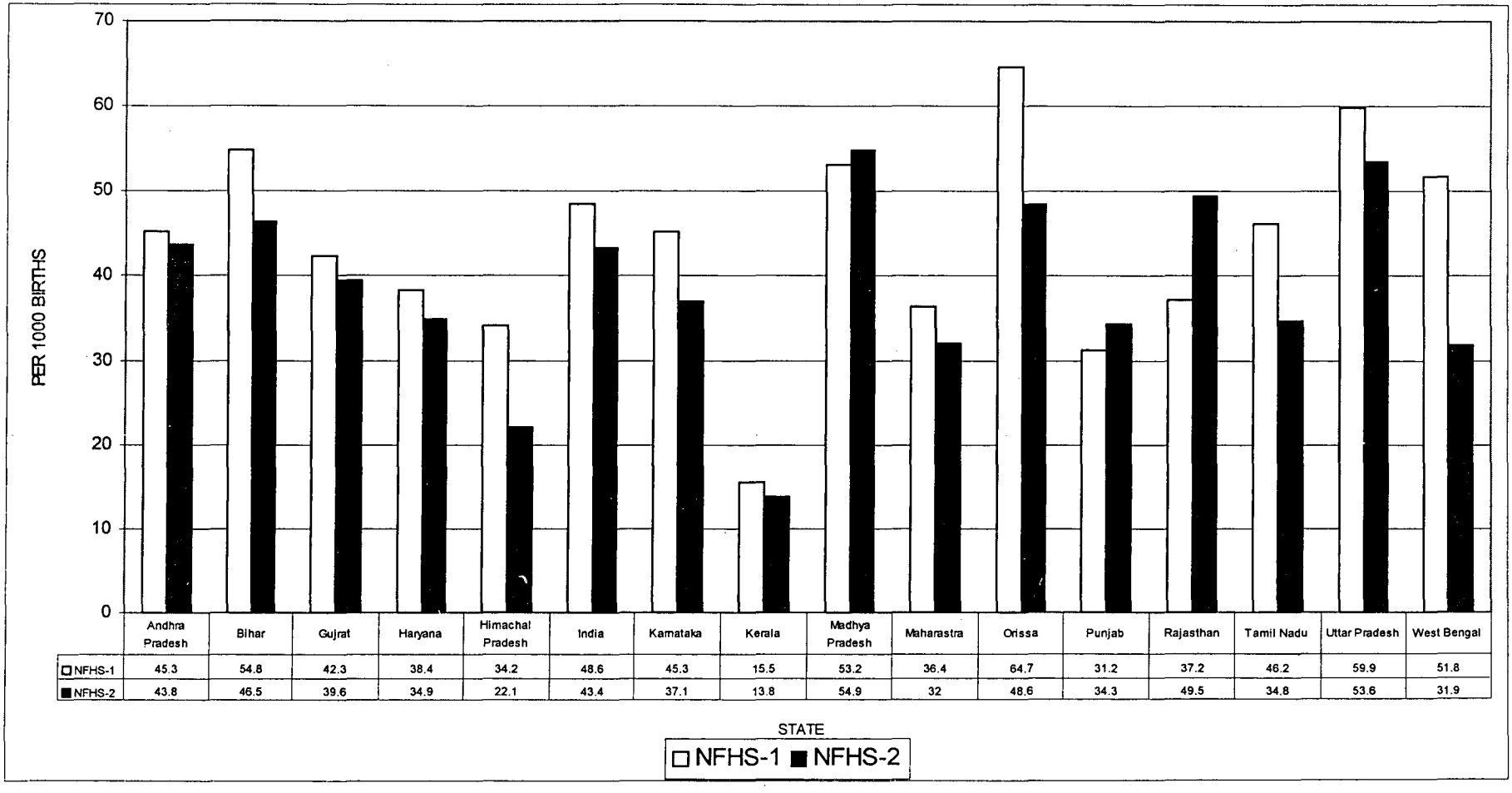
1.2 Objectives of Study

1. To examine inter state variations in high risk factors.
2. To analyze the various social, economic, and other factors that influence the HRB.

1.3 Organization of Chapters

The study is divided into five chapters. The next chapter summarizes the previous work on the various aspects of High Risk Births. The third chapter provides the conceptual framework. It also explains the methodology used for analyzing the socio-economic factors affecting HRB. The fourth chapter deals with detailed analyses of factors influencing HRB. The last chapter concludes the study by suggesting certain measures by which the incidence of HRB can be reduced.

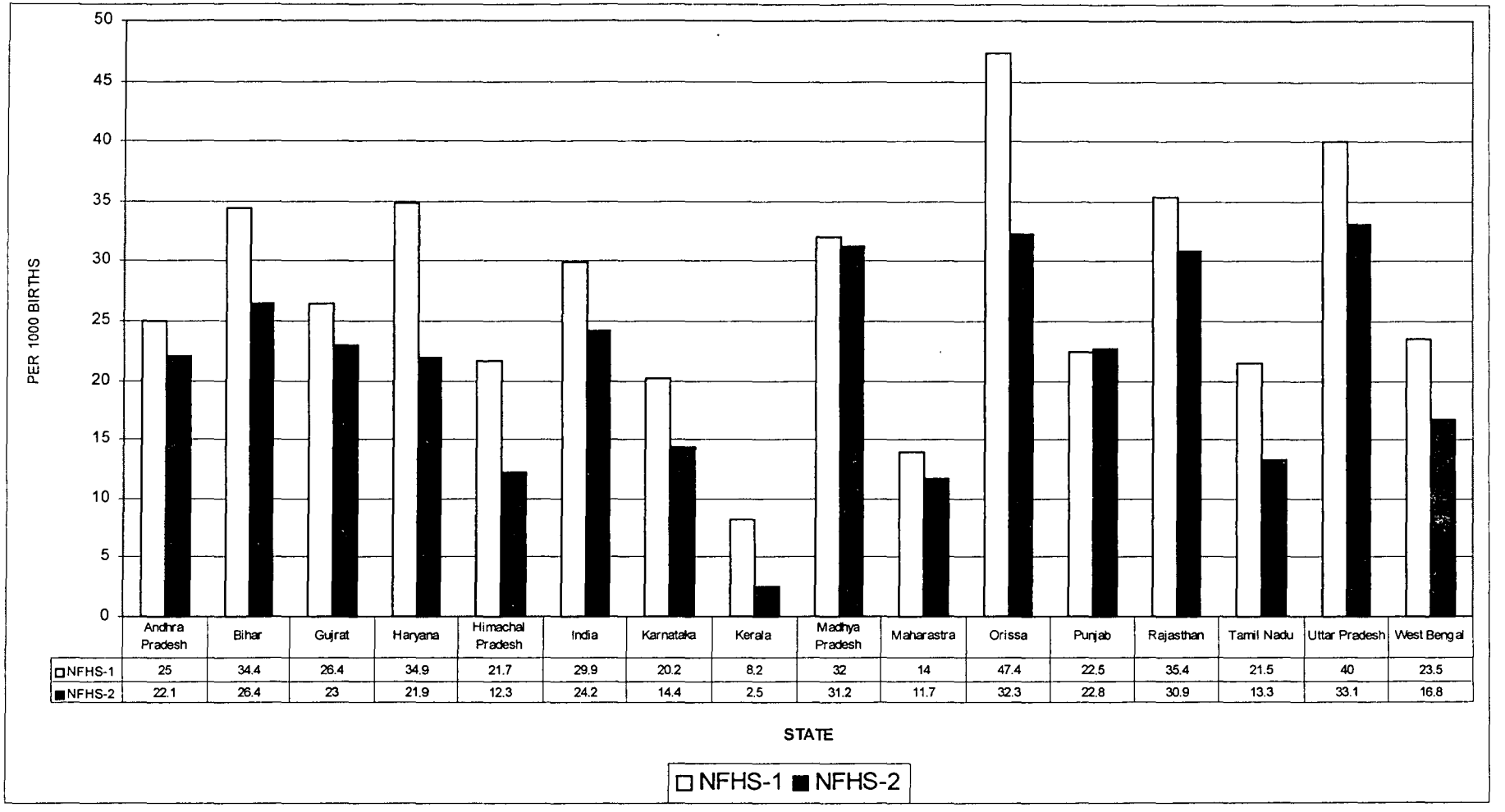
Figure 1.1 Neonatal Mortality in the States of India



	Andhra Pradesh	Bihar	Gujrat	Haryana	Himachal Pradesh	India	Karnataka	Kerala	Madhya Pradesh	Maharastra	Orissa	Punjab	Rajasthan	Tamil Nadu	Uttar Pradesh	West Bengal
NFHS-1	45.3	54.8	42.3	38.4	34.2	48.6	45.3	15.5	53.2	36.4	64.7	31.2	37.2	46.2	59.9	51.8
NFHS-2	43.8	46.5	39.6	34.9	22.1	43.4	37.1	13.8	54.9	32	48.6	34.3	49.5	34.8	53.6	31.9

Note: Refers to last birth in five year preceding the survey
Source: IIPS, 1995 and IIPS, 2000.

Figure 1.2 Postneonatal Mortality in the States of India

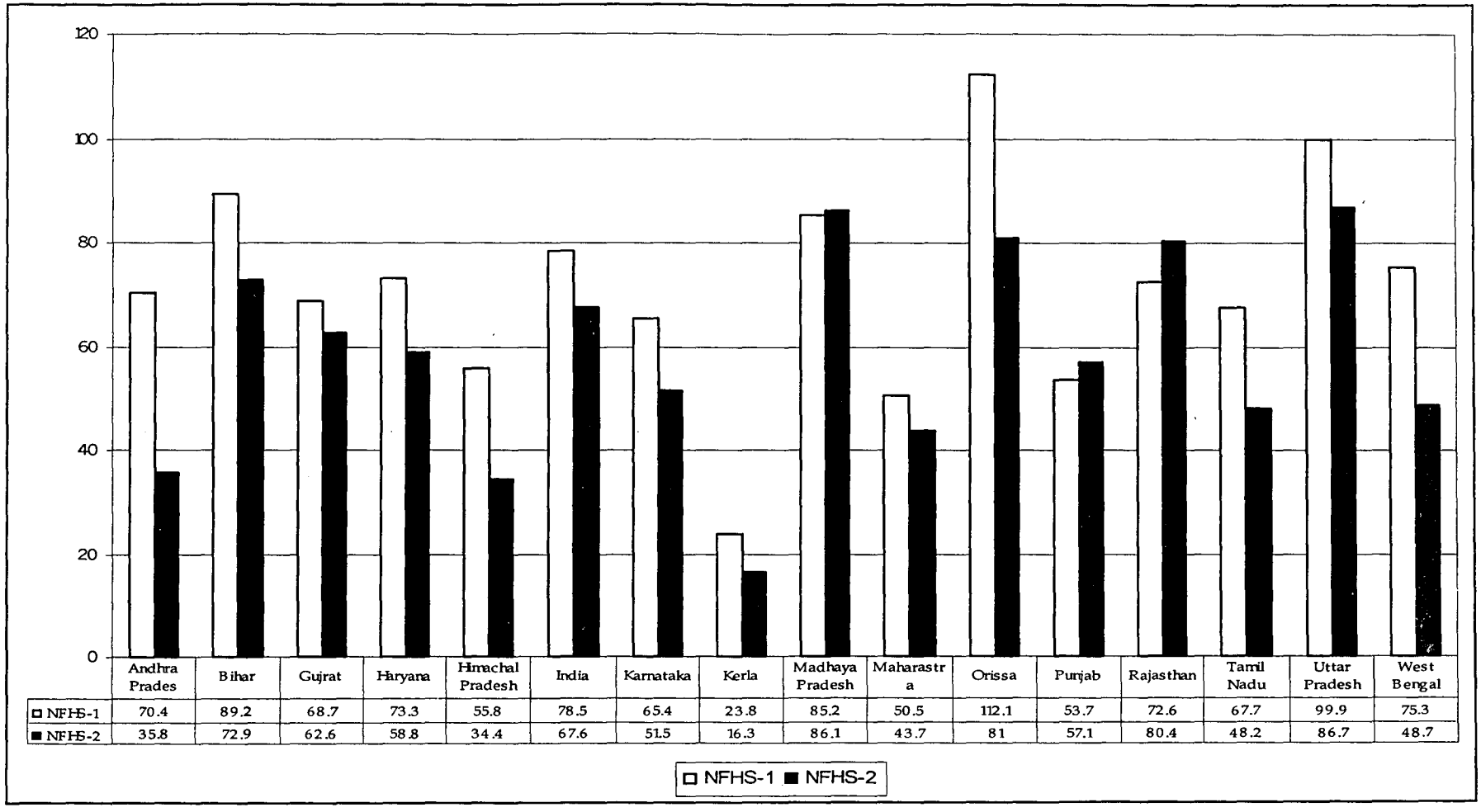


	Andhra Pradesh	Bihar	Gujrat	Haryana	Himachal Pradesh	India	Karnataka	Kerala	Madhya Pradesh	Maharastra	Orissa	Punjab	Rajasthan	Tamil Nadu	Uttar Pradesh	West Bengal
NFHS-1	25	34.4	26.4	34.9	21.7	29.9	20.2	8.2	32	14	47.4	22.5	35.4	21.5	40	23.5
NFHS-2	22.1	26.4	23	21.9	12.3	24.2	14.4	2.5	31.2	11.7	32.3	22.8	30.9	13.3	33.1	16.8

Note Refers to last birth in five year preceding the survey

Source: IIPS, 1995 and IIPS, 2000.

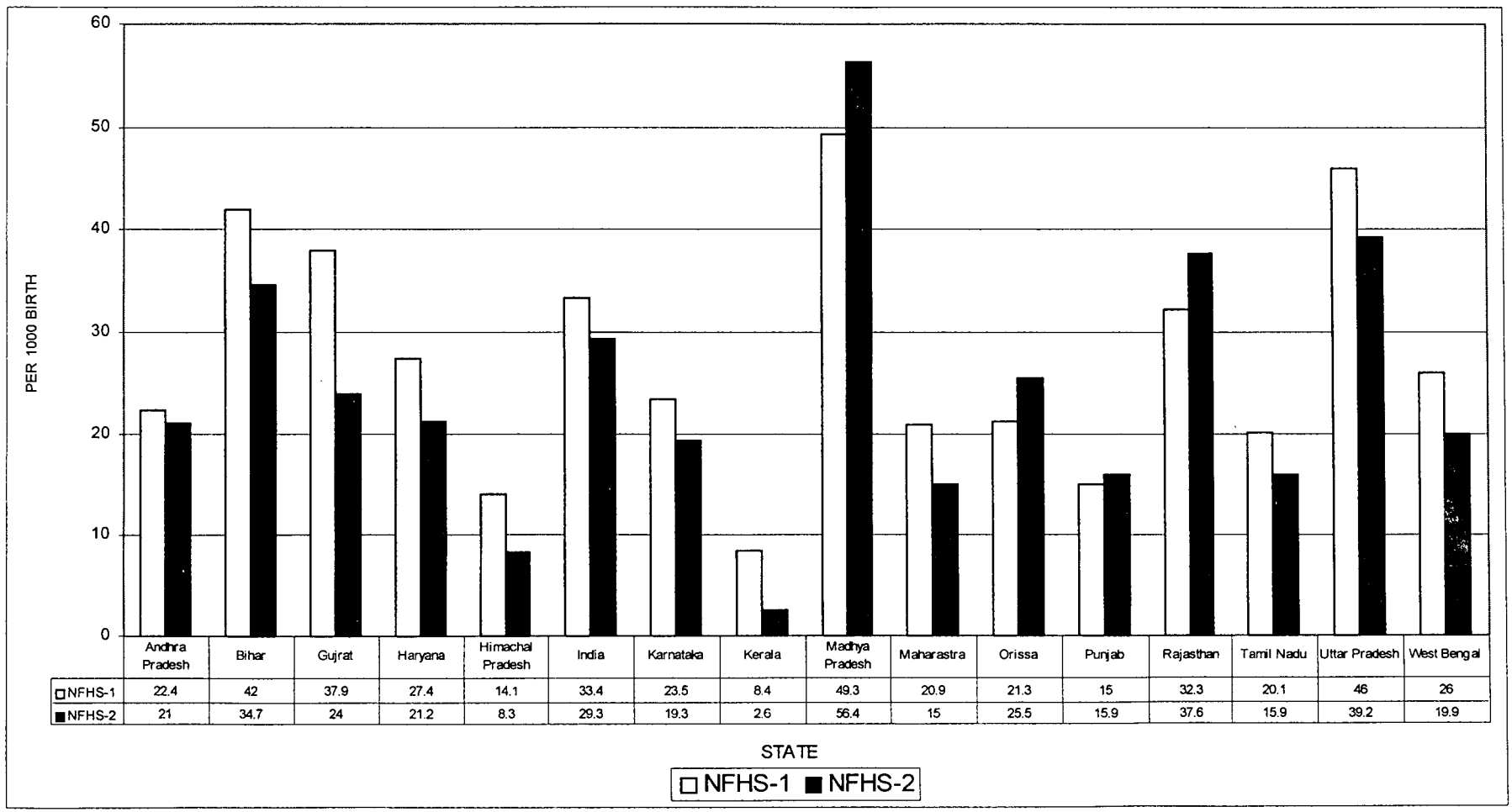
Figure1.3 Infant Mortality in the States of India



	Andhra Prades	Bihar	Gujrat	Haryana	Himachal Pradesh	India	Karnataka	Kerla	Madhaya Pradesh	Maharastra	Orissa	Punjab	Rajasthan	Tamil Nadu	Uttar Pradesh	West Bengal
NFHS-1	70.4	89.2	68.7	73.3	55.8	78.5	65.4	23.8	85.2	50.5	112.1	53.7	72.6	67.7	99.9	75.3
NFHS-2	35.8	72.9	62.6	58.8	34.4	67.6	51.5	16.3	86.1	43.7	81	57.1	80.4	48.2	86.7	48.7

Note: Refers to last birth in five year preceding the survey
Source: IIPS, 1995 and IIPS, 2000.

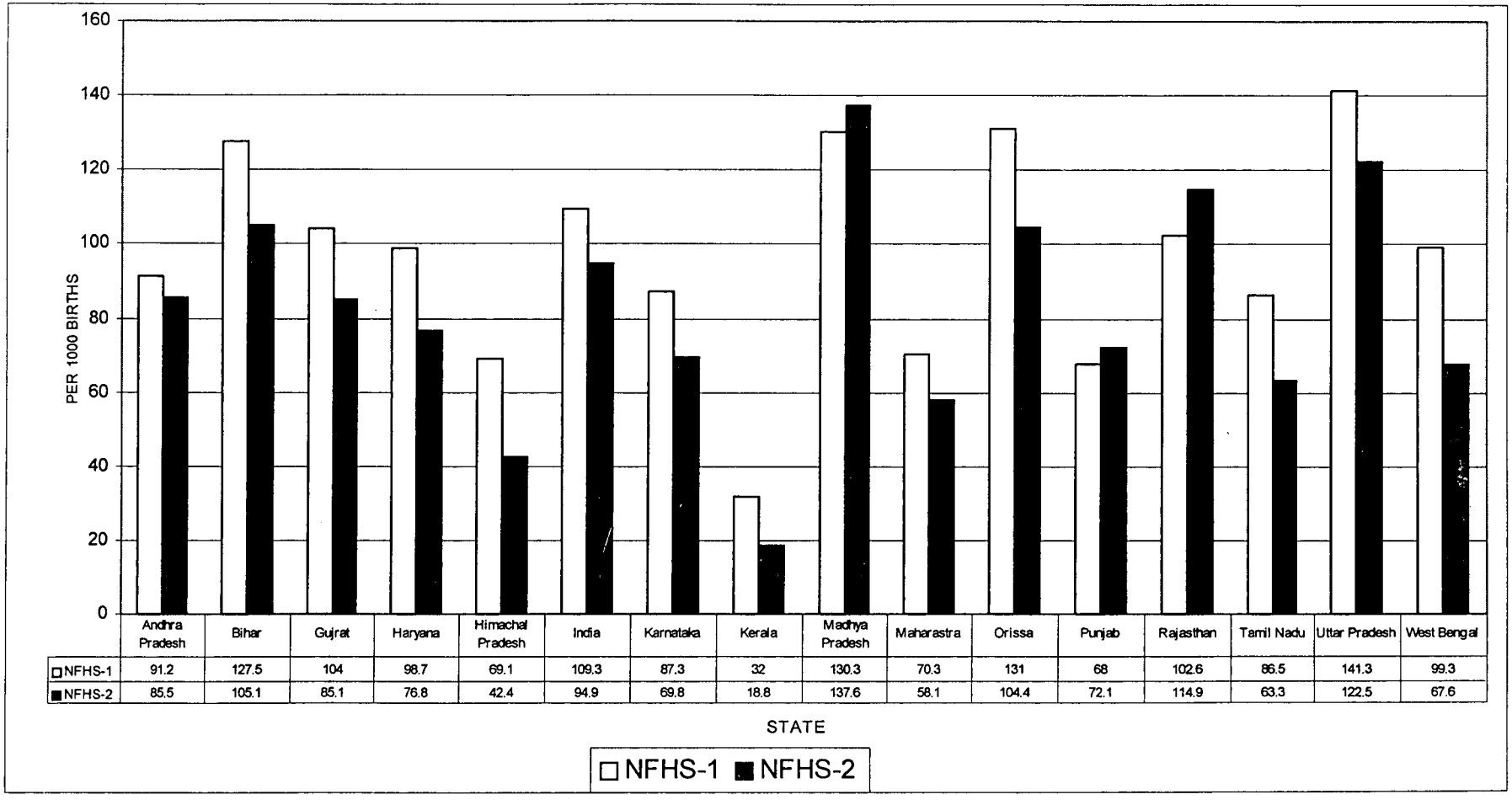
Figure 1.4 Child Mortality in the States of India



	Andhra Pradesh	Bihar	Gujrat	Haryana	Himachal Pradesh	India	Karnataka	Kerala	Madhya Pradesh	Maharastra	Orissa	Punjab	Rajasthan	Tamil Nadu	Uttar Pradesh	West Bengal
NFHS-1	22.4	42	37.9	27.4	14.1	33.4	23.5	8.4	49.3	20.9	21.3	15	32.3	20.1	46	26
NFHS-2	21	34.7	24	21.2	8.3	29.3	19.3	2.6	56.4	15	25.5	15.9	37.6	15.9	39.2	19.9

Note: Refers to last birth in five year preceding the survey
Source: IIPS, 1995 and IIPS, 2000.

Figure 1.5 Under-Five mortality in the States of India



	Andhra Pradesh	Bihar	Gujrat	Haryana	Himachal Pradesh	India	Karnataka	Kerala	Madhya Pradesh	Maharastra	Orissa	Punjab	Rajasthan	Tamil Nadu	Uttar Pradesh	West Bengal
NFHS-1	91.2	127.5	104	98.7	69.1	109.3	87.3	32	130.3	70.3	131	68	102.6	86.5	141.3	99.3
NFHS-2	85.5	105.1	85.1	76.8	42.4	94.9	69.8	18.8	137.6	58.1	104.4	72.1	114.9	63.3	122.5	67.6

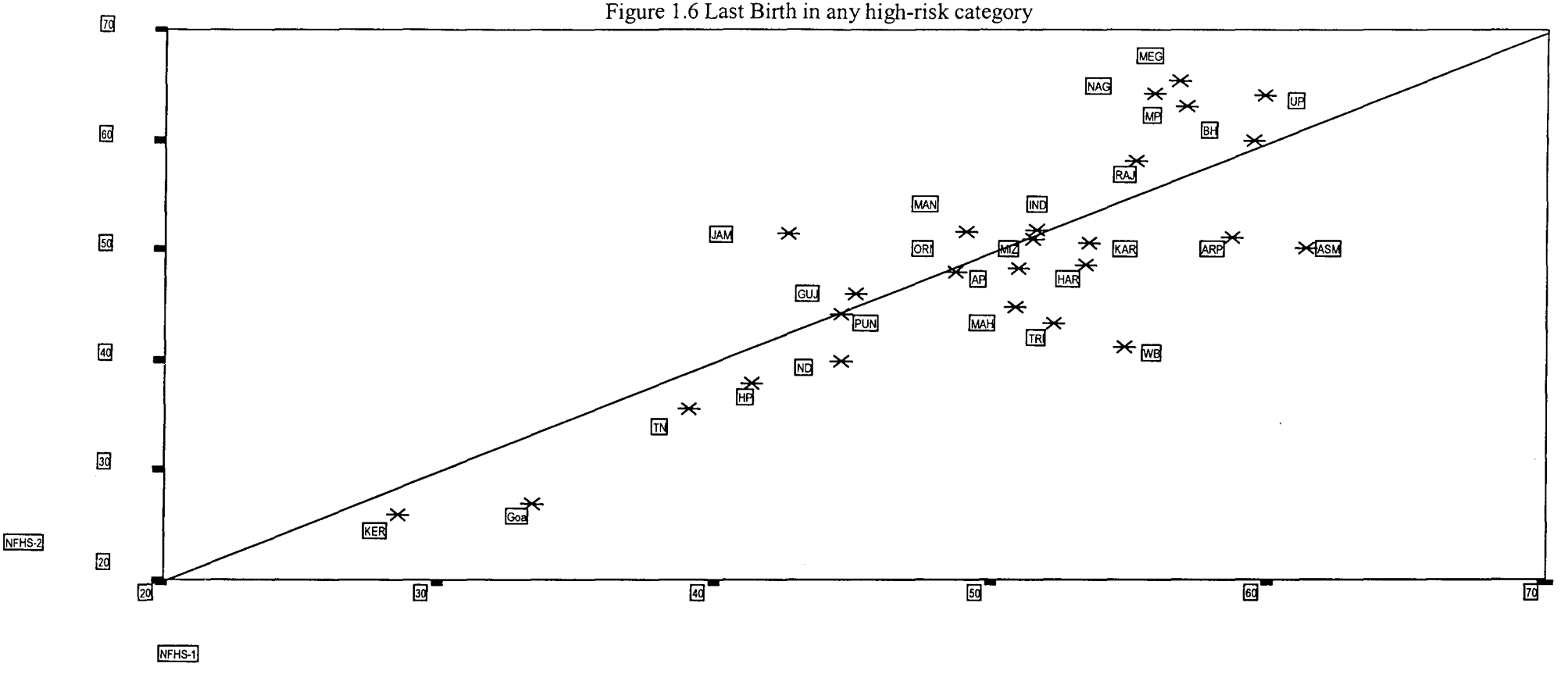
Note: Refers to last birth in five year preceding the survey
Source: IIPS, 1995 and IIPS, 2000.

Table 1.1 Percentage of Last Birth (five year preceding the survey) in Any High Risk Category

STATE	NFHS-1 (1992-93)	NFHS-2 (1998-99)
Andhra Pradesh	51	48.3
Assam	61.3	50.1
Bihar	59.4	59.9
Goa	33.4	27.0
Gujarat	45.1	46.0
Haryana	53.4	48.7
Himachal Pradesh	41.4	37.8
Jammu	42.6	51.4
Karnataka	53.5	50.6
Kerala	28.6	26.0
Madhya Pradesh	56.9	63.0
Maharashtra	50.8	44.9
Manipur	49	51.7
Meghalaya	56.7	65.3
Mizoram	51.5	51.0
Nagaland	55.8	64.2
Orissa	48.6	48.0
Punjab	44.6	44.2
Rajasthan	55.2	58.1
Tamil Nadu	39.1	35.5
West Bengal	54.8	41.2
Uttar Pradesh	59.8	64.1
New Delhi	44.6	39.9
Arunachal Pradesh	58.6	51.2
Tripura	52.2	43.3
India	**51.6**	**51.8**

Source IIPS Mumbai, 1995 & IIPS Mumbai, 2000.

Figure 1.6 Last Birth in any high-risk category



Note(1): AP=ANDHRA PRADESH, AR= ARUNACHAL PRADESH, AS= ASSAM, BR=BIHAR, GO=GOA, GJ=GUJRAT, HR=HARYANA, HP=HIMACHAL PRADESH, IN=INDIA, JM=JAMMU, KA=KARNATAKA, KE=KERALA, MP=MADHYA PRADESH, MH=MAHARASTRA, MN=MANIPUR, MZ=MIZORAM, NA=NAGALAND, ND=NEW DELHI, OR=ORISSA, PU=PUNJAB, RJ=RAJASTHAN, TN=TAMIL NADU, TR=TRIPURA, UP= UTTAR PRADESH AND WB=WEST BENGAL.

Note (2): The figures are for the last birth in five years preceding the survey.

Chapter II

Review of Literature

HRB are not only the outcome of the demographic factors but various social, cultural and economic factors also have significant influence on it. This chapter reviews earlier studies conducted by eminent scholars on the various aspects of HRB. The review of literature is arranged in terms of four factors: (1) HRB; (2) Social; (3) Economic; and (4) Other.

2.1 HRB Factors

2.1.1 Age of Mother

Age of mother at the time of child bearing is an important determinant for the survival of a child. Those mothers who give birth or become pregnant before they have attained full material growth have greater risk of complications during pregnancy or child birth (Govindasamy et al., 1993; Aitken and Walls, 1986). Adolescent girls (15-19 years) and older women (more than 35 years) are more likely to experience maternal morbidity and mortality than women in intervening ages (Jajebhoy, S.J. 2000).

Higher mortality of first births was related to mother's young age (Pandey et al., 1998). Young women who became pregnant have fewer chances to get early and adequate prenatal care. They are more likely to be from a socio-economically disadvantaged environment as a result they are less likely to be able to care for their children (Govindasamy et al., 1993; Geronimus, 1987). A very young mother is biologically not fully mature, so that the probability of pregnancy related complications are high. Also young mothers, being inexperienced, may not be able to take proper care of young infants, even though in the Indian setting, they receive considerable support from their kin group. Beyond the age of 30, the risk of pregnancy complication apparently increases because of the increasing inflexibility of the female reproductive organs (Mishra, 2001). Young women who become pregnant are often at risk of obstructed labour if they have not yet grown to their full height or

pelvic size. With the age one can also see the changes in woman's attitude towards pregnancy related health care (Pebley et al., 1996).

The health risk of child bearing increases after age 39. Chatterjee (2001) in her study found that the risk of death is five times higher for the women of age 40-44 years than the women in their 20s. Hossain and Yadava (2001) in their study on Bangladesh observed that mother's age at time of birth of the child had a significant effect on neonatal mortality.

2.1.2 Birth Order

Child mortality, especially infant mortality, has a J shaped relationship with parity or birth order; i.e., substantial risk is associated with both first and high order births when there is no control for maternal age. Compared with second and third order births, the first-born may experience acute excess mortality soon after birth, but after age one, this disadvantage may wane. In contrast, mortality for high birth order children may remain elevated at all ages. The lack of decline with age could be due to a combination of factors: competition from siblings, being cared for by someone other than the mother (perhaps an older sibling, and the unwantedness of the births (Govindasamy et al., 1993; Galway et al., 1987). The risk of mortality increases with the higher birth order thus confirming maternal depletion hypothesis (Nortman, 1974; Miller et al., 1992). It suggests that women with many and closely spaced pregnancies may suffer nutritional depletion which affects the health of her subsequent births. However, this relation may be exaggerated due to the confounding effects of socio-economic status, short birth interval or older age (Govindsamy et al., 1993; Trussell and Hammerslough, 1983).

2.1.3Birth Interval

The study by various scholars in the recent past has indicated that birth spacing influences child survival. Studies have indicated the inverse association between the length of the birth interval and child survival (Srinivasan, 2000). This is especially true in the case of the length of the preceding birth interval. The preceding birth interval is significantly related to survival of the index-children in the general population as well as among index-children whose preceding sibling child died before

their conception, or whose preceding survived for atleast 36 months after the birth of the index child. The subsequent birth interval has a significant influence on survival of index-children only for interval of less than 18 months and only upto the age of 18 months, Sweemer, 1984; Hobcraft et al., 1983 found excess mortality for closed spaced births and concluded

> *...the risk of dying is considerably increased for a child who has a sibling born within the preceding two years and that the risk of dying, particularly the second year of life was higher if the mother had an additional births within a short period.*

Hobcraft et al., (1985) concluded that any birth that occurred within 2 years of the index birth was linked with considerable excess mortality for the index child even when controlling for birth order, age of mother, other spacing effects and education. Short preceding birth interval of less than 24 months increased the neonatal mortality risk by 98 percent (Boerma and Bicego, 1992). Similarly Miller et al., 1992, in their study of Bangladesh and Philippines observed 60 to 80% greater risk of dying during the first two years of life in both Bangladesh and Philippines. The effect of death of previous child is one of the determining factors of short Birth Interval (Koeing, 1990). Children born after an interval of 2 years or less since the last birth are twice as likely to perish at those ages as those born after 4 or more years. *After the age of 2 years, the relationship is less strong but nevertheless appreciable* (Clealaul and Sather, 1984).

Gribble (1993) found short Birth Interval increases the odds of low birth weight regardless of gestational age.

> *...short birth interval may not give women adequate time to build up nutritional reserves and a result is infant of low birth weight. It also indicates that gestational age does not affect the relationship between birth interval and low birth interval and low birth weight, a very strong predictor of neonatal mortality.*

Excess mortality resulting from closely spaced births has also been attributed to the drain on a woman's nutritional resources. Studies have found that repeated pregnancies, especially with short birth intervals, result in maternal depletion

syndrome in which the mother does not have sufficient time to recover, both physically and nutritionally, from the birth of each child; she is therefore more likely to have pregnancy losses and low birth weigh babies (Merchant and Marlorell, 1988; Winikoff, 1983).

2.2 Social Factors

2.2.1 Place of Residence

Urbanization leads to concentration of Economic Power and new type of problems associated with modernization. This also gives rise to new kind of spatial interaction. It produces a new type of civilization and a new culture guide distinct than those of rural societies (Boerma and Beoges, 1993). Mosley and Chen (1984) observed rural and urban areas of the same country have widely different infant death rates in addition to infant mortality differentials by geographical residence, differential due to other demographic and socio-economic factor may also be observed within the boundary of a particular country. Such factors include acceptation, female work participation rate, female literacy rate, and income level etc.

In most of the developing countries, infant mortality is higher in rural areas in comparison to urban areas. It may be because of easy access to the medical facilities, safe drinking water supply, higher rate of female literacy and higher standard of living in urban areas (Prasad, 1984).

2.2.2 Education

Studies have suggested that child mortality in developing countries is associated more closely with education than any other socio-economic factor (Caldwell et al., 1990). This finding has led some researchers to conclude that mother's education is important and independent covariate of child mortality. An educated mother has greater role in the family decision-making about allocation of resources, distribution of food among its mothers and recourse to modern medicine despite traditional beliefs about procreation and causes of illness and their treatment. Education may affect access to health facilities at the community level; thereby improve the health of children of educated as well as uneducated mothers in the

community where literacy level is high (Jain, 1985). Education is the most widely reported variable, which shows consistent negative association with fertility. Female education in particular bears a strong and consistent negative relationship to fertility. Ubaidur Rob (1992) found the education-fertility relation rises with a few years of schooling. It also shows that the initial rise is followed by a much sharper decline as educational level reaches into the upper primary and secondary stages. The more likely explanation for the initial rise may be that women with a few years of primary schooling are more likely to discontinue traditional practices such as breastfeeding and postpartum abstinence thus, shortening the interval between births. Female education also increases the age at marriage and also improves the likelihood of knowledge and use of modern contraceptives, when needed. Besides this, higher female education increases a woman's ability to work outside and to be involved in household decision-making process. Kutty (1989) has concluded that the education of husband is more important in providing positive attitudes in women than their own educational status. Pandey et al., (1998) concluded that the effect of mother's literacy on neonatal mortality is large and positive Post neonatal mortality is higher for children of illiterate mothers than for children of literate mothers.

2.2.3 Religion and Caste

Religion and caste are also regarded as factors associated with infant and child mortality. It has been observed that prevalence of malnutrition (which is a major cause of child morbidity) is higher among children of low-caste families than among children of the high-caste families (Singh, 1989). Mahadeva et al., (1986) have found neonatal mortality in Andhra Pradesh is slightly higher among Harijans followed by Muslims and lastly among caste Hindu. They also observed that post neonatal mortality is lowest among Muslims and mortality on the day of birth is lowest among Muslims than Hindu followed by Harijan. According to them, this reflects health status of the mother during pregnancy and the intra-natal care received by her varies among different castes and religion. Analysing NFHS-I data, Pandey et al., (1998) concluded, children from Hindu-caste/tribe households have the highest neonatal mortality in 12 states and it is highest among Muslims in 6 states. Post neonatal mortality also varies from religion and caste across the different states. They observed

...in the three religion groups, excluding the Hindu caste/tribe group do not differ much in adjusted child mortality in the country as a whole. Some differences in post-neonatal and child mortality related to membership in a scheduled caste or tribe can be explained by differences in other socio-economic characteristic, such as mother's literacy, access to a flush or pit toilet, use of a clear cooking fuel or ownership of household goods. Nevertheless substantial differences remain that are not explained by these other variables.

2.2.4 Sex Preference

In most populations male mortality is higher than the female mortality at almost all ages (UN, 1988). In South Asia, however, female mortality is higher than male mortality at many ages (Ghosh, 1987). Excess female mortality at post-neonatal and childhood ages in India and other south Asian countries are believed to result in son preference, which leads to differential treatment of son and daughter in terms of food allocation, prevention of diseases and accidents and treatment of illness (UN, 1988). Further, in India, male children are valued higher than the female children and the prevalence of under nutrition is often found higher among girls than boys (Gopalan, 1995). Basu, (1990), emphasised in her study, sex differences in nutrition, where they exist are not responsible for significant observed sex differences in mortality in India, rather it is differential use of health care by mothers which is probably an important factor.

2.3 Economic Factors

2.3.1 Work Status

Mother's activity is generally regarded as a proxy for maternal time allotted to child rearing. Those women who participate in the labour market are believed to spend less time in maternal activities than those who do not participate at all, and those who are engaged in market activities at home are thought to be in intermediate position. Hobcraft et al., (1984) found that mother's work participation was associated with higher child mortality. It was initially held that this was partly because working

women in many developing countries were generally less educated and belonged to lower socio-economic strata. However, the net effect of work participation on child survival was found to be negative. A cross-national comparative study showed women who do not participate in economic activities or who work within their family enterprise have the lowest level of child mortality (UN, 1985). A small survey among slum population in Delhi and another in a village in Tamil Nadu has found the children of working women are at significantly greater risk of health even when socio-economic factors were controlled (Basu, 1990; Sivakami, 1997). The study by Happel et al., (1984) provides a direct positive relationship between women acquiring higher-paying jobs and couples postponing children. Delay in timing patterns is encouraged if educational and training period are extended. In contrast, improved access to day care centers promotes early births by reducing the time of childbearing that women must spend out of the labour force. Ram and Rahim (1993) found support for the view of women's early employment experiences increase in the length of birth interval. They stated that women with a longer experience, a less interrupted early career and a great work commitment had their children at longer interval than those with less work experience and highly interrupted early career. Also the effects of early work experience and commitment to work on birth interval and fertility tended to persist into the women's later child bearing years. Early work interruption and work activity during periods surrounding the marriage or the birth of a first child were influencing not only in the case of second birth interval, but also in the case of third intervals especially at older ages.

2.3.2 Income

The potential role of income-related factor in child survival is complex, mainly due to the multifaceted nature of income itself (UN, 1985, 1986; Schulz et al., 1984). Household income may serve as an indicator of children's consumption of goods and services that affect their health. A higher household income is expected to be associated with lower child mortality risks. But higher income could be obtained at the expense of extra hours of work that reduce women's time spent in child care. If so, the effect of income on mortality could be adverse. The studies focusing on the relation between infant mortality and income at the household level in developing countries found consistently negative associations. These studies vary in term of

explanatory power to attribute to income in relation to other factors (UN, 1985). Pandey et al. (1998), observed the economic status of a household, as measured by ownership of household goods, an important determinant, which is negatively associated with infant and child mortality, particularly as children get older.

2.3 Other Factors

2.3.1 Experience of Childloss

Studies have shown the woman who had experienced child loss had a lower mean age at marriage, higher family size, high fertility, and low levels of contraceptive use than the woman who had not experienced childloss (Hamed, 1989). Santow and Bracher (1984) found child mortality prompts the rapid return of fecundity with $4/5^{th}$ of women menstruating again within 3 months.

2.3.2 Mass Media

Media has significant effect on High Risk Birth, but very little attention has been paid on this. Gandotra et al., (1998), found that women who are regularly exposed to electronic mass media have significantly lower fertility and infant mortality than do other women, even after controlling for urban/rural residence and education. In another study by Rao et al., (1998) based on NFHS-I data on effect of exposure to mass media in using ORS packets for childhood diarrhoea, concluded that women regularly exposed to electronic mass media are much more likely than other women to know about ORS packets and the use ORS or RHS to treat their children for diarrhoea. They also found the effect of electronic mass media exposure or knowledge and use of ORS packets is stronger in rural areas than in urban areas, probably because urban women have access to a wider variety of other services and sources of information than do rural women.

2.3.3 Household Amenities

The characteristics of the household amenities have long been recognized as an important influence on infant and child mortality. The majority of studies on housing conditions and mortality have focused on the presence and type of water supply, sanitation facilities, the power source, and the type of building materials used

to construct the house. The type of dwelling affects mortality mainly through the elements of exposure. Benjamin in 1965, contended that:

> *...the most important effect of housing conditions on health work through their impact on the incidence of infectious diseases, in particular diarrhoeal disease. Feachen (1984) pointed out that of the infections diseases related to water supply and lavatory facilities, diarrhoeal diseases are of the greatest importance.*

Rao et al., (1997) observed

> *Mortality was three times higher among children from households without toilets compared to children with toilets. The probability of dying was 6 times higher among children living in households with a low Standard of Living Index (SLI) than in households with a high SLI. Children from middle SLI households had a 3.5 times higher risk than the highest SLI children...children with a medium SLI had about a 40% lower risk of dying than children from low SLI households.*

2.3.4 Medical Facilities

Orubuloye and Caldwell (1975) observed the existence of public health services in small traditional villages of Nigeria helped in reducing infant mortality. The decline in infant mortality in Nigeria between 1965 and 1975 was due to availability of rural health center, which carried out vigorous programs in maternal and child health, health education an environmental situation. In Kerala, the decline in child mortality in 1980s can be attributed to universal immunization programme that gave ante-natal care and immunization and above all it brought the pregnant women closer to the health system (Rajan and Naveneethan, 1994). In rural India, pregnant women showed poor maternal care receptivity, especially, in terms of antenatal care (Bhardwaj et al., 1993). Further Basu (1990) argued that if the physical environment is poor, better antenatal and natal care would reduce morbidity and mortality among children. It is also found that stunting and underweight is more among children who are not vaccinated against childhood diseases than among children who are fully vaccinated (Sommerfelt and Stewart, 1994). Analysis of NFHS-I data revealed that

improvements in the nutritional status of the children in India requires improvement in the educational level of women, improvement in the nutritional status of mothers, better housing environment, improvement in delivery of MCH services etc. (Rajaretnam and Hallod, 2000).

2.3.5 Immunization

Immunization provides protection to the children against specific and serious infectious diseases. The level of immunization may be used not only to assess the prevalence of specific disease protection but also act as one of the indicators of the pre-natal attention give to children to protect their health (Tekce and Shorter, 1984). The immunization status of the children is a factor for differential survival status of the children. The effect of immunization in case of neonatal infant and child mortality is higher than those children who were not immunized (Hallod et al., 1989). Using data from NFHS-I, Luther (1998) examined how neonatal and early childhood mortality vary in India according to mother's tetanus immunization. Controlling for the effects of 13 potential confounding demographic and socio-economic variables, the analysis showed that mother's tetanus immunization is associated not only with reduced neonatal mortality but also with substantially reduced early childhood mortality. Puffer (1985) analysed the efficiency of Integrated Child Development Services (ICDS) and reported that the immunization programmes for all six diseases, tuberculosis, whooping cough, diphtheria, tetanus, measles and poliomyelitis and use of ORS packets have reduced infant and child mortality in India to a large extent. He identified major problem on mortality in the early neonatal period. Concentrating on mother and child care during antenatal and post-natal periods, Jain (1988) argued that the chances of infant and child survival depend upon the timing (prenatal, natal and postnatal periods) and type of care (medical, immunization and non-medical) with which child is brought up.

2.3.6 Breastfeeding

Various studies shows the link between breastfeeding and child survival providing convincing evidence of health benefits of breastfeeding (Feachen and Koblinski: 1984; Jason J.M. et al. (1984).

Breast milk produces the necessary nutritional need for infants and also transmits certain antibodies from mother to child. During first two or three days after baby is born, the breast does not secret milk but yield a yellowish fluid called *colostrums*, which is good for the baby as it takes care of the first hunger. The colostrums contain less fat, but it is richer in proteins and has a higher concentration of antibodies, which protect against infection. By not putting the infant to the breast immediately after delivery the infant is denied that benefit (Basu, 1989). Breastfeeding duration has a strong impact in reducing the relative risk of early child mortality; but it does not explain the effect of the length of the preceding birth interval on child mortality (Nath et al., 1993).

Based on the literature review, in the next chapter a conceptual framework is developed. This is used in empirical analysis of the factors influencing HRB.

Chapter III

A Conceptual Framework for Analysing High-Risk Births

In this chapter we provide a conceptual framework to understand HRB. Following from the conceptual framework the variables for the study are defined. The methodology that we use for analysing HRB is presented next. It is based on the literature review presented in the previous chapter.

Figure 3.1 shows the conceptual framework used for the analyses of HRB. Several predictor variables broadly classified as social, economic and others are used. The demographic variables include age of mother, birth interval and birth order. The socio-economic variables include caste, religion, place of residence, educational attainment of mother, father's education. Work status of mother and husband's work status are included in economic variables while experience of child loss, exposure to mass media and standard of living are included in other variables.

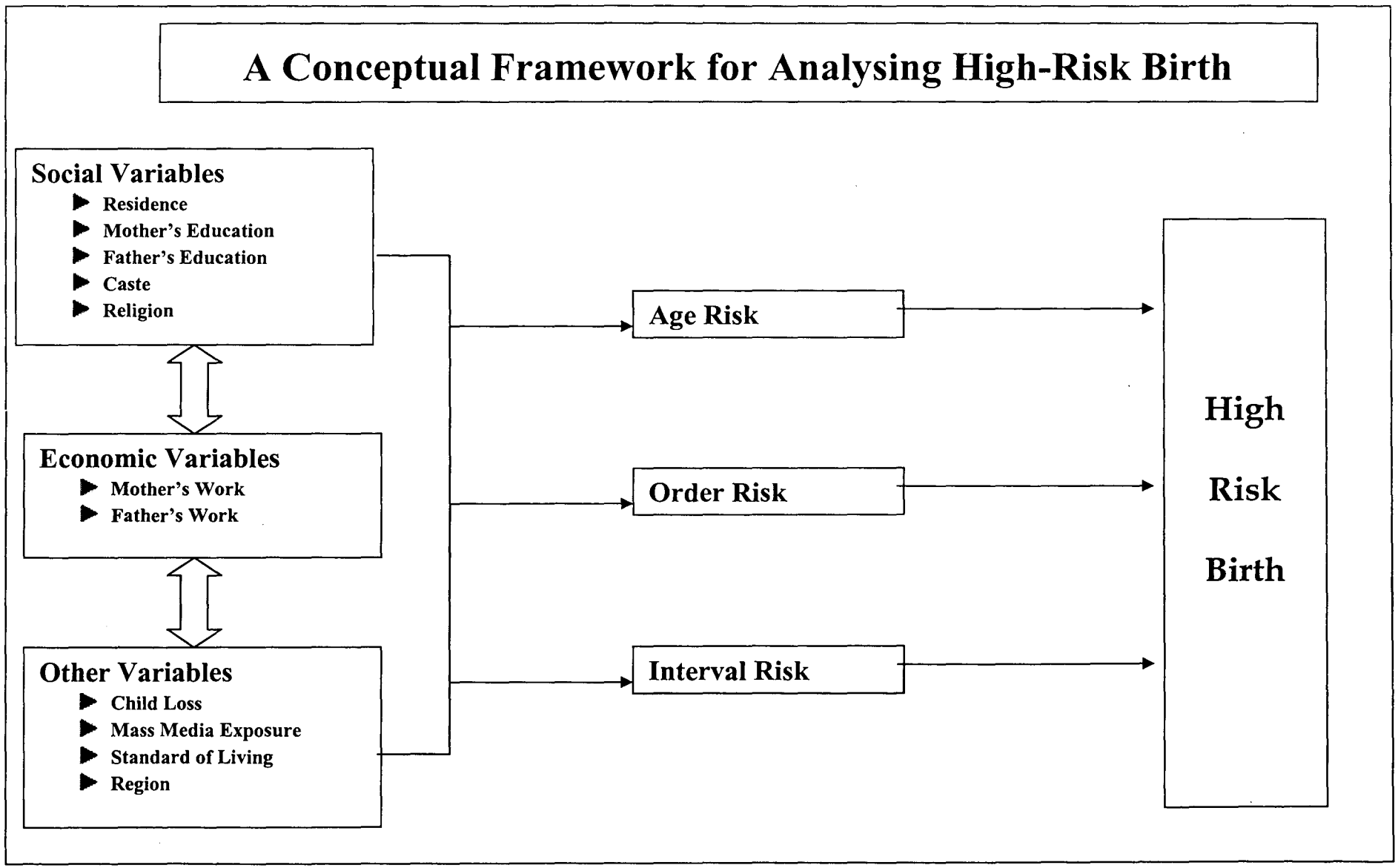
HRB Variables

Age of mother at the time of child bearing is an important determinant for the survival of child. It has been observed that adolescent girls (15-19 yrs) and older women (35 years and more) are more likely to experience maternal morbidity and mortality than women in intervening ages (Jajebhoy, 2000).

The maternal depletion hypothesis suggests risk of mortality increases with the higher birth order (Nortman, 1974, Miller et al., 1992). It suggests that women with many and closely spaced pregnancies may suffer nutritional depletion which affects the health of her subsequent births. However, this relation may be exaggerated due to the confounding effects of socio-economic status, short birth interval or older age (Govindsamy et al., 1993; Trussell and Hammerslough, 1983).

The birth interval has considerable influence on child survival. Boerma and Bicego (1992), Sweemer (1984), Hobcraft (1983) etc has found inverse relationship between birth interval and child survival.

Figure 3.1


A Conceptual Framework for Analysing High-Risk Birth
Social Variables
Residence
Mother's Education
Father's Education
Caste
Religion
Economic Variables
Mother's Work
Father's Work
Other Variables
Child Loss
Mass Media Exposure
Standard of Living
Region
Age Risk
Order Risk
Interval Risk
High
Risk
Birth

Social Variables

Residence plays pivotal role in determining health status of the child and mother. Urban women have more access to health facilities, information and counselling facilities hence they are in a comparatively better position as compared with their rural counterparts.

Studies have shown education level and status of women (mother) have a strong negative effect on risk births even when economic status and background characteristics of the women are statistically controlled (Rathnam, 1995). Though education of mother has significant influence on pregnancy and maternal health related decisions, still, it is generally determined by the attitude and level of education of father due to our patriarchal society.

Caste, one of the important social institutions in Indian society, has a great influence on decision-making process. Arora (1985) observed that fertility was inversely related to caste and socioeconomic status.

Religion has considerable impact on demographic behaviour of particular religious groups. Religious affiliation determines beliefs, customs and attitude towards marriage, childbearing and child care, thus affecting the HRB.

Economic Variables

Working mothers are more aware of the importance of maternal and child health importance and the available facilities than non-working mothers. Beside awareness, they are confident to take decision that allows them to choose the right maternal care services, thus reducing the HRB risks. Studies have shown that employed women in India as a whole and in the states of Kerala, Madhya Pradesh, and Goa generally have relatively lower levels of fertility (Kumar, 1997). This is supported by the findings of Nanda and Surender (1997) who mentioned that women engaged in work outside the home have fewer children than both those who earn an income by working within the home and those who do not work for an income. The probability of HRB decreases with low fertility. In Indian society, father is generally

regarded as the bread earner as well as the head of the family. Thus, the HRB is also influenced by the work status of father.

Other Variables

Those women who had experienced child loss are more likely to have more number of children (Shrivastava, 1991). These women therefore have higher order birth with short birth interval, which leads to HRB.

Mass media is the fastest, effective and major source of awareness among couples. The more couples are exposed to mass media, the more will be the awareness level. Mass media also helps in understanding the importance of maternal and child care practices and thus helps in reducing HRB.

Standard of living acts as a proxy variable for income. It has direct impact on the education, work status, exposure to mass media, attitude towards health facility, attitude towards contraceptives and family planning programme, etc. A couple with relatively higher standard of living is better informed and hence they are in better position to plan births.

Regional differences can be seen in IMR, child mortality, maternal mortality, etc. The southern states are relatively better in demographic aspects like (low fertility rates, low infant mortality rates, low maternal mortality rates, etc).

To sum up, it is expected that the woman residing in rural areas are more prone to HRB than the women residing in urban areas. Similarly the woman with higher education will have a relatively low HRB. The woman belonging to scheduled community is also expected to have more HRB than non-scheduled woman. Likewise the women in southern region tend to have lower HRB as compared to women in other region.

Data Base

National Family Health Survey (NFHS) round-1 and round-2 dataset is used for the present study. The International Institute of Population Sciences, Mumbai, coordinated the survey. NFHS-1(1992-93) survey covered 89,777 ever-married

women while 9303 ever-married women were interviewed during NFHS-2 (1998-99) survey. The study considers the currently married woman who has given birth in last five year. The number of last birth (five year preceding the survey) registered in NFHS-1 was 41112, while in NFHS-2 it was 38848. In this study, information is used from the section of the women's questionnaire – respondent's background, fertility, mortality, and occupation.

Measurement of Variables

Table 3.1 shows the response and predictor variables selected for the study.

Table 3.1 List of variables selected for analyses of HRB

Variable	Definition
Response Variable	
Age Risk	At Risk (Mother's Age is less than 18 or more than 35 years)
	Not At Risk (Mothers age between 18 and 34 years)
Order Risk	At Risk (Birth order more than 3)
	Not At Risk (Birth order less than or equal to 3)
Interval Risk	At Risk (Birth interval more than 24 months)
	At Risk (Birth interval less than or equal to 24 months)
Predictor Variable	
Social	
Place of Residence	Urban
	Rural
Educational attainment of mother	Illiterate
	Upto primary school
	Primary - middle school
	High school +
Father's literacy[1]	Illiterate
	Literate
Caste	Scheduled caste and scheduled tribe
	Other[2]
Religion	Hindu
	Muslim
	Other[3]
Economic	
Mother's work	Not working
	Working
Father's Work	Not working
	Working

[1] Due to non-availability of educational attainment for husband, literacy status is used in the analyses.
[2] Other caste means non-scheduled castes.
[3] Other religion includes Christians, Sikh, Buddhist/Neo-Buddhist, Jain, Jewish, Zoroastian/Parsi, No-religion, Doni-Polo, Sanamhi, and others.

Other Variables	
Child Loss	No
	Yes
Exposure to Mass Media[4]	No
	Yes
Standard of living [5]	Low
	Medium
	High
State [6]	South
	North
	East
	West
	BIMARUO

Methodology

The study uses the following statistical techniques to empirically analyse the relationship between the predictor and the dependent variables.

First, the Karl Pearson bivariate correlation analysis has been carried out among the predictor variables to understand the nature of relationship between them. The Karl Pearson coefficient of correlation 'r' between two variables x and y is calculated as:

$$r(X, Y) = \frac{\sum x_1 \sum y_2 - \frac{(\sum x_1)(\sum y_2)}{n}}{\sqrt{\sum x_i^2 - \left[\frac{(\sum x_1)^2}{n}\right] \sum y_i^2 - \left[\frac{(\sum y_2)^2}{n}\right]}}$$

The value of 'r' ranges between –1 and +1. The value of '1' indicates perfect correlation between the two variables – so that nearer the absolute value is to '1', the

[4] Exposure to mass media includes those woman watches television atleast once in a week or listens radio once in a week.

[5] Adopted from Roy and Jayachandran, 1995.

[6] Region Recode: South includes Andhra Pradesh, Karnataka, Kerala, and Tamil Nadu. North includes Punjab, Haryana, Jammu, Himmachal Pradesh and New Delhi. East includes West Bengal, Manipur, Meghalaya, Mizoram, Nagaland, Arunachal Pradesh and Tripura. West includes Maharastra, Gujrat and Goa. BIMARUO includes Bihar, Madhya Pradesh, Rajasthan, Uttar Pradesh and Orissa.

stronger the relationship is. The sign of the coefficient 'r' indicates the direction of the relationship.

A multivariate logistic regression analysis has been used to examine the relationship between each of the predictor variables and the response variable. This is done since the response variable is dichotomous and not normally distributed. In a logistic regression analysis, the relationship between the response variable and the predictor variable is better understood[7], as the influences of other variables are controlled. The linear probability model has not been used in this situation due to the following limitations:

(i) The estimated probability can assume impossible values.

(ii) The linearity assumption is seriously violated, according to which, the expected value of the dependent variable ($\hat{Y}$) at any given value of predictor variable (X) falls on the regression line. But this is not possible for the parts of the line for which $P<0$ or $P>1$. in these regions, the observed points are either all above the line or all below the line.

(iii) The homoscedasticity assumption is seriously violated. The variance of the dependent variable (Y) tends to be much higher in the middle range of the predictor variable (X) than at the two extremes, where the values of Y are either mostly zeroes or mostly ones. In such a situation the equal variance assumption is untenable.

(iv) Since the linearity and homoscedasticity assumptions are seriously violated, the usual procedures for hypothesis testing are invalid.

(v) The fit of the line (R^2) tends to be very poor, for the set of the two values of the dependent variable (Y) tend not to cluster closely about the regression line.

In a logit regression model, a sigmoid curve is used to fit the observed points. Since the tails of the sigmoid curve level off before reaching $P=0$ or $P=1$, the impossible values of P ($P<0$ and $P>1$) observed in a probit model are avoided. The basic

[7] Adopted from Retherford and Choe, 1993

$$P = \frac{1}{1-e^{-z}} \quad (1)$$

where, P is the estimated probability (here the probability of having intention not to use contraception), z is the predictor variable and e is the base of the natural logarithm (e=2.7183). The predictor variable has the largest effect on P when P=0.5 and P becomes smaller in absolute magnitude as P approaches 0 or 1.

The quantity $\frac{P}{1-P}$ is called the odds and the quantity $\log\left[\frac{P}{1-P}\right]$ is called the logit of P. simplifying Eqn. (1) we get

$$\log z = \frac{P}{1-P} \quad (2)$$

$$\text{logit } P = z \quad (3)$$

The multivariate logistic function involving K Predictor variables (X_1, X_2, X_3, ...X_k) is given by

$$\log z = \frac{1}{1+ e^{-(b_0 + b_1 x_1 + b_2 x_2 + \ldots\ldots b_k x_k)}} \quad (4)$$

and logit $P= b_0 + b_1 x_1 + b_2 x_2 + b_3 x_3 + \ldots\ldots b_k x_k$ (5)

The coefficient b_1 represents the additive effect of one unit change in predictor variable x_1 on the log odds of the dependent variable.

The quantity e^{bi} is called the odds-ratio that represent the multiplicative effect on one unity change in the predictor variable $x_1$on the odds of high risk births. The "odds-ratio" is interpreted and not 'b' for it is more readily understandable.

On the basis of above mentioned conceptual framework and the methodology an analyses of HRB is presented in the next chapter.

Chapter IV

Socio-Economic Factors Affecting High Risk Births in India: A Comparative Analyses of NFHS-1 and NFHS-2

In this chapter the influence of various socio-economic factors on HRB is analyzed for India as a whole using the conceptual framework developed in the previous chapter. Firstly, the percentage distribution of last birth by currently married women in individual risk categories is presented for both NFHS Round 1 and 2 survey. In this section, we first discuss age risk, which is followed by order risk and interval risk. It is followed by bivariate analyses for the response and predictor variables. Then correlation coefficient between the response and predictor variable is worked out. Finally, logistic regression analyses have been presented to understand the influence of each predictor variable on risk categories.

4.1 Distribution of Risk According to States

4.1.1 Age Risk

Table 4.1 shows the percentage of the last birth according to age risk. The same is represented graphically in Figure 4.1 The age risk for India as a whole` has decreased from 8.5 percent in NFHS-1 to 8.4 percent in NFHS-1, indicating a decline of 1 percent. This decline is reflected in all states except Gujrat, Uttar Pradesh, Madhya Pradesh, Assam, Karnataka, and Orissa. The maximum decline in age risk was observed in Maharastra, i.e., from 13.0 percent in NFHS-1 to 9.2 percent in NFHS-2, decline of 3.8 percent. The age risk in Gujrat increased from 3.9 percent in NFHS-1 to 7.1 in NFHS-2, indicating an increase of 3.2 percent in Gujrat. It is followed by Uttar Pradesh, Assam and Karnataka, which recorded an increase of 2.3, 0.3, and 0.3 percent in age risk from NFHS-1 to NFHS-2 respectively. The age risk in Orissa remained same, i.e., 8.3 percent in NFHS-1 and NFHS-2.

Table 4.1 Percentage of last birth (five year preceding the survey) at elevated risk of mortality according to age risk

State	NFHS-1		NFHS-2	
	No. Of Births	*%*	*No. Of Births*	*%*
Andhra Pradesh	274	16.3	214	15.6
Arunachal Pradesh	50	9.6	45	(7.8)
Assam	156	10.3	155	10.6
Bihar	311	10.1	336	9.7
Goa	58	5.3	29	(6.6)
Gujarat	62	3.9	101	7.1
Haryana	121	8.3	67	5.4
Himachal Pradesh	36	(2.9)	22	(2.1)
India	**3483**	**8.5**	**3261**	**8.4**
Jammu	48	(3.8)	54	4.2
Karnataka	255	13.3	213	13.6
Kerala	79	5.2	43	(4.6)
Madhya Pradesh	322	10.4	374	11.3
Maharashtra	223	13.0	186	9.2
Manipur	16	(3.3)	38	(5.1)
Meghalaya	30	(5.6)	29	(4.9)
Mizoram	10	(2.8)	23	(4.5)
Nagaland	29	(6.1)	22	(4.8)
New Delhi	62	3.8	25	(2.5)
Orissa	162	8.3	154	8.3
Punjab	51	4.1	37	(3.5)
Rajasthan	228	9.4	266	7.8
Tamil Nadu	126	8.3	111	6.7
Tripura	48	(9.4)	60	14.0
Uttar Pradesh	448	7.0	451	9.3
West Bengal	278	14.2	170	10.8

Note: () shows where the total number of births was less than 50.
Source: IIPS, 1995 and IIPS, 2000.

4.1.2 Order Risk

Table 4.2 shows the percentage of last birth according to order risk; same is graphically shown in figure 4.2. The order risk for India as a whole decreased from 20.8 in NFHS-1 to 18.9 in NFHS-2, indicating a decline of 1.9 percent. Among the states, the order risk in Tripura decreased from 22.1 percent in NFHS-1 to 13.7 percent in NFHS-2, a decline of 8.4 percent. It is followed by Assam that registered a decline of 8.3 percent, Arunachal Pradesh (7.9 percent) West Bengal (7.9 percent) and Andhra Pradesh (6.8 percent) respectively. Other states recorded decline of 5 percent. The order risk increased from 17.6 percent in NFHS-1 to 23.6 in NFHS-2, a maximum increase of 6 percent. It is

followed by Meghalaya (4.9 percent), Nagaland (4.9 percent), Madhya Pradesh (2.1 percent) and Uttar Pradesh (0.6 percent) in NFHS-2 respectively.

Table 4.2 Percentage of last birth (five year preceding the survey) at elevated risk of mortality according to order risk.

State	NFHS-1		NFHS-2	
	No. of Births	*%*	*No. of Births*	*%*
Andhra Pradesh	304	18.1	155	11.3
Arunachal Pradesh	128	24.5	96	16.6
Assam	384	25.4	250	17.1
Bihar	856	27.8	898	25.8
Goa	125	11.5	21	(4.8)
Gujarat	296	18.7	199	13.9
Haryana	293	20.1	211	17.0
Himachal Pradesh	176	14.3	106	9.9
India	**8549**	**20.8**	**7329**	**18.9**
Jammu	221	17.6	301	23.6
Karnataka	382	19.9	226	14.5
Kerala	116	7.6	48	(5.2)
Madhya Pradesh	738	23.8	856	25.9
Maharashtra	297	17.3	267	13.3
Manipur	113	23.5	146	19.7
Meghalaya	109	20.3	150	25.2
Mizoram	63	17.6	81	16.0
Nagaland	97	20.5	116	25.4
New Delhi	282	17.4	150	14.9
Orissa	406	20.7	336	18.1
Punjab	195	15.8	133	12.7
Rajasthan	582	24.0	795	23.3
Tamil Nadu	176	11.6	109	6.6
Tripura	113	22.1	59	13.7
Uttar Pradesh	1673	26.3	1311	26.9
West Bengal	424	21.7	217	13.8

Note: () shows where the total number of births was less than 50.
Source: IIPS, 1995 and IIPS, 2000.

4.1.3 Interval Risk

Interval risk in India increased from NFHS-1 to NFHS-2. Table 4.3 shows the percentage of last birth according to interval risk; same is graphically shown in figure 4.3. India as a whole has registered increase in interval risk from 9.7 percent in NFHS-1 to 11.4 percent in NFHS-2, indicating an increase of 1.4 percent. The increase in interval risk is reflected among the states in India except Mizoram, Jammu, Meghalaya, Tripura, and Nagaland. Andhra Pradesh, Himachal Pradesh, Punjab, and Tamil Nadu registered

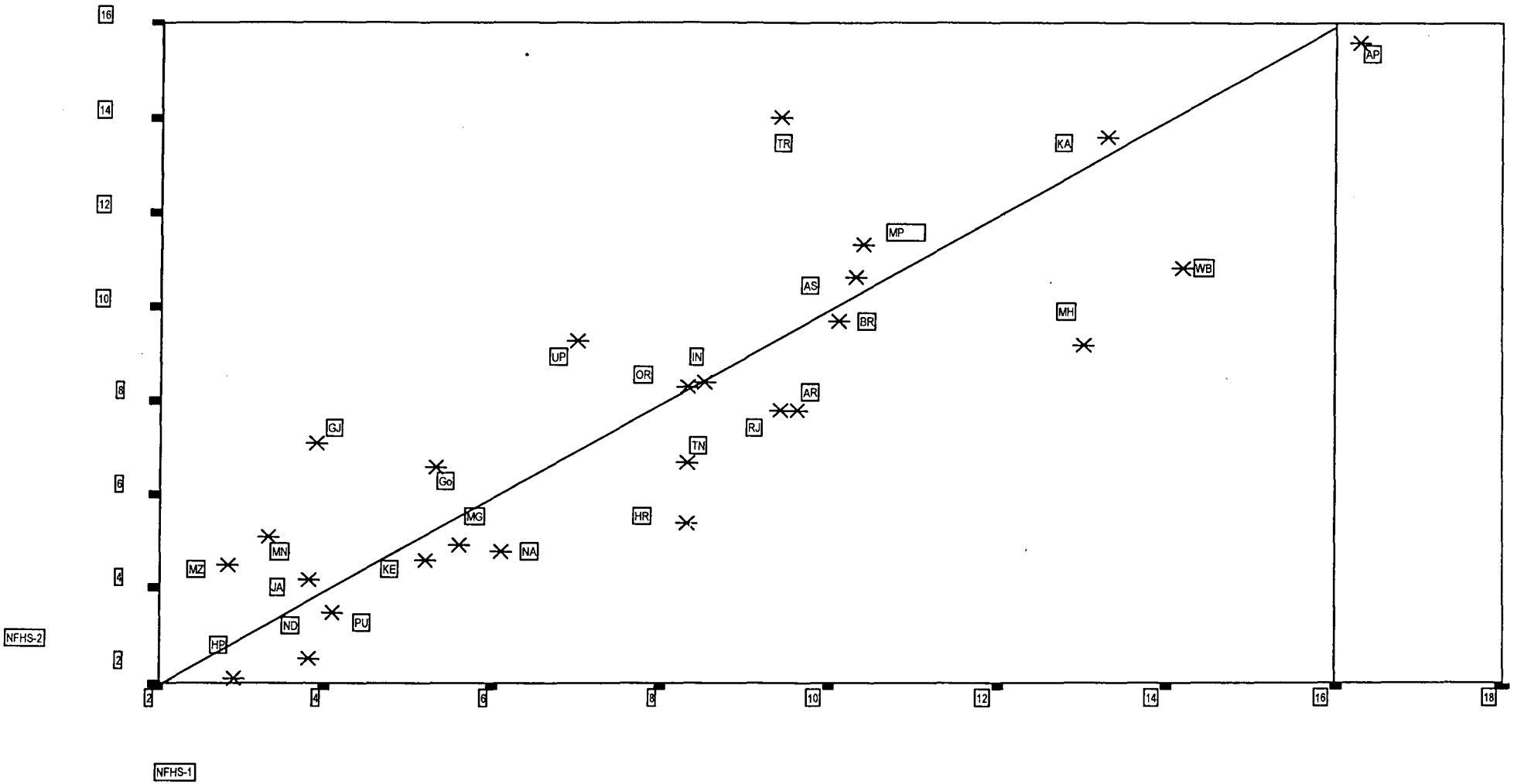
the highest increase in interval risk, i.e., 4.3 percent in between NFHS-1 and 2. These were followed by Maharastra (3.6 percent), Haryana (3.0 percent) and Manipur (3.0 percent). Other states have registered an increase of less than 3 percent between NFHS-1 and NFHS-2 survey. The interval risk in Mizoram decreased from 16.8 percent in NFHS-1 to 15.6 percent in NFHS-2, a decline of 1.2 percent. It is followed by Jammu, Meghalaya, Tripura and Nagaland, which registered a decline of 1.1, 0.2, 0.2 and 0.1 percent respectively between NFHS-1 and NFHS-2.

Table 4.3 Percentage of last birth (five year preceding the survey) at elevated risk of mortality according to interval risk.

	NFHS-1		NFHS-2	
State	***No. of Births***	***%***	***No. of Births***	***%***
Andhra Pradesh	130	7.8	166	12.1
Arunachal Pradesh	46	(8.8)	66	11.4
Assam	108	7.1	142	9.7
Bihar	212	6.9	260	7.5
Goa	106	9.8	46	(10.5)
Gujarat	195	12.3	190	13.3
Haryana	178	12.2	188	15.2
Himachal Pradesh	181	14.7	204	19.1
India	**3978**	**9.7**	**4417**	**11.4**
Jammu	152	12.1	140	11.0
Karnataka	179	9.3	187	12.0
Kerala	174	11.4	116	12.5
Madhya Pradesh	255	8.2	295	8.9
Maharashtra	164	9.5	263	13.1
Manipur	39	8.1	82	11.1
Meghalaya	58	10.8	63	10.6
Mizoram	60	16.8	79	15.6
Nagaland	58	12.2	55	12.1
New Delhi	206	12.7	136	13.5
Orissa	171	8.7	201	10.9
Punjab	195	15.8	211	20.1
Rajasthan	197	8.1	369	10.8
Tamil Nadu	196	13.0	287	17.3
Tripura	37	(7.2)	32	(7.4)
Uttar Pradesh	553	8.7	442	9.1
West Bengal	128	6.6	137	8.7

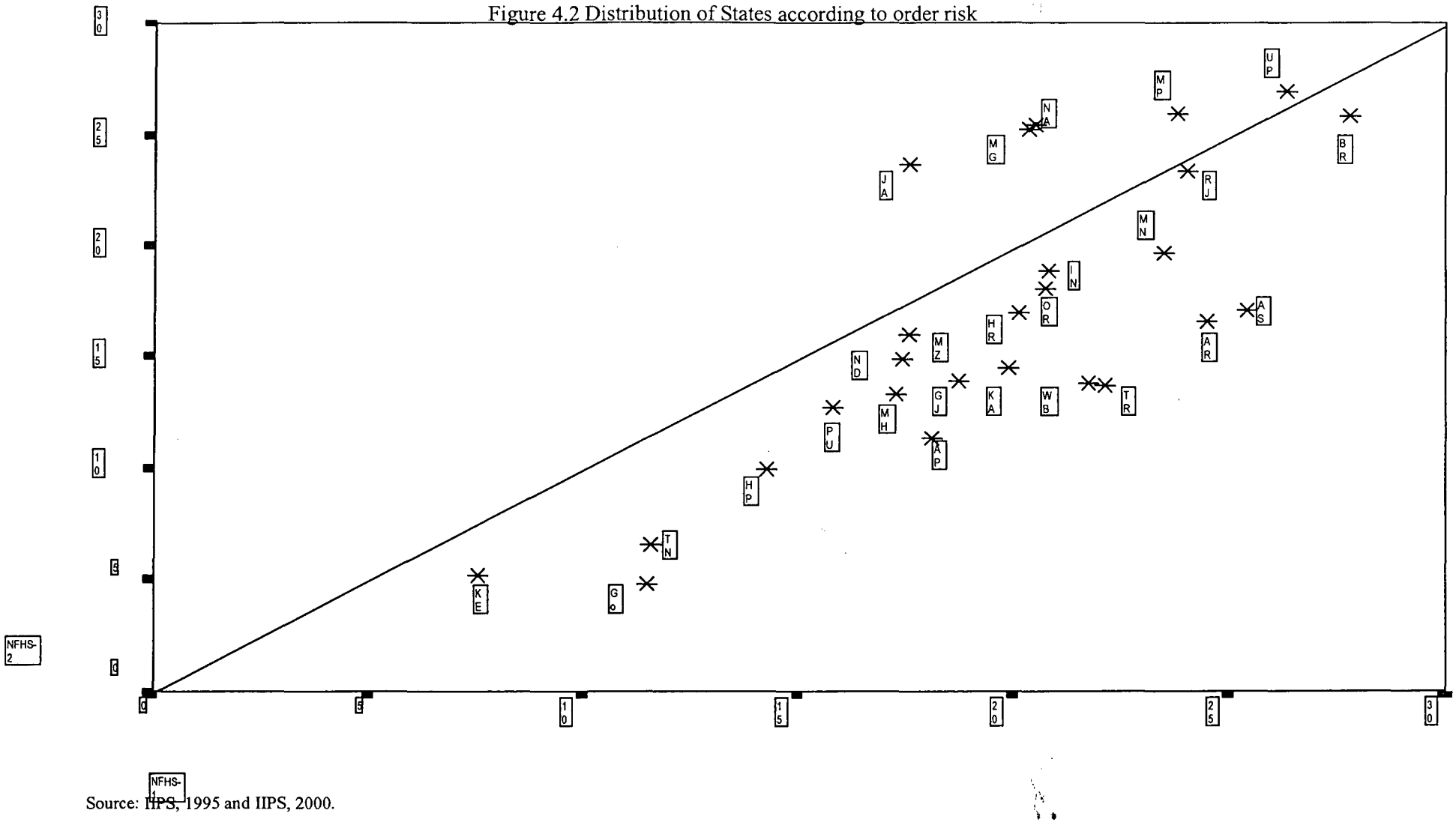
Note: () shows where the total number of births was less than 50.
Source: IIPS, 1995 and IIPS, 2000.

Figure 4.1 Distribution of States according to age risk



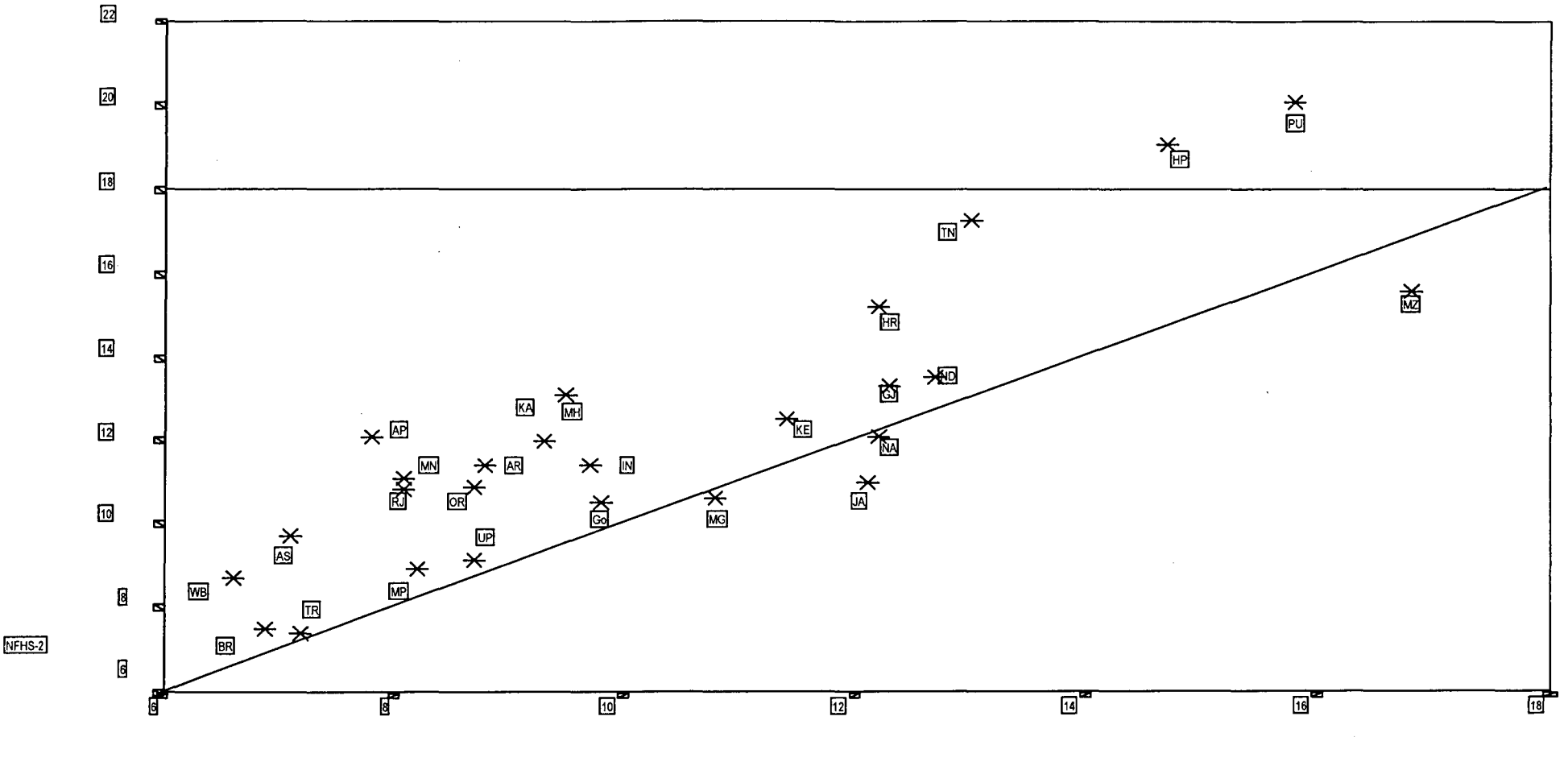
Source: IIPS, 1995 and IIPS, 2000.

Figure 4.2 Distribution of States according to order risk



Source: IIPS, 1995 and IIPS, 2000.

Figure 4.3 Distribution of States according to interval risk



Source: IIPS, 1995 and IIPS, 2000.

The overall single risk in India has decreased from 39 percent in NFHS-1 to 38.7 percent in NFHS-2, showing a decline of 0.3 percent. Among the different categories of single risk, the maximum decline was observed in order risk, i.e., from 20.8 percent in NFHS-1 to 18.9 percent in NFHS-2, a decline of 1.9 percent. It was followed by age risk where a decline of 1 percent was observed. At the same time interval risk has increased from 9.7 percent in NFHS-1 to 11.4 percent in NFHS-2, an increase of 1.4 percent. The increase in interval risk is contrary to the general expectation. Though the reason for the increase is not clear, it is necessary to check the trend.

4.2 Percentage Distribution of Risk Categories by the Predictor Variables

This section presents bivariate analyses between each of the response variables, i.e., age risk, order risk and spacing risk, with the predictor variables. It is divided into social, economic and other category. Among the predictor variables, social category includes caste, religion, place of residence, education of mother and literacy of father. Mother's work and fathers are included in economic variables, while child loss, mass media exposure and the standard of living is included in other category.

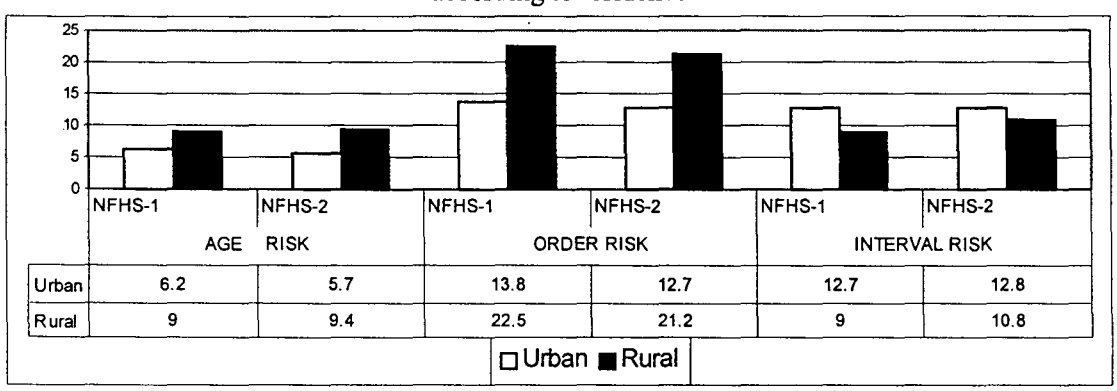
4.2.1 Social Variables

4.2.1a Place of Residence

Figure 4.4 shows the percentage of the three risks with the place of residence. Births in urban areas registered less risk compared with rural areas in the category of mother's age and order risk. The age risk for last births in rural areas increased from 9 percent in NFHS-1 to 9.4 percent in NFHS-2, while the same registered a decline from 6.2 percent in NFHS-1 to 5.7 percent in NFHS-2 in urban areas. Last birth in urban areas faced about 60 percent less risk in comparison to last births in rural areas. On the other hand, risk related to spacing is relatively more in urban areas in comparison to rural areas. 12.8 percent of last birth in NFHS-2 in urban areas was in the category of interval risk, while 10.8 percent of last birth was at interval risk in rural areas. These differences

in risk figure may be due to differential socio-economic factors like female work participation rate, literacy rates etc in urban and rural areas (Mosley and Chen, 1984).

Figure 4.4 Percentage of last birth (five year preceding the survey) at elevated risk of mortality according to residence



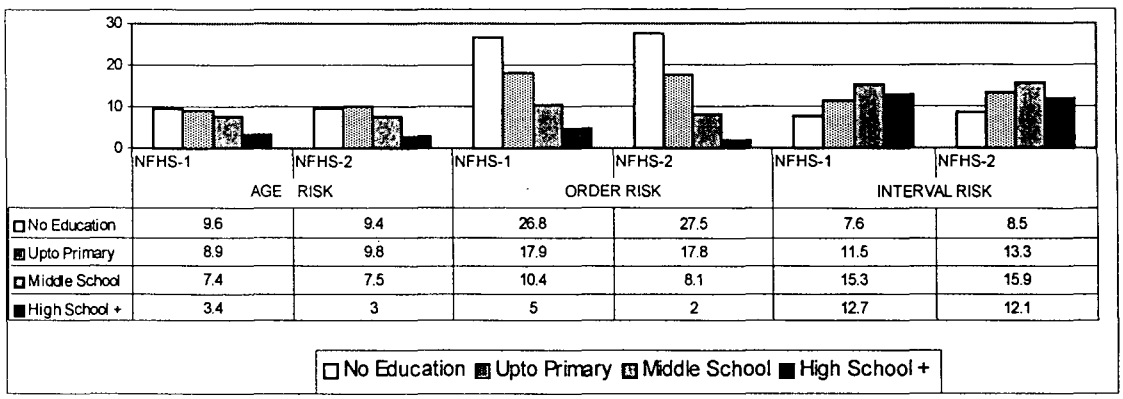
Source: IIPS, 1995 and IIPS, 2000.

4.2.1b Educational Attainment of Mother

Various scholars have described Mother's education as one of significant covariates of fertility, health of the child, birth spacing, etc as described in chapter-II. The importance of mother's education can be seen in figure 4.5. It clearly shows that with the attainment of education the HRB risk percentage decreases in all categories except in spacing. It is observed that the spacing risk increases for the births where the mother had education upto middle school. This corroborates with the finding of Rob (1992). He found that the initial rise in spacing risk with the education might be that with a few years of schooling women are more likely to discontinue traditional practices such as breast-feeding and postpartum abstinence thus shortening the birth interval.

> *Female education is a deterring factor in early marriage thus reducing age risk... (E)ducated woman has knowledge of modern contraceptives, role in decision-making and also some of them are working. All these factors lead to smaller family size which checks the risk at birth order (Rob, 1992).*

Figure 4.5 Percentage of last birth (five year preceding the survey) at elevated risk of mortality according to mother's education.



	AGE RISK		ORDER RISK		INTERVAL RISK	
	NFHS-1	NFHS-2	NFHS-1	NFHS-2	NFHS-1	NFHS-2
No Education	9.6	9.4	26.8	27.5	7.6	8.5
Upto Primary	8.9	9.8	17.9	17.8	11.5	13.3
Middle School	7.4	7.5	10.4	8.1	15.3	15.9
High School +	3.4	3	5	2	12.7	12.1

Source: IIPS, 1995 and IIPS, 2000.

4.2.1c Father's Literacy

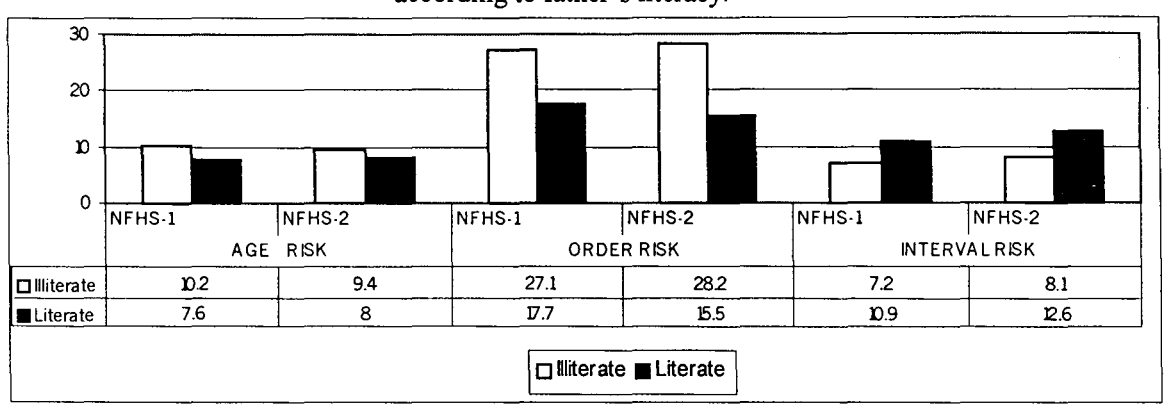
Figure 4.6 shows the risk percentages of HRB in different categories on the basis of father's literacy level. Age risk and order risk is low where father is literate. Age risk has increased from 7.6 percent in NFHS-1 to 8 percent in NFHS-2, where the father was literate while for illiterate father category, it has decreased from 102 percent in NFHS-1 to 9.4 percent in NFHS-2 respectively. The order risk has increased from 27.1 percent in NFHS-1 to 28.2 percent in NFHS-2, where father was illiterate. On the other hand, the order risk decreased from 17.7 percent in NFHS-1 to 15.5 percent where father was literate. The interval risk was more in case of literate fathers like in case of educated mother's, which is contrary to general belief that educated parents prefer to have more have spacing between their children.

4.2.1d Religion

Figure 4.7 shows Muslims have more HRB in comparison to Hindus and others in age risk and order risk category. The order risk for Muslims was 27.6 percent in NFHS-1 in comparison to 20.3 percent and 16 percent for Hindus and others respectively. In NFHS-2, decrease in order risk was observed among all religion, but Muslims continue to have high order risk of 24.3 percent in comparison to 18.3 percent and 15.7 percent for Hindus and others respectively. Age risk for Hindus remained same in NFHS-1 and NFHS-2, i.e., 8.7 percent, while it decreased from 9.6 percent in NFHS-1 to 9.1 percent

in NFHS-2 among the Muslims. Age risk was significantly low for others, i.e., 5.6 percent in NFHS-2. Muslims have the lowest risk percentage in interval risk followed by Hindus and others, though the percentages for interval risk have increased in NFHS-2. Interval risk for others registered a maximum increase of 2.1 percent followed by 1.7 percent and 1.6 percent among others, Muslims and Hindus respectively.

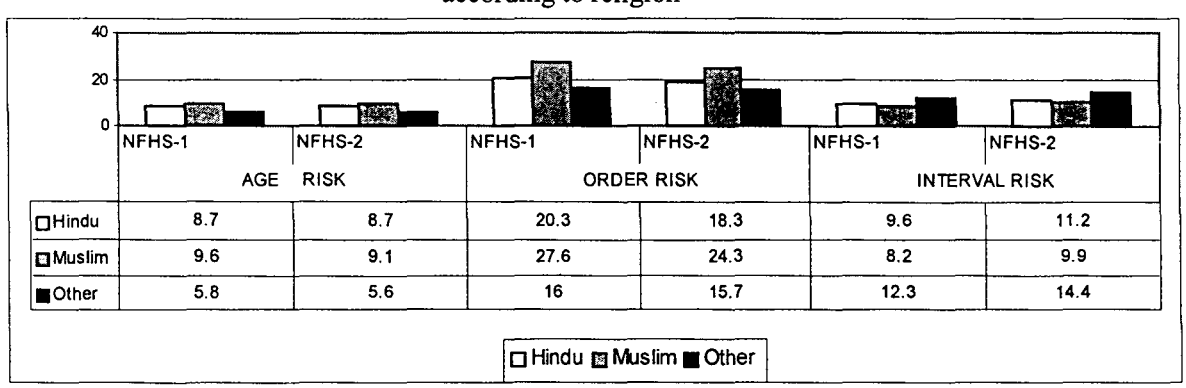
Figure 4.6 Percentage of last birth (five year preceding the survey) at elevated risk of mortality according to father's literacy.



	AGE RISK		ORDER RISK		INTERVAL RISK	
	NFHS-1	NFHS-2	NFHS-1	NFHS-2	NFHS-1	NFHS-2
Illiterate	10.2	9.4	27.1	28.2	7.2	8.1
Literate	7.6	8	17.7	15.5	10.9	12.6

Source: IIPS, 1995 and IIPS, 2000

Figure 4.7 Percentage of last birth (five year preceding the survey) at elevated risk of mortality according to religion



	AGE RISK		ORDER RISK		INTERVAL RISK	
	NFHS-1	NFHS-2	NFHS-1	NFHS-2	NFHS-1	NFHS-2
Hindu	8.7	8.7	20.3	18.3	9.6	11.2
Muslim	9.6	9.1	27.6	24.3	8.2	9.9
Other	5.8	5.6	16	15.7	12.3	14.4

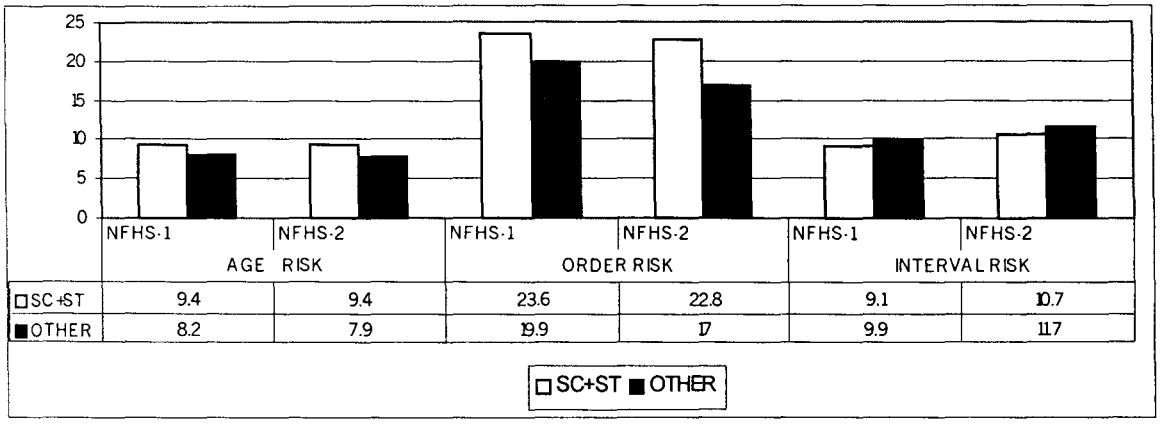
Source: IIPS, 1995 and IIPS, 2000.

4.2.1e Caste

Figure 4.8 shows the percentage of births in the various risk categories by caste. It shows that scheduled castes and scheduled tribe have relatively higher risk in all categories of HRB. The risk figures for age risk and order risk remained nearly the same

for SC and ST in NFHS-1 and NFHS-2, but a marginal decline was observed for others (non-scheduled). Interval risk increased for both SC and ST from 9.1 percent in NFHS-1 to 10.7 percent in NFHS-2 while it increased from 9.9 percent in NFHS-1to 11.7 in NFHS-2 percent for others.

Figure 4.8 Percentage of last birth (five year preceding the survey) at elevated risk of mortality according to caste



	AGE RISK		ORDER RISK		INTERVAL RISK	
	NFHS-1	NFHS-2	NFHS-1	NFHS-2	NFHS-1	NFHS-2
SC+ST	9.4	9.4	23.6	22.8	9.1	10.7
OTHER	8.2	7.9	19.9	17	9.9	11.7

Source: IIPS, 1995 and IIPS, 2000.

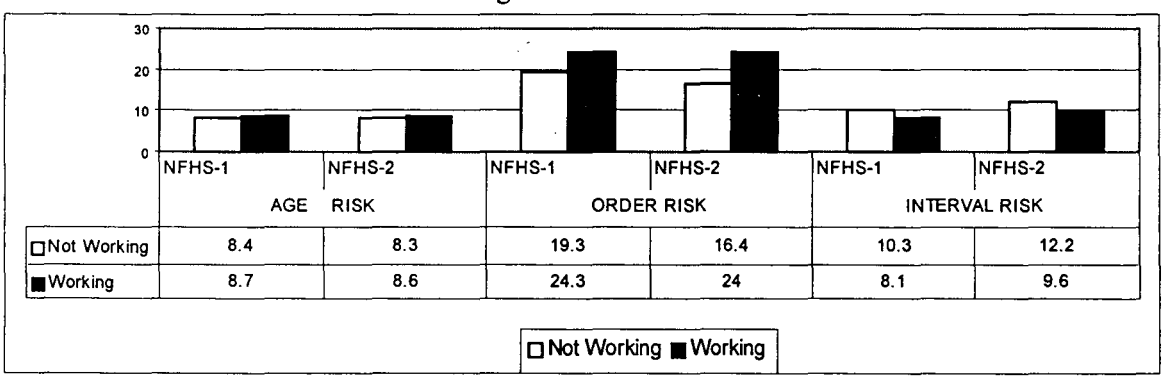
4.2.2 Economic Variables

4.2.2a Mother's Work

Women who do not participate in economic activities or who work within their family enterprise have lowest level of child mortality (UN, 1985). Basu and Basu (1990) found that the children of working mother are at significantly greater risk of health even when other socio-economic factors are controlled. Sivakami has corroborated this finding in 1997. But all these studies have examined either slum dwellers or women from low socio-economic strata. Happel (1984) reported a direct positive relationship between women acquiring higher-paying jobs and couples postponing children, thus delaying birth interval and at the same time reducing higher birth order. Early employment opportunity also helps in increasing the length of birth interval (Ram and Rahim, 1993). Figure 4.9 presents the HRB according to work status of mother. The percentage of births at age risk was almost identical for working and non-working mothers. The order risk decreased from 19.3 percent in NFHS-1 to 16.4 percent in NFHS-2 for non-working mother's while

it remained same for mothers in working category. Interval risk was more for non-working mothers and it has increased for both non-working and working mothers.

Figure 4.9 Percentage of last birth (five year preceding the survey) at elevated risk of mortality according to mother's work.



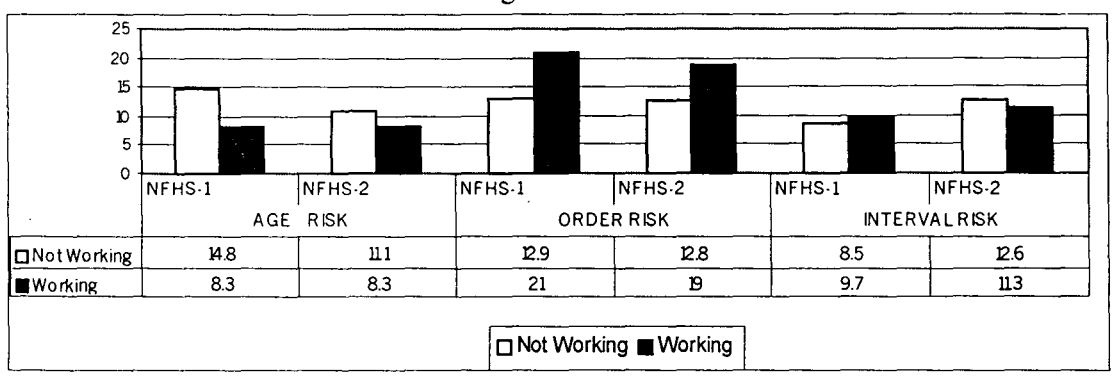
	AGE RISK		ORDER RISK		INTERVAL RISK	
	NFHS-1	NFHS-2	NFHS-1	NFHS-2	NFHS-1	NFHS-2
Not Working	8.4	8.3	19.3	16.4	10.3	12.2
Working	8.7	8.6	24.3	24	8.1	9.6

Source: IIPS, 1995 and IIPS, 2000.

4.2.2b Father's Work

Figure 4.10 shows the percentage of last birth at risk with father's work. It shows the percentage of age risk is high where the father is not working. The percentage of last birth at age risk remained 8.3 in NFHS-1 and NFHS-2 where father was working. It decreased from 14.8 percent in NFHS-1 to 8.3 percent in NFHS-2 where the father was not working. Early marriage might be one of the reasons for high age risk among the non working fathers. The order risk was high among the working fathers as in case of working mothers. The order risk has decreased by two percent form NFHS-1 to NFHS-2 where father is working, while in the same period the order risk decreased from 12.9 to 12.8 percent, a decline of 0.1 percent for non working fathers. The percentage of births at interval risk has increased from 8.5 percent in NFHS-1 to 12.6 percent in NFHS-2 among the non-working fathers. The same recorded an increase from 9.7 percent in NFHS-1 to 11.3 percent in NFHS-2 for working fathers.

Figure 4.10 Percentage of last birth (five year preceding the survey) at elevated risk of mortality according to father's work.



	AGE RISK		ORDER RISK		INTERVAL RISK	
	NFHS-1	NFHS-2	NFHS-1	NFHS-2	NFHS-1	NFHS-2
Not Working	14.8	11.1	12.9	12.8	8.5	12.6
Working	8.3	8.3	21	19	9.7	11.3

Source: IIPS, 1995 and IIPS, 2000.

4.2.3 Other Variables

4.2.3a Experience of Child Loss

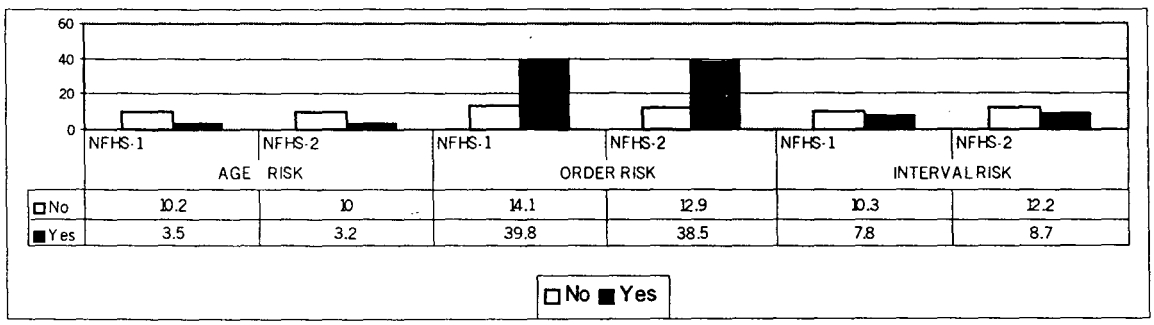
Figure 4.11 shows the percentage of births at risk in the category of child loss. It clearly shows order risk is more associated with mother who has experienced any child loss. This supports the views of various scholars presented in chapter-II. The percentages for order risk is 14.1 and 12.1 for the mother who has not experienced any child loss during NFHS-1 and NFHS-2 survey period respectively, in comparison to 39.8 and 38.5 percent for those who have experienced child loss. It clearly shows that mother who have experienced child loss have the desire of more number of children than the mother with no child loss.

4.2.3b Mass Media Exposure

Figure 4.12 shows the percentage of births at risk within the categories of mass media exposure. The percentage of birth is high in order and age risk for those women who are not exposed to mass media. The risk percentages for birth order remained almost same for those who are not exposed to mass media in both the survey, while the percentage declined from 15.6 percent in NFHS-1 to 11.4 percent in NFHS-2 respectively for those who are exposed to mass media. This is indicative of the effectiveness of mass media in reducing higher order birth. The figure shows that the interval risk is more

associated with those who are exposed to media than who are not exposed to media. This is contrary to expectation and the reason(s) for it is not clear.

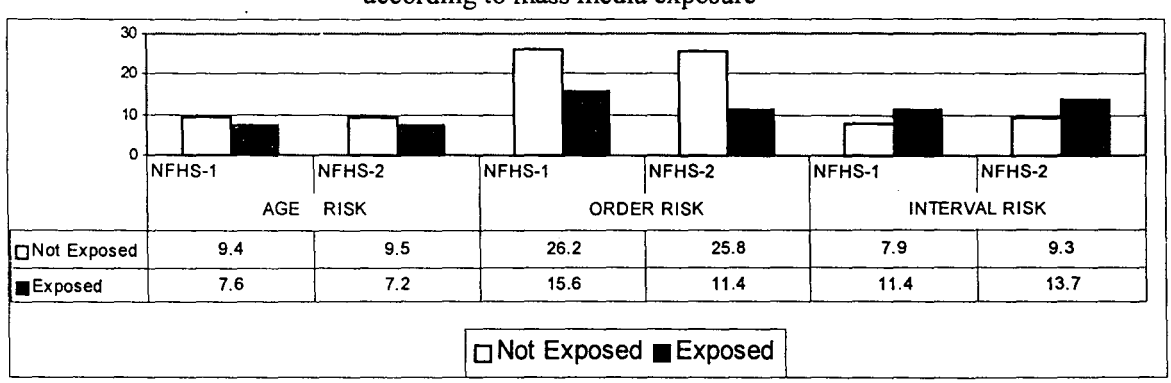
Figure 4.11 Percentage of last birth (five year preceding the survey) at elevated risk of mortality according to child loss



	AGE RISK		ORDER RISK		INTERVAL RISK	
	NFHS-1	NFHS-2	NFHS-1	NFHS-2	NFHS-1	NFHS-2
No	10.2	10	14.1	12.9	10.3	12.2
Yes	3.5	3.2	39.8	38.5	7.8	8.7

Source: IIPS, 1995 and IIPS, 2000.

Figure 4.12 Percentage of last birth (five year preceding the survey) at elevated risk of mortality according to mass media exposure



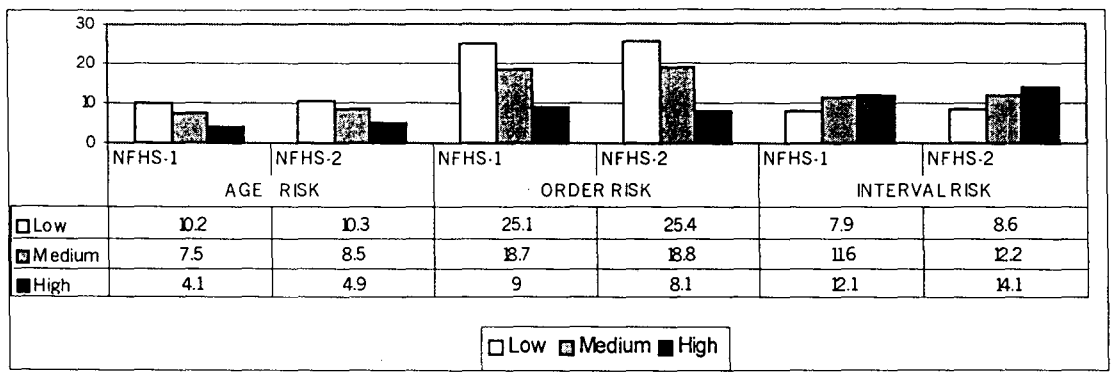
	AGE RISK		ORDER RISK		INTERVAL RISK	
	NFHS-1	NFHS-2	NFHS-1	NFHS-2	NFHS-1	NFHS-2
Not Exposed	9.4	9.5	26.2	25.8	7.9	9.3
Exposed	7.6	7.2	15.6	11.4	11.4	13.7

Source: IIPS, 1995 and IIPS, 2000.

4.2.3c Standard of Living

Table 4.13 shows the births at risk within the category of standard of living (SLI). It shows the higher the SLI the lower is the risk. This is true except for the spacing, where it is in the opposite direction. It also shows the risk percentage of all categories in NFHS-2 have increased except order risk in high SLI category. Order risk is a concern among the woman with low and medium SLI category while spacing risk is major concern among the woman with high SLI.

Figure 4.13 Percentage of children born in last five years at elevated risk of mortality according to standard of living



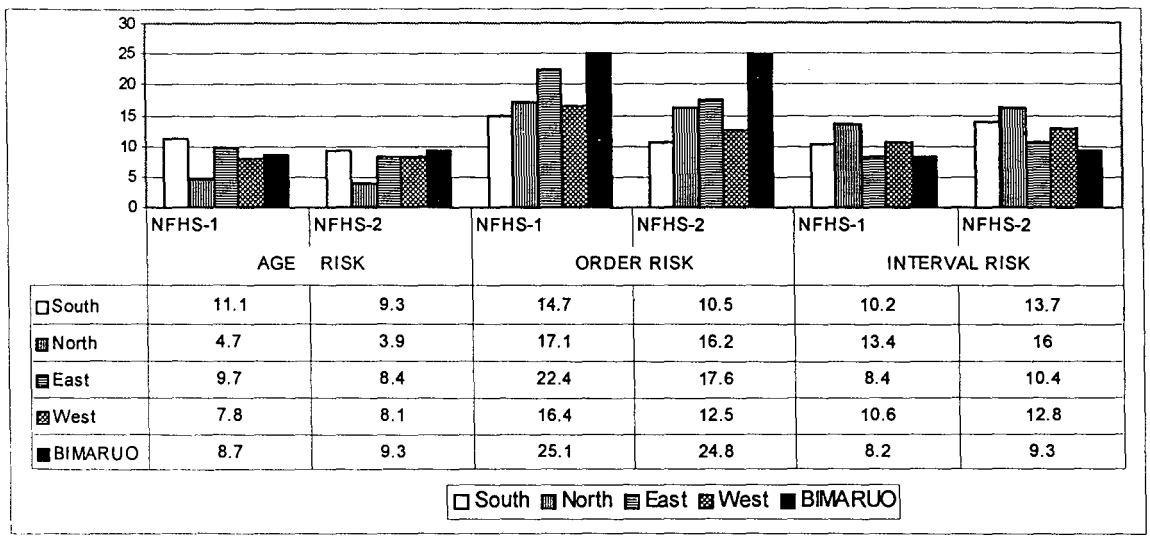
	AGE RISK		ORDER RISK		INTERVAL RISK	
	NFHS-1	NFHS-2	NFHS-1	NFHS-2	NFHS-1	NFHS-2
Low	10.2	10.3	25.1	25.4	7.9	8.6
Medium	7.5	8.5	18.7	18.8	11.6	12.2
High	4.1	4.9	9	8.1	12.1	14.1

Source: IIPS, 1995 and IIPS, 2000.

4.2.3d Region

The HRB is not uniform in the India. It varies from region to region. Table 4.14 shows the regional variation in HRB. Among all the regions, South has the highest age risk, while North has the lowest age risk. This is opposite to the general perception about South and North regarding age risk. The age risk in West has increased from 7.8 percent in NFHS-1 to 8.1 percent in NFHS-2. BIMARUO has registered an increase of 0.5 percent between NFHS-1 and NFHS-2 survey. BIMARUO states also account for highest births in order risk. The order risk in BIMARUO states was 25.1 percent in NFHS-1 while in NFHS-2 it was 24.8 percent showing a very little change. The interval risk has increased from NFHS-1 to NFHS-2 in the entire region. Among all the regions, BIMARUO has the lowest interval risk, i.e., 9.3 percent in NFHS-2. It is followed by East (10.4 percent), South (13.7 percent) and North (16 percent) in NFHS-2 respectively. The NFHS results are contrary to general perception about the demographically advanced south (low IMR, low maternal mortality, better child care, better medical facilities). The same is true about BIMARUO which is known for its demographic backwardness (high IMR, high maternal mortality, poor child care and poor medical facilities in comparison to South). The reason behind such phenomena is not understood.

Figure 4.14 Percentage of children born in last five years at elevated risk of mortality according to Region



	AGE RISK		ORDER RISK		INTERVAL RISK	
	NFHS-1	NFHS-2	NFHS-1	NFHS-2	NFHS-1	NFHS-2
South	11.1	9.3	14.7	10.5	10.2	13.7
North	4.7	3.9	17.1	16.2	13.4	16
East	9.7	8.4	22.4	17.6	8.4	10.4
West	7.8	8.1	16.4	12.5	10.6	12.8
BIMARUO	8.7	9.3	25.1	24.8	8.2	9.3

Source: IIPS, 1995 and IIPS, 2000.

The bivariate results show in all the categories, the age risk and order risk in general has declined from NFHS-1 to NFHS-2, while the interval risk has increased. Some of the important observations are, (1) Births in urban areas recorded less age and order risk in comparison to rural areas. (2) Educated parents have less age and order risk but they witnessed more interval risk in comparison to uneducated or illiterate parents. (3) Muslims had high percentage of age and order risk in comparison to Hindus and others, while the same have less interval risk in comparison to Hindus and others. (4) Scheduled caste and tribes have more age and order risk while interval risk was reported high among others. (5) Age and order risk is high among the working mother in comparison to non-working mothers (6) Interval risk was low for working mothers in comparison to non-working mothers. (7) The percentage of birth at risk was high for non-working fathers' especially in the category of age risk and the interval risk, while in order risk it was opposite. (8) Order risk is very high among those mothers who had experienced child loss. (9) The mothers who are exposed to mass media had relatively less age and order risk in comparison to those mothers who are not exposed to mass media. This is exactly opposite in case of interval risk. (10) Interval risk is more with the high SLI than others, while age risk and order risk is more among the mothers with relatively low SLI.

4.3 Correlation among the Predictor Variables

The present section examines the results of the correlation analyses among the predictor variables. A correlation analyses helps to identify the presence of common variance, if any, among the variables. Another reason for correlation analyses is to see the possibility of multicollinearity in the multivariate analyses. In this section, we discuss only those statistically significant correlation coefficients, which are rather high, i.e., correlation coefficient of 0.50.

Table 4.4 and table 4.5 show the correlation matrix among the predictor variables in all India for NFHS-1 and NFHS-2 survey respectively. It has been found that education of mother and SLI has significant positive association (0.592 in NFHS-1 and 0.514 NFHS-2) at one percent level. It may be due to the fact that higher education provides better occupation, which results into high SLI. It has also been observed that there is positive association between SLI and media exposure (0.570). It may be due to the fact that those who have better SLI are generally better exposed to mass media.

Another correlation that needs to be mentioned is the correlation between mass media and education. The positive correlation clearly shows that educated woman have better exposure to mass media. The correlation results in the study by and large show that the predictor variables are not highly correlated. Thus, in multivariate analysis, serious distortion due to multicollinearity between predictor variables is not anticipated.

Table 4.4 Correlation coefficients among predictor variables, India, 1992-93

Variables	Residence	Education (Mother)	Literacy (Father)	Religion	Caste	Work (Mother)	Work (Father)	Child Loss	Mass Media	SLI	Region
Residence	1										
Education (Mother)	-.404(**)	1									
Literacy (Father)	-.186(**)	.429(**)	1								
Religion	-.049(**)	.097(**)	.023(**)	1							
Caste	-.122(**)	.183(**)	.162(**)	-.092(**)	1						
Work (Mother)	.124(**)	-.152(**)	-.168(**)	-.056(**)	-.150(**)	1					
Work (Father)	0.005	-.038(**)	-.061(**)	-0.003	-0.007	.031(**)	1				
Child Loss	.117(**)	-.230(**)	-.160(**)	-.078(**)	-.042(**)	.059(**)	.027(**)	1			
Mass Media	-.294(**)	.467(**)	.333(**)	.036(**)	.159(**)	-.117(**)	-.010(*)	-.171(**)	1		
SLI	-.370(**)	.592(**)	.390(**)	.038(**)	.211(**)	-.168(**)	-.021(**)	-.189(**)	.508(**)	1	
Region	-.025(**)	-.031(**)	.017(**)	.049(**)	-.039(**)	-.106(**)	0.004	.037(**)	-.028(**)	0.005	1

Note: * = Significant at 5 percent level of confidence.
** = Significant at 1 percent level of confidence
Source: IIPS, 1995).

Table 4.5 Correlation coefficients among predictor variables, India, 1998-99

Variables	Residence	Education (Mother)	Literacy (Father)	Religion	Caste	Work (Mother)	Work (Father)	Child Loss	Mass Media	SLI	Region
Residence	1										
Education (Mother)	-.364(**)	1									
Literacy (Father)	-.197(**)	.431(**)	1								
Religion	-.048(**)	.088(**)	.013(*)	1							
Caste	-.122(**)	.182(**)	.139(**)	-.100(**)	1						
Work (Mother)	.173(**)	-.190(**)	-.166(**)	-.012(*)	-.170(**)	1					
Work (Father)	.026(**)	-.038(**)	-.046(**)	-0.004	0.008	.021(**)	1				
Child Loss	.122(**)	-.251(**)	-.162(**)	-.038(**)	-.077(**)	.110(**)	.019(**)	1			
Mass Media	-.417(**)	.571(**)	.344(**)	.073(**)	.151(**)	-.174(**)	-.029(**)	-.191(**)	1		
SLI	-.322(**)	.514(**)	.376(**)	.059(**)	.246(**)	-.197(**)	-.034(**)	-.174(**)	.502(**)	1	
Region	-.067(**)	0.004	.062(**)	.050(**)	-.060(**)	-.033(**)	-.026(**)	.036(**)	0.005	.047(**)	1

Note: * = Significant at 5 percent level of confidence.

** = Significant at 1 percent level of confidence

Source: IIPS, 2000.

4.4 Multivariate Analyses

In this section, the results of the logistic regression are discussed. Table 4.6, 4.7 and 4.8 shows the logistic regression analyses for age risk, order risk and spacing risk respectively. The exponential parameter in the tables, exp. (b) is the odds ratio. It represents proportional increase (if greater than 1.0) or decrease (if less than 1.0) in the concerned risk category. The differences in the results of NFHS-1 and NFHS-2 are minor. Thus, the statistically significant results of NFHS-2 are largely discussed.

4.4.1 Age Risk

Table 4.16 shows the association of various predictor variables with the age risk. The odds-ratio observed for the educational attainment of mother shows that the mother with high school and above education are less associated with age risk in contrast to illiterate and less educated mother. Table 4.6 shows the mother with the education of high school or above had 60 percent less probability of risk age in comparison to illiterate mother. Mother with middle school and primary school education had 27 percent and 10 percent less chances of age risk in NFHS-1 in comparison to illiterates. We thus find an inverse association between the education of mother and the likelihood of age risk.

Among other social variables, the incidence of age risk is 1.57 times high in rural areas as compared to urban areas. It has increased from 1.11 in NFHS-1 to 1.57 in NFHS-2. According to caste the group labeled *others* have 15 percent less probability of age risk in comparison to scheduled castes and scheduled tribes. In the religion category, Muslims have 1.14 times more likelihood of age risk as compared to Hindus. It has increased from 1.01 to 1.14 in the intervening period of the survey. On the other hand, the group labeled *others* had 40 percent less chances of age risk in comparison to Hindus in NFHS-1. It has declined to 33 percent in NFHS-2 survey.

The age risk for working mother was about 7 percent less than the non-working mother. Similarly, a woman whose husband was working had 50 percent less likelihood of age risk in NFHS-1 than woman whose husband was not working. Though there may be other factors also, this also supports our view of association between early marriage

and father's non-working status.

Among the other variables, the mother with high standard living has around 31 percent less age risk in NFHS-2 as compared to mother with low SLI. Similarly the mother with medium SLI in same survey had about 12 percent less age risk as compared with the mother of low SLI.

The odds-ratio for the regions, (except North and East) are not significant. The probability of age risk in North is 62 percent less than South while it is 17 percent less for East. The same accounted for 52 and 7 percent for North and East respectively in NFHS-1, which shows the risk at mother's age, has increased for both. The table also reveals that the age risk has decreased from 26 and 27 percent to 11 percent in both West and BIMARUO states.

The above mentioned results show an inverse association between the educational attainment of the parents and age risk. Similarly, scheduled caste and scheduled tribes and Muslim mothers tend to have relatively high age risk in comparison to others. Mother with high SLI seem to have less age risk than mothers with low SLI. The result also shows that working parents are likely to have less age risk than non-working parents.

Table 4.6 Results of logistic regression for age risk.

	NFHS-1 (1992-93)		NFHS-2 (1998-99)	
PREDICTOR VARIABLES	SIG.	Exp(B)	SIG.	Exp(B)
SOCIAL VARIABLES				
PLACE OF RESIDENCE				
URBAN	REF.			
RURAL	0.0552	1.1117*	0	1.5739**
EDUCATION (WOMAN)				
ILLITERATE	REF.			
UPTO PRIMARY SCHOOL	0.0571	0.9047*	0.7192	1.0198
MIDDLE SCHOOL	0.0001	0.7395**	0	0.7835**
HIGH SCHOOL +	0	0.3977**	0	0.3575**
LITERACY (Father)				
No	REF.			
YES	0.0006	0.8636*	0.9785	0.9987
RELIGION				
HINDU	REF.			
MUSLIM	0.8336	1.0116	0.0137	1.1473*
OTHER	0	0.6008**	0	0.6740**

CASTE				
SC + ST	REF.			
OTHER	0.0156	0.8990*	0.0001	0.8434**
ECONOMIC VARIABLES				
WORK (Mother)				
NOT WORKING	REF.			
WORKING	0.1484	0.9415	0.1162	0.9361
WORK (Father)				
NOT WORKING	REF.			
WORKING	0	0.5001**	0.0018	0.728*
OTHER VARIABLES				
EXPERIENCED CHILD LOSS				
NO	REF.			
YES	0	0.2565**	0	0.2416**
EXPOSURE TO MEDIA				
NO	REF.			
YES	0.308	1.0453	0.028	1.1133*
STANDARD OF LIVING				
LOW	REF.			
MEDIUM	0	0.8150**	0.0045	0.8829*
HIGH	0	0.64	0	0.6842**
REGION				
SOUTH India	REF.			
NORTH India	0	0.4794**	0	0.3794**
EAST India	0.2739	0.9336	0.0049	0.8302*
WEST India	0	0.7410**	0.1531	0.8999
BIMARUO	0	0.7498**	0.1141	0.9168
Constant	0		0	
-2 Log Likelihood	23857.133		22399.321	

Note: * = Significant at 5 percent level of confidence.

** = Significant at 1 percent level of confidence

Source: IIPS, 1995 and IIPS, 2000.

4.4.2 Order Risk

This section discusses the result of logistic regression between the predictor variables and the order risk. The odds-ratio observed for experience of child loss is very high. Table 4.7 clearly shows that a woman who had experienced any child loss was 3.06 times associated with high birth order in NFHS-2, than the woman who has not experienced any child loss. This is similar to the findings of various studies mentioned in chapter-II.

The odds-ratio observed for all the educational categories are significant. Education has significant effect on order risk. The woman with the education of high

school and above had 90 percent less chances of age risk while, the mother with the education upto middle school and upto primary school 60 and 24 percent less chances of order risk in comparison to illiterate woman in NFHS-2. It seems that high order risk is more pronounced with the illiterate or less educated mother.

Among other social variables, mothers belonging to group labeled *other* castes, have about 12 percent less likelihood to have high order birth in comparison to scheduled caste and scheduled tribe mother in NFHS-2. The order risk has increased from 3 percent in NFHS-1 to 12 percent in NFHS-2 for *others* in comparison to scheduled caste and scheduled tribe woman. Similarly, Muslims had 1.51 times more birth order related risk in comparison to Hindus in NFHS-1 survey.

The odds-ratio for all the regions are statistically significant. It shows the order risk in North, East, West and BIMARUO states were 1.49, 1.43, 1.16 and 1.65 times higher respectively in comparison to South India. The high birth order in these states may be due to high child mortality, high percentage of illiteracy, low SLI. This is true especially for BIMARUO, North, and East India, which is expected due to the demographically better position of southern states (See appendix-II).

The above mentioned results points out to the high possibility of order risk to a mother who has experienced child loss. Similarly the probability of order risk is high among scheduled caste, scheduled tribe, Muslim and illiterate mothers.

Table 4.7 Results of logistic regression for order risk.

	NFHS-1 (1992-93)		NFHS-2 (1998-99)	
PREDICTOR VARIABLES	SIG.	Exp(B)	SIG.	Exp(B)
SOCIAL VARIABLES				
RESIDENCE				
URBAN	REF.			
RURAL	0.3703	0.9645	0.0005	0.8708**
EDUCATION (MOTHER)				
ILLITERATE	REF.			
UPTO PRIMARY SCHOOL	0	0.7504**	0	0.7625**
MIDDLE SCHOOL	0	0.4694**	0	0.4018**
HIGH SCHOOL +	0	0.2410**	0	0.1151**
LITERACY (Father)				
NO	REF.			
YES	0.7889	1.008	0.0086	0.9191**

RELIGION				
HINDU	REF.			
MUSLIM	0	1.4929	0	1.5148**
OTHER	0.2202	1.0627	0.0607	1.1107
CASTE				
SC + ST	REF.			
OTHER	0.3724	0.9727	0.0001	0.8807**
ECONOMIC VARIABLES				
WORK (Mother)				
NOT WORKING	REF.			
WORKING	0	1.2111**	0	1.2491**
WORK (Father)				
NOT WORKING	REF.			
WORKING	0	1.5579**	0.0012	1.3745**
OTHER VARIABLES				
EXPERIENCE OF CHILD LOSS				
NO	REF.			
YES	0	3.2486**	0	3.0628**
EXPOSURE TO MASS MEDIA				
NO	REF.			
YES	0.0052	0.9166**	0	0.8411**
STANDARD OF LIVING				
LOW	REF.			
MEDIUM	0.1657	1.047	0.8286	1.0069
HIGH	0.2177	0.9258	0.0235	0.8758*
REGION				
SOUTH	REF.			
NORTH	0	1.3211**	0	1.4990**
EAST I	0	1.4743**	0	1.4329**
WEST	0.0048	1.1727**	0.0204	1.1660*
BIMARUO	0	1.4416**	0	1.6524**
Constant	0		0	
-2 Log Likelihood	42034.558		37625.975	

Note: * = Significant at 5 percent level of confidence.
** = Significant at 1 percent level of confidence
Source: IIPS, 1995 and IIPS, 2000.

4.4.3 Interval Risk

Table 4.8 shows the result of logistic regression between the predictor variables and the risk due to shorter birth interval. According to caste category, the group labeled *other* has 11 percent less chances of interval risk in NFHS-2 as compared to scheduled castes and tribes. In the religion category, Muslims had about 14 percent less spacing risk as compared to Hindus. Similarly the group labeled *other* religion has spacing risk 1.2 times higher than Hindus.

Education that had shown inverse association with the earlier risk categories seems to have positive association with birth spacing. This association is strong only upto the education of middle school after which it becomes weak. The mother with education upto middle school had 1.58 times high spacing risk while mother with the education of high school and above had statistically insignificant exp. (B). in NFHS-2. In case of the other two risks, education has shown a negative association but we are not sure why there is a positive association for interval risk.

The odds-ratio observed for all the states are statistically significant except West. It shows the North experienced spacing risk that is 1.17 times higher than the South. Mother's in East and BIMARUO states at the same time have about 30 percent and 23 less spacing risk respectively in comparison to South India.

Interval risk is high among women who live in North India and has high SLI. The result clearly shows the interval risk is low among those who are working. However, in case of other predictor variable the results are contrary to our expectations. The reason why results are contrary to our expectation requires further investigation.

Table 4.8 Results of logistic regression for interval risk.

	NFHS-1 (1992-93)		NFHS-2 (1998-99)	
PREDICTOR VARIABLES	SIG.	Exp(B)	SIG.	Exp(B)
SOCIAL VARIABLES				
RESIDENCE				
URBAN	REF.			
RURAL	0.0002	0.8465**	0.392	1.0351
EDUCATION (MOTHER)				
ILLITERATE	REF.			
UPTO PRIMARY SCHOOL	0	1.3523**	0	1.4288**
MIDDLE SCHOOL	0	1.7652**	0	1.5600**
HIGH SCHOOL +	0	1.3712**	0.2111	1.0932
LITERACY (Father)				
NO	REF.			
YES	0.0006	1.1685**	0.001	1.1654**
RELIGION				
HINDU	REF.			
MUSLIM	0.0178	0.8751*	0.0061	0.8687**
OTHER	0.0014	1.1891**	0.0001	1.2430**
CASTE				
SC + ST	REF.			
OTHER	0.2077	0.9471	0.6145	0.9803

ECONOMIC VARIABLES				
WORK (Mother)				
NOT WORKING	REF.			
WORKING	0	0.8350**	0.0017	0.8877**
WORK (Father)				
NOT WORKING	REF.			
WORKING	0.0497	1.2425*	0.3587	0.9163
OTHER VARIABLES				
EXPERIENCE OF CHILD LOSS				
NO	REF.			
YES	0.0047	0.8866**	0	0.8389**
EXPOSURE TO MASS MEDIA				
NO	REF.			
YES	0.1869	1.0582	0.2479	1.051
STANDARD OF LIVING				
LOW	REF.			
MEDIUM	0.0635	1.0852	0.0007	1.1558**
HIGH	0.0274	0.8641*	0.0588	1.1185**
REGION				
SOUTH	REF.			
NORTH	0	1.3171**	0.0037	1.1781**
EAST I	0.0001	0.7733**	0	0.6933**
WEST	0.6862	1.0265	0.1943	0.9245
BIMARUO	0.124	0.9223	0	0.7785**
Constant	0		0	
-2 Log Likelihood	26139.44		27518.44	

Note: * = Significant at 5 percent level of confidence.

** = Significant at 1 percent level of confidence

Source: IIPS, 1995 and IIPS, 2000.

Summary

On the basis of the results of logistic regression, it can be said that:

1. The age risk and interval risk is high among the mother in rural as compared to urban areas. Practice of early marriage or marriage before the attainment of legal marriageable age might be one of the contributing factor for the age risk. Studies as mentioned earlier have indicated that rural women have births at short interval that is unhealthy for both mother and child. Lack of knowledge or lack of counseling and birth planning might be a reason for shorter birth interval in rural areas.
2. A mother with higher education has less age and order risk in comparison to

illiterate mother. It may be due to the fact that while one is enrolled at school, less is the chance to get married. Thus, education can prove to be a deterring factor in delaying early marriage and reduce risk age. Similarly a educated woman is often more concerned about the size of family and her carrier, thus preferring to have less number of children as compared to illiterates. The same kind of relationship between father's literacy and the risk categories are observed. Although the findings are same but the reasons might be different.

3. The incidence of age risk is less among the religious group labeled others, while Muslims have comparatively less interval risk in relation to Hindus. The practice of early marriage among Hindus and Muslims, especially in the rural areas might be an explanation for high age risk. Similarly, a high proportion of illiterates among Hindus and Muslims may be responsible for high order risk.
4. The group labeled others in caste, has less age and order risk as compared with the scheduled castes and scheduled tribes. High age and order risk may be related to low level of education and low SLI. The interval risk for scheduled caste and scheduled tribe mother is significantly less, which is opposite than expected. The reason for this relationship is not clear.
5. Working couples seem to be less associated with age risk and interval risk in comparison to the non-working couples. The non-working couples have less order risk in comparison to working couples.
6. The order risk is very high among those mothers who have experienced child loss. It may be due to the security factor that the mother who had earlier experienced child loss wants to have significant number of surviving children. This supports the studies mentioned in chapter II.
7. The positive impact of mass media can be seen on birth order. The order risk is less among those mothers who are exposed to mass media in relation to those who are not exposed to mass media.
8. The mothers having high SLI seem to have less chances of age and order risk in comparison to women in other categories. The high percentage of higher education among the women of high SLI is probably one of the factors for less age and order risk. While the high percentage of illiteracy in the low SLI group,

might be a reason for high age and order risk.

9. Among the regions, age risk is comparatively low in North and East while interval risk is less in East and BIMARUO states.
10. The results of interval risk are contrary to expectations. We are not sure why this is so.

Table 4.9 Summary of logistic regression for HRB categories.

PREDICTOR VARIABLES	AGE RISK	ORDER RISK	INTERVAL RISK
SOCIAL VARIABLES			
RESIDENCE			
URBAN	REF.	REF.	REF.
RURAL		(+)	
EDUCATION (MOTHER)			
LITERATE	REF.	REF.	REF.
UPTO PRIMARY SCHOOL	(+)	(+)	
MIDDLE SCHOOL	(+)	(+)	
HIGH SCHOOL +	(+)	(+)	
LITERACY (Father)			
NO	REF.	REF.	REF.
YES	(+)	(+)	
RELIGION			
HINDU	REF.	REF.	REF.
MUSLIM			(+)
OTHER	(+)		
CASTE			
SC + ST	REF.	REF.	REF.
OTHER	(+)	(+)	
ECONOMIC VARIABLES			
WORK (Mother)			
NOT WORKING	REF.	REF.	REF.
WORKING			
WORK (Father)			
NOT WORKING	REF.	REF.	REF.
WORKING	(+)		(+)
OTHER VARIABLES			
EXPERIENCE OF CHILD LOSS			
NO	REF.	REF.	REF.
YES	(+)		(+)

EXPOSURE TO MASS MEDIA			
NO	REF.	REF.	REF.
YES		(+)	
STANDARD OF LIVING			
LOW	REF.	REF.	REF.
MEDIUM	(+)		
HIGH	(+)	(+)	
REGION			
SOUTH	REF.	REF.	REF.
NORTH	(+)		
EAST	(+)		(+)
WEST			
BIMARUO			(+)

Note: (+) Denotes positive association

The next chapter discusses the various recommendations and the government policy to reduce the infant, child and maternal mortality. It concludes with suggestions for reducing HRB.

Chapter V

Conclusion

Since independence, efforts have been taken to reduce infant, child and maternal mortality. However, there has not been significant success. Reproductive and child health approach (RCH) was adopted in 1996 on the recommendation of the International Conference on Population Development (ICPD) in 1994. In addition to conventional maternal and child health services it includes immunization of children and contraceptive services to couples, treatment of reproductive tract infection (RTIs) and sexually transmitted diseases, provision of reproductive health education and services for adolscent boys and girls, screening of women near menopausal age for cervical and uterine cancer and treatment where required. A new National Population policy was launched in year 2000 taking into consideration the above-mentioned requirements.

The immediate objective of NPP, 2000 is to address the unmet needs for contraception, health care infrastructure, and health personnel, and to provide integrated service delivery for basic reproductive and child health care. The National Socio-Demographic Goals[1] for 2010 are:

1. Address the unmet needs for basic reproductive and health services, supplies and infrastructure.
2. Make school education up to age 14 free and compulsory, and reduce drop outs at primary and secondary levels to below 20 percent for both boys and girls.
3. Reduce infant mortality rate to below 30 per 1000 live births.
4. Reduce maternal mortality to below 100 per 100,000 live births.
5. Achieve universal immunization of children against all vaccine preventable diseases.

[1] Adopted from National Population Policy, 2000, pp.2-3.

6. Promote delayed marriage for girls, not earlier than age 18 and preferably after 20 years of age.
7. Achieve 80 percent inistitutional deliveries and 100 percent deliveries by trained persons.
8. Achieve universal access to information/ counceling, and services for fertility regulation and contraception with a wide basket of choices.
9. Integrate Indian Systems of Medicine (ISM) in the provision of reproductive and child health services, and in reaching out to households.
10. Promote vigorously the small family norm to achieve replacement levels of TFR.
11. Bring about convergence in implementation of related social sector programs so that family welfare becomes a people centred programme.

The above discussion shows maternal and child health has been given priority in all government programs and policy on population. Inspite of the government programs and intervention, the RCH situation has not improved in India. This is evident by the fact that the incidence of high-risk births (in any category) has remained high that is nearly 52 percent.

High-risk birth has significant impact on the survival and the health of mother and child. Among the various categories of single HRB, the order risk comprises a major share in India. It is followed by the interval risk and age risk respectively. The order risk and age risk had decreased since 1988, while the interval risk has increased over the same period. This rise in interval risk needs to be checked. The issue of HRB has to be tackled not only from plan and policy perspective but also from programmatic aspects.

In order to reduce the incidence of HRB, RCH and MCH programs should be able to identify the group/section of women who are having high HRB as compared to others.

The program personnel should give due consideration to the age of the woman. Family Planning (FP) personnel should be instructed to provide more care to women who are less than 18 years of age and more than 34 years of age. Similarly HRB due to order risk of more than three children should be identified as a group in need of special services. These women not only require assistance in term of delivery but also they are the women who require contraception so that further births can be averted. FP personnel also need to exercise care for those women whose birth interval are less than 24 months. Here again in addition to achieving safe delivery, these women are clearly in need of contraceptive services, especially those that provide enough spacing between births. As our results show women in rural areas especially require the services of health and family planning services for delivery and contraception so that HRB are reduced. A direct policy outcome of our study is that RCH program should utilize various mass media channels so that women are aware of HRB. As an extension to providing mass media programs, new information and counseling centers are necessary so that safe pregnancy can be discussed at the grass root level.With proper and timely implementation of these suggestions the incidence of HRB can be reduced.

Appendix –1

Standard of Living Index

Standard of Living Index (Roy and Jayachandran, 1995) has been calculated to understand the standard of living of households of the interviewed women. Calculation procedure is given below

Appendix Table: Scores for the variables used in the computation of Standard of Living Index (SLI)

Variable	Scores
Separate Room for cooking	Yes = 1
	NO = 0
Type of house	Pucca = 2
	Semi-Pucca = 1
	Kachha = 0
Fuel for Cooking	Electricity or gas or bio gas = 2
	Coal or charcoal or kerosene = 1
	Other = 0
Source of Lighting	Electricity = 2
	Kerosene or gas or oil = 1
	Other = 0
Source of drinking water	Well or pipe or hand-pump (own) = 2
	Well or pipe or hand-pump (public) = 1
	Other = 0
Toilet facility	Own Flush toilet = 3
	Flush Toilet (Public or shared) or own pit toilet = 2
	Shared pit toilet or public pit toilet = 1
	Other = 0
Ownership of live stock	Bullock = 2
	Cow = 2
	Buffalo = 2
	Goat = 1
	Sheep = 1
	Camel = 1
Ownership of goods	Sewing Machines = 2
	Clock/Watch = 1
	Sofa set = 2
	Fan = 2
	Refrigerator = 3
	Television = 3
	VCR/VCP = 3
	Bicycle = 2
	Motorcycle/Scooter = 3
	Car = 3
Standard of Living Index (SLI)	Score Range 0 – 48
Categories of SLI	
Low SLI	0 – 9
Medium SLI	10 – 11
High SLI	20 and above

Appendix – II

Region	Illiterate (Women)	Last Birth Dead	Low SLI	Women Not Working	Age Risk	Order Risk	Interval Risk
South	2125	243	1844	2328	606	688	892
(%)	32.6	3.7	28.3	35.7	9.3	10.5	13.7
North	1989	192	474	906	180	751	743
(%)	43	4.1	10.2	19.6	3.9	16.2	16
East	2591	278	2658	2226	578	1207	716
	37.7	4	38.7	32.4	8.4	17.6	10.4
West	1303	120	1027	1524	316	487	499
(%)	33.5	3.1	26.4	39.2	8.1	12.5	12.8
BIMARUO	11686	1054	6800	5665	1581	4196	1567
(%)	69	6.2	40.2	33.5	9.3	24.8	9.3

Appendix – III

DETAILED RESULT OF THE LOGISTIC REGRESSION ANALYSIS: AGE RISK, NFHS-1

	B	S.E.	Wald	df	Sig.	Exp(B)
RESIDENCE						
URBAN	REF.					
RURAL	0.106	0.055	3.675	1	0.055	1.112
EDUCATIONAL ATTAINMENT OF WOMAN						
ILLITERATE	REF.					
UPTO PRIMARY	-0.1	0.053	3.619	1	0.057	0.905
MIDDLE SCHOOL	-0.302	0.077	15.456	1	0	0.739
HIGH SCHOOL +	-0.922	0.092	100.14	1	0	0.398
HUSBAND'S LITERACY STATUS						
ILLITERATE	REF.					
LITERATE	-0.147	0.043	11.828	1	0.001	0.864
RELIGION						
HINDU	REF.					
MUSLIM	0.011	0.055	0.044	1	0.834	1.012
OTHER	-0.51	0.075	46.431	1	0	0.601
CASTE						
SC+ST	REF.					
OTHER	-0.106	0.044	5.848	1	0.016	0.899
HUSBAND'S WORK STATUS						
NOT WORKING	REF.					
WORKING	-0.693	0.089	60.148	1	0	0.5
WOMAN'S WORK STATUS						
NOT WORKING	REF.					
WORKING	-0.06	0.042	2.088	1	0.148	0.941
EXPERIENCE OF CHILD LOSS						
NO	REF.					
YES	-1.361	0.057	568.63	1	0	0.256
MASS MEDIA EXPOSURE						
NO	REF.					
YES	0.044	0.044	1.039	1	0.308	1.045
STANDARD OF LIVING						
LOW	REF.					
MEDIUM	-0.205	0.047	19.158	1	0	0.815
HIGH	-0.446	0.087	26.319	1	0	0.64
Constant	-2.941	0.065	2051.7	1	0	0.053
REGION						
SOUTH	REF.					
NORTH	-0.735	0.073	101.4	1	0	0.479
EAST	-0.069	0.063	1.197	1	0.274	0.934
WEST	-0.3	0.07	18.294	1	0	0.741
BIMARUO	-0.288	0.052	30.75	1	0	0.75

DETAILED RESULT OF THE LOGISTIC REGRESSION ANALYSIS: ORDER RISK, NFHS-1

	B	S.E.	Wald	df	Sig.	Exp(B)
RESIDENCE						
URBAN	REF.					
RURAL	-0.036	0.04	0.803	1	0.37	0.965
EDUCATIONAL ATTAINMENT OF WOMAN						
ILLITERATE	REF.					
UPTO PRIMARY	-0.287	0.039	55.479	1	0	0.75
MIDDLE SCHOOL	-0.756	0.063	142.45	1	0	0.469
HIGH SCHOOL +	-1.423	0.074	368.09	1	0	0.241
HUSBAND'S LITERACY STATUS						
ILLITERATE	REF.					
LITERATE	0.008	0.03	0.072	1	0.789	1.008
RELIGION						
HINDU	REF.					
MUSLIM	0.401	0.038	110.78	1	0	1.493
OTHER	0.061	0.05	1.503	1	0.22	1.063
CASTE						
SC+ST	REF.					
OTHER	-0.028	0.031	0.796	1	0.372	0.973
HUSBAND'S WORK STATUS						
NOT WORKING	REF.					
WORKING	0.443	0.095	21.775	1	0	1.558
WOMAN'S WORK STATUS						
NOT WORKING	REF.					
WORKING	0.191	0.029	43.807	1	0	1.211
EXPERIENCE OF CHILD LOSS						
NO	REF.					
YES	1.178	0.027	1937.5	1	0	3.249
MASS MEDIA EXPOSURE						
NO	REF.					
YES	-0.087	0.031	7.815	1	0.005	0.917
STANDARD OF LIVING						
LOW	REF.					
MEDIUM	0.046	0.033	1.921	1	0.166	1.047
HIGH	-0.077	0.063	1.519	1	0.218	0.926
Constant	-1.674	0.056	887.79	1	0	0.188
REGION						
SOUTH	REF.					
NORTH	0.278	0.052	29.051	1	0	1.321
EAST	0.388	0.051	57.565	1	0	1.474
WEST	0.159	0.056	7.96	1	0.005	1.173
BIMARUO	0.366	0.043	73.291	1	0	1.442

DETAILED RESULT OF THE LOGISTIC REGRESSION ANALYSIS: INTERVAL RISK, NFHS-1

	B	S.E.	Wald	df	Sig.	Exp(B)
RESIDENCE						
URBAN	REF.					
RURAL	-.167	.044	14.330	1	.000	.847
EDUCATIONAL ATTAINMENT OF WOMAN						
ILLITERATE	REF.					
UPTO PRIMARY	.302	.050	37.122	1	.000	1.352
MIDDLE SCHOOL	.568	.062	84.648	1	.000	1.765
HIGH SCHOOL +	.316	.064	24.196	1	.000	1.371
HUSBAND'S LITERACY STATUS						
ILLITERATE	REF.					
LITERATE	.156	.045	11.793	1	.001	1.168
RELIGION						
HINDU	REF.					
MUSLIM	-.133	.056	5.616	1	.018	.875
OTHER	.173	.054	10.184	1	.001	1.189
CASTE						
SC+ST	REF.					
OTHER	-.054	.043	1.587	1	.208	.947
HUSBAND'S WORK STATUS						
NOT WORKING	REF.					
WORKING	.217	.111	3.850	1	.050	1.242
WOMAN'S WORK STATUS						
NOT WORKING	REF.					
WORKING	-.180	.041	19.706	1	.000	.835
EXPERIENCE OF CHILD LOSS						
NO	REF.					
YES	-.120	.043	8.007	1	.005	.887
MASS MEDIA EXPOSURE						
NO	REF.					
YES	.057	.043	1.742	1	.187	1.058
STANDARD OF LIVING						
LOW						
MEDIUM	.082	.044	3.444	1	.063	1.085
HIGH	-.146	.066	4.868	1	.027	.864
Constant	-2.270	.066	1190.334	1	.000	.103
REGION						
SOUTH	REF.					
NORTH	.275	.057	23.221	1	.000	1.317
EAST	-.257	.065	15.566	1	.000	.773
WEST	.026	.065	.163	1	.686	1.026
BIMARUO	-.081	.053	2.366	1	.124	.922

DETAILED RESULT OF THE LOGISTIC REGRESSION ANALYSIS: AGE RISK, NFHS-2

	B	S.E.	Wald	df	Sig.	Exp(B)
RESIDENCE						
URBAN	REF.					
RURAL	.454	.053	73.589	1	.000	1.574
EDUCATIONAL ATTAINMENT OF WOMAN						
ILLITERATE	REF.					
UPTO PRIMARY	.020	.054	.129	1	.719	1.020
MIDDLE SCHOOL	-.244	.058	17.453	1	.000	.783
HIGH SCHOOL +	-1.029	.112	84.433	1	.000	.357
HUSBAND'S LITERACY STATUS						
ILLITERATE	REF.					
LITERATE	-.001	.047	.001	1	.978	.999
RELIGION						
HINDU	REF.					
MUSLIM	.137	.056	6.079	1	.014	1.147
OTHER	-.394	.080	24.429	1	.000	.674
CASTE						
SC+ST	REF.					
OTHER	-.170	.043	15.368	1	.000	.843
HUSBAND'S WORK STATUS						
NOT WORKING	REF.					
WORKING	-.317	.102	9.693	1	.002	.728
WOMAN'S WORK STATUS						
NOT WORKING	REF.					
WORKING	-.066	.042	2.468	1	.116	.936
EXPERIENCE OF CHILD LOSS						
NO	REF.					
YES	-1.420	.064	491.821	1	.000	.242
MASS MEDIA EXPOSURE						
NO	REF.					
YES	.107	.049	4.830	1	.028	1.113
STANDARD OF LIVING						
LOW	REF.					
MEDIUM	-.124	.044	8.080	1	.004	.883
HIGH	-.380	.074	26.203	1	.000	.684
Constant	-3.246	.071	2102.960	1	.000	.039
REGION						
SOUTH	REF.					
NORTH	-.969	.090	115.592	1	.000	.379
EAST	-.186	.066	7.902	1	.005	.830
WEST	-.105	.074	2.041	1	.153	.900
BIMARUO	-.087	.055	2.496	1	.114	.917

DETAILED RESULT OF THE LOGISTIC REGRESSION ANALYSIS: ORDER RISK, NFHS-2

	B	S.E.	Wald	df	Sig.	Exp(B)
RESIDENCE						
URBAN	REF.					
RURAL	-.138	.040	12.233	1	.000	.871
EDUCATIONAL ATTAINMENT OF WOMAN						
ILLITERATE	REF.					
UPTO PRIMARY	-.271	.041	43.472	1	.000	.762
MIDDLE SCHOOL	-.912	.049	341.377	1	.000	.402
HIGH SCHOOL +	-2.162	.125	298.234	1	.000	.115
HUSBAND'S LITERACY STATUS						
ILLITERATE	REF.					
LITERATE	-.084	.032	6.907	1	.009	.919
RELIGION						
HINDU	REF.					
MUSLIM	.415	.040	106.386	1	.000	1.515
OTHER	.105	.056	3.517	1	.061	1.111
CASTE						
SC+ST	REF.					
OTHER	-.127	.032	15.534	1	.000	.881
HUSBAND'S WORK STATUS						
NOT WORKING	REF.					
WORKING	.318	.098	10.447	1	.001	1.374
WOMAN'S WORK STATUS						
NOT WORKING	REF.					
WORKING	.222	.030	54.731	1	.000	1.249
EXPERIENCE OF CHILD LOSS						
NO	REF.					
YES	1.119	.029	1485.897	1	.000	3.063
MASS MEDIA EXPOSURE						
NO	REF.					
YES	-.173	.037	21.667	1	.000	.841
STANDARD OF LIVING						
LOW	REF.					
MEDIUM	.007	.032	.047	1	.829	1.007
HIGH	-.133	.059	5.132	1	.023	.876
Constant	-1.862	.061	927.707	1	.000	.155
REGION						
SOUTH	REF.					
NORTH	.405	.062	42.815	1	.000	1.499
EAST	.360	.058	38.588	1	.000	1.433
WEST	.154	.066	5.373	1	.020	1.166
BIMARUO	.502	.048	107.481	1	.000	1.652

DETAILED RESULT OF THE LOGISTIC REGRESSION ANALYSIS: INTERVAL RISK, NFHS-2

	B	S.E.	Wald	df	Sig.	Exp(B)
RESIDENCE						
URBAN	REF.					
RURAL	.034	.040	.733	1	.392	1.035
EDUCATIONAL ATTAINMENT OF WOMAN						
ILLITERATE	REF.					
UPTO PRIMARY	.357	.049	52.204	1	.000	1.429
MIDDLE SCHOOL	.445	.049	81.884	1	.000	1.560
HIGH SCHOOL +	.089	.071	1.564	1	.211	1.093
HUSBAND'S LITERACY STATUS						
ILLITERATE	REF.					
LITERATE	.153	.046	10.863	1	.001	1.165
RELIGION						
HINDU	REF.					
MUSLIM	-.141	.051	7.509	1	.006	.869
OTHER	.218	.054	16.037	1	.000	1.243
CASTE						
SC+ST	REF.					
OTHER	-.020	.040	.254	1	.614	.980
HUSBAND'S WORK STATUS						
NOT WORKING	REF.					
WORKING	-.087	.095	.842	1	.359	.916
WOMAN'S WORK STATUS						
NOT WORKING	REF.					
WORKING	-.119	.038	9.884	1	.002	.888
EXPERIENCE OF CHILD LOSS						
NO	REF.					
YES	-.176	.043	16.566	1	.000	.839
MASS MEDIA EXPOSURE						
NO	REF.					
YES	.050	.043	1.335	1	.248	1.051
STANDARD OF LIVING						
LOW	REF.					
MEDIUM	.145	.043	11.542	1	.001	1.156
HIGH	.112	.059	3.570	1	.059	1.118
Constant	-2.053	.057	1293.124	1	.000	.128
REGION						
SOUTH	REF.					
NORTH	.164	.057	8.401	1	.004	1.178
EAST	-.366	.058	39.883	1	.000	.693
WEST	-.079	.061	1.685	1	.194	.924
BIMARUO	-.250	.049	26.563	1	.000	.779

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