Child Mortality in Jumla District of Nepal, 1971 through 1995: Trends and Socio-economic Differentials

Thapa Narbada, PhD[a], Chongsuvivatowng Virasakdi, PhD[b], Geater Alan, PhD[c] & Ulstein Magnar, PhD[d]

Abstract

Objectives This study describes trends and socio-economic differences in child mortality among the birth cohorts of 1971 through 1995 in a remote, Jumla District of Nepal.

Methods Data were derived from a household survey in September to October 1996. Mothers were interviewed on socio-economic background, reproductive history, delivery practices and child survival. A total of 2949 live born children during the period of 1970 to 1995 were included in the final analysis. The life-table method, rate and Generalized Estimation Equation were used to analyze the data.

Results Infant and child mortality rates in Jumla are high although they exhibited an overall-declining trend over the period of 1971-1995. The declines are more remarkable among post-neonate infant and under-5 children but neonatal death rate has not shown any significant decline among all socio-economic groups.

Conclusion Non-significant changes in neonatal mortality suggest that the practice of safe pregnancy and delivery has not changed over the last two decades in this community. To reduce the overall mortality rate among children, emphasis should be put on safe motherhood along with a child survival program.

Keywords Child mortality among the birth cohort, Neonatal mortality, Jumla

Introduction

Infant and child mortality rates have long been regarded as sensitive indices of the level of social and economic well being among various population groups. They also reflect social, cultural and behavioral practices existing in the society [1,2]. Despite the Government target to reduce the infant and child mortality to 50 and 70 per 1000 live births by 2000 AD, the infant and child mortality are still a major public health problem in Nepal. It has declined from 123 infant deaths per 1000 live births in 1981[3] to 102 in 1991[4] and 79 in 1996[5]. Similarly, the under-5 mortality has declined from 196 to 118 per 1000 live births between 1981[3] and 1996[5]. There is little known about neonatal mortality in Nepal. However, the rate has declined from 75 to 50 per 1000 between 1981[3] and 1996[5]. The perinatal mortality rate ranges from 90/1000[6] to 138/1000[7] live births in different studies.

Although significant improvement has been achieved in child survival, the death rate is still high and varied within the country[1]. When this rate is compared with that of developed countries, which have infant mortality rates of around 6 per 1000 live births and under-five mortality of around 7 per 1000 live-births[8], it becomes more obvious that child mortality is still extreme in Nepal. The present study was confined to Jumla, a remote district of Nepal. According to the human development index (life expectancy, literacy, and resource access), the district ranks 6[th] lowest position of the 75 districts in Nepal[9].

The reported local maternal mortality rate was 2000/100,000 live births[10] and infant mortality rate was 130 per 1000 live births[4] and an under-five mortality rate was 313 per 1000 live births in a baseline survey in 1986[11]. Jumla community health survey 1982 revealed a neonatal mortality of 70 per 1000 live births[12].

The district ranks eleventh highest in infant mortality rate, among 75 districts in the country[1].

Basically, Jumla is deprived of modern technology in all aspects, such as transportation, communication and medical care facilities. Most of the population live in mud and stone houses at an altitude of 2000-3000 m in a cold dry climate and are economically dependent on a combination of subsistence agriculture and animal husbandry. Local food production is inadequate. Communities consist of small-scattered hamlets typically consisting of 60 or fewer tightly clustered households, with an average of 6 family members each. The general level of sanitation is poor and the majority of houses do not

[a] Shree Military Birendra Hospital Chauni, Kathmandu, Nepal.
Post Box: 7605, E-mail: narbada_thapa@hotmail.com
[b] *Epidemiology Unit, Faculty of Medicine, Prince of Songkla University, Hat-Yai, 90112 Thailand.*
[c] *Epidemiology Unit, Faculty of Medicine, Prince of Songkla University, Hat-Yai, 90112 Thailand.*
[d] Department of Obsteric and Gynaecology, Haukeland University Hospital, N-5021 Bergen, Norway.

have a toilet. In most cases, the ground floor of the house is used for animal shelter and the same place is used for child delivery.

A 15-bed governmental hospital and 9 health posts and 17 sub-health posts serve the district. There is practically no hospital delivery and no facility for caesarean section or blood transfusion. Few children have access to medical care and immunization. In addition to the established health infrastructure, however, there have been several programs on maternal and child health carried out in different periods of time. They were the Pneumonia Intervention Trial Program (PITP) 1986 to 1989[11], Jumla Focused Intervention for child Survival (FICS) 1989-1992 and Jumla Community Health Project (JCHP) from July 1992 to 1994[13].

Despite several intervention programs on child health in Jumla, except for a few reports from the specific program[11;13] and fertility and family planning survey data, there has been no study on child mortality and its trend. It is therefore of interest and importance to determine the state and magnitude of child mortality in this particular community, and whether the changes are toward improvement despite the lack of modern technology and other development. The estimates provided can help the policy maker to organise an appropriate program to reduce the child mortality in this area. Moreover, the identification of differentials in mortality among different categories of the population may help to provide an understanding of the area, which needs more focus.

Materials and Methods

A household survey was carried out from September to October 1996. Out of 270 administrative wards in the district, 20 were randomly selected for inclusion in the study. Among the estimated 1026 households in the selected wards, data collection was performed in 825 households. One hundred and ffifty-four households had undertaken seasonal migration during the study period and 47 households had no married women of reproductive age (MWRA). All MRWA (N=939) residing in the study area were included as potential subjects for interview. Ten records were discarded due to error and incomplete information.

Mothers were interviewed using a pre-tested open and closed-ended questionnaire. Data on socio-economic status, reproductive history, birth practices and child survival were obtained. Female interviewers with a health education background were recruited from the local residents. Verbal informed consent was sought from the village head and interviewee. None refused to participate. Permission to conduct the study was provided by the Nepal Health Research Council.

As in other developing countries, Nepal has a poorly maintained system of vital registration, almost all child deliveries and deaths occur outside the medical setting. Thus it was necessary to resort reports of retrospective events by mothers.

Efforts were made to reduce the potential inaccuracies or recall bias by involving all family members during questioning concerning child survival. As a result of group consensus, the probability of getting accurate information may increase.

Statistical analysis

Of the 929 MWRA interviewed, 828 reported 3498 pregnancies with the following outcomes: 3192 (91.3%) live births, 103 (2.9%) stillbirths, and 203 (5.8%) abortions. Children born before 1966 were not included in the analysis as the number was small (11); 162 born after 1995 were excluded because the high number of children below one year during the survey.

Twelve twins were excluded because they were regarded as a high-risk group. Furthermore, children born before 1971 were excluded for the death rate calculation and multivariate analysis because the number was small in some cells. Finally a total of 2949 neonates, 2714 post-neonates, and 1475 children age 1-<5 were included in the calculation of rates, and in the multivariate analysis.

Data from the questionnaire were double-entered and processed using Epi-info version 6 software, and analysed using STATA statistical software. The life-table method was used to calculate the survival probability of children in different cohort groups. Death rates were calculated among those who survived from the previous age period. For example, post-neonate death rates were computed among those who survived the neonate period. Similarly, the risk of death among 1-<5 year children was computed among those who survived the first year of life. Children who died within each age group were compared with children who survived throughout that age group.

To test for common trend of mortality among different categories over the time, iinteractions between birth cohort and factors of interest were considered. To account for possible intra-mother correlation (many children are born from the same mother), a generalised estimation equations (GEE) model was applied to the full data set to construct a final multivariate model. GEE with binary link function and exchangeable intra-mother correlation was carried out to compute the odds ratios for birth cohort controlling for difference in various socio-demographic and biological factors. Modelling was performed separately for different age periods of the children.

Results

Detailed cumulative mortality is illustrated by the Kaplan-Meier curves in Figure 1. Children born in later cohorts had lower probability of death (lower curve) than those born in earlier cohorts. Mortality differentials among different cohorts are more remarkable after one month of life until 5 years of age. However, a cohort tended to have stable survival after 5 years of age.

Table 1 shows the cumulative deaths per 1000 live births at the end of each age period in different birth cohorts from 1971 to 1995 calculated by the Kaplan-Meier life table method. Probability of death for all age groups decreases in successive cohorts although the trend is not significant for the neonate group. During the period of 1971 to 1995, the total drop in mortality rates among neonates and infants was 32% and 45%, respectively. Similarly, among under-5 children the drop from 1971 to 1990 was 41%.

Age-specific mortality among under-5 children in different birth cohorts is shown in Table 2. Of a total 2949 live born children in the period of 1971-1995, 883 (30%) died during their first five years of age. Among all deaths 186 (21%) died in the neonatal period and 461 (52%) before their first birthday. Age-specific mortality declined for all age periods in successive cohorts except for post-neonates of 1976-1980 birth cohort.

Table 3 and 4 show mortality trend among neonate and post-neonate across the 5 years birth cohorts according to socio-demographic variables. Although neonatal mortality rates are declined among the subgroups none of them is significant and surprisingly, the mortality was significantly increased among the teenage mothers. In contrast, among post-neonate children a significant decline trend of mortality was observed over time in all subgroups. Within each variable, there are no significant different in trend, except for the mother age group. Mothers below 20 years of age were significantly different from the mothers in the 20-24 years age.

Adjusted odds ratios denoting the changes in risk of death among neonates, post-neonates and 1-<5 year-old children in different birth cohorts are presented in Table 5. Compared to the neonates born in the earliest cohort, 1971-1975, neonates born in later cohorts were at lower risk of death even after adjusting for socio-economic and biological factors. The risk of death was gradually decreased up to 1986-90 cohort OR=0.48, CI:0.2-0.9 and increased again to OR=0.58, CI:0.3-1.1 for 1991-95 cohort. Despite an over all drop in risk of death among this study group the trend was not statistically significant (p= 0.294).

The risk of death among post-neonates and 1-<5 year children showed a significantly decreasing trend across the cohorts (p=0.0005 in both age period). Within the two decades the risk of death among post-neonate children was dropped by two folds (OR=0.58,CI:0.4-0.9). The risk dropped more substantially and steadily among children age 1-<5 years (OR=0.38, CI:0.22-0.67) than among postneonates.

Discussion

From 1971 to 1995, overall children mortality in Jumla district decreased significantly with a remarkable drop in the under-five and infant mortality but a statistically non-significant drop among neonates. Although the mortality rates among all age period are still higher than the national figures,[5;14] the declining trend is quite encouraging.

Despite low education, lack of basic medical facilities, and high-risk childbirth practices in this area, the declining trend has paralleled with National level. Total reduction of neonate and infant mortality was 36% and 43%, for the period of 1972 to 1996 in the National level,[5] while it was 32% and 45% in Jumla during the period of 1971 to 1995.

For the accuracy of information, although we could not validate our findings with previous report for all cohort comparison with available data did not show much discrepancy. For instance, the reported under-5 mortality in Jumla was 313 per 1000 live birth in 1986[11] and neonatal mortality 70 in 1982[12], while in our finding the under-5 mortality was 362 in 1981-85 and neonatal death 70 in 1976-80.

However, the present study differed from the conventional method of data collection for infant and child mortality. We used retrospective data from the mothers who were currently in reproductive age. Because, of the sampling method, the majority of mothers in the early period were young. One might argue that the reduced child death rate in more recent years might be an effect at least in part, of mother's age or mother's birth cohort. The lack of older women in the earlier cohorts could have under estimate the mortality rate than the actual levels in previous cohorts.

Child loss to older women is expected to be higher as for very young women than to women in mid period age.[15; 16; 17] However, to control mother's age effect on child mortality in different cohorts, mother's age was included along with cohort in the logistic model. Mother's age was not a significant predictor for infant or child mortality except during the neonatal period. Information for the children whose mother dead has been missed which could have underestimated the death rate in all birth cohort.

Decline in mortality was more rapid after 1981-85 cohort and for older children than for younger children. This improvement may reflect the impact of a number of intervention programs conducted since year 1986 in Jumla which were primarily focused on child health perspectives.[11;13] Anti-microbial treatment intervention program was held during the period of 1986 to 1989. The program led to a 28% reduction in the risk of death from all causes and greatest benefit was found among infants of 6-11 months of age. Mortality reduction was less obvious among neonates.[11] It was found that after 6 months of age diarrhoea was the leading cause of death while for the early neonate and neonate birth-related causes were predominant.

Other programs, such as FICS and JCHP program were held in the period 1989-1992 and 1992-1994, respectively. These programs also focused on child health, and included diarrhoeal disease control and treatment, pneumonia case-management, vitamin A supplementation, and motivation for immunization.[13] Although there were several programs on child health in different periods of time, maternal health was not included and this is one of the most important determinants for early infant death. Most of the post-neonatal deaths are related to the child rearing, infection and nutrition etc.[11] whereas neonatal mortality is linked to the environment of the fetus in the uterus and midwifery care (prenatal, intra-natal, and postnatal care).[18;19;20;21] A previous report from Jumla in 1987 [6;11] revealed that 53% of infant deaths were neonatal and of these 78% were birth-related, which reflects a severe problem related to pregnancy and childbirth. Thus, without strengthening safe motherhood practices (prenatal, intra-natal and postnatal care) there will be no improvement in early infant death, and total child mortality will still not be fully reduced.

There was no evidence of differentials in changes among the different socio-economic groups, except among mother age group during the neonatal period. This reflects the homogeneity of the living condition and background of the inhabitants in this area, for example; the use of communal water sources, poor sanitation, high proportion of illiteracy, sharing of the same culture and traditions, and common and limited access to medical facilities. Breast-feeding until the following pregnancy is universal, weaning foods are introduced at the same age because it is culturally defined at 5 months for daughters and 6 months for sons and, most importantly, child rearing was in most cases undertaken by grandmothers and elder siblings.

Although there was no significant changes in neonatal death over time, surprisingly, the death was significantly increased among the neonates of teenage mothers. Because of the long recall period, mothers in earlier cohorts might have reported death within 28 days as occurring at one month. So far, this speculation cannot be confirmed.

Finally, childhood mortality continued to be higher in the Jumla District than the national and international levels.[5;8;24;25] Although overall mortality was declining in successive cohorts the changes were particularly marked only among the older children. The slight and non- significant trend in neonatal death suggests that the practice of safe motherhood might have changed relatively little over the last two decades in this community.

Our previous analysis revealed poor pregnancy care and childbirth practices, such as giving birth in an animal shed, unattended delivery, and unsafe neonatal care. Although there have been several program launched on safe motherhood in the last decade in various parts of the world, the women and children in Jumla are deprived of this opportunity. With the benefit of knowledge and modern medical technology, one part of the world is able to reduce the child mortality less than 1%[25], while Jumla is left far behind with rudimentary health care services and precarious child health.

To improve the situation in this area, a culturally accepted and feasible maternal and child health program must be initiated. Emphasis should be placed on safe motherhood to save the life of children from early age through childhood.

References

1. Thapa S. Infant mortality and its correlates and determinants in Nepal: A district-level analysis. *J Nep Med Assoc* 1996;**34**:94-109.
2. Hobcraft J, McDonald J, Rutstein S. Socio-economic factors in infant and child mortality: a cross-sectional comparison. *Popul.Stud.* 1984;**38**:193-198.
3. Central Bureau of Statistics. *Nepal in Figures 1981.* Kathmandu: National Planning Commission Secretariats, 1981.
4. Central Bureau of Statistics. *Nepal in Figures 1991.* Kathmandu: National Planning Commission Secretariats, 1991.
5. Ministry of Health. Nepal Family Health Survey 1996. Kathmandu: Family Health Division, Ministry of Health, 1997.
6. Houston R, Johnson RB. A Review of perinatal mortality in the district of Jumla, Nepal 1987-88. 1989;(UnPub)
7. Pradhan DP, Shah U. Perinatal mortality in Bheri Zonal Hospital. J Nep.Med.Assoc. 1997;35 :146-149.
8. UNICEF. *The State of the World's Children 1998.* UNICEF, WHO, 1998.
9. Thapa S. The Human Development Index: A portrait of 75 Districts in Nepal. *Asia-Pacific Population Journal* 1995;**10**:3-14.
10. Ministry of Health. *Safe Motherhood Initiative in Nepal: A National Plan of Action (1994-1997).* 1993. Kathmandu, Family Health Division, Ministry of Health, Nepal.
11. Pandey MR, Daulaire NMP, Starbuck ES, Houston RM, McPherson K. Reduction in total under-five mortality in western Nepal through community-based antimicrobiol treatment of pneumonia. *Lancet* 1991;**338**:993-997.
12. Shrestha MP, Parker RL. *Jumla community health survey.* 1982;(UnPub)
13. Mrigendra Medical Trust. *Mrigendra Medical Trust Jumla Community Health Project July 1992 - June 1994: Final Report.* 1994;(UnPub)
14. Central Bureau of Statistics. *Nepal in Figures 1993.* Kathmandu: National Planning Commission Secretariats, 1993.
15. Fauveau V, Wojtyniak B, Mostafa G, Sarder AM, Chakraborty J. Perinatal mortality in Matlab, Bangladesh: A community-based study. *Int J Epidemiol* 1990;**19**:606-612.
16. Ahmad OB, Eberstein IW, Sly DF. Proximate determinants of child mortality in Liberia. *J Biosoc Sci.* 1991;**23**:313-326.
17. Zhang J, Cai W, Chen H. Perinatal in Shanghai: 1986-1987. *Int J Epidemiol* 1991;**20**:958-963.
18. Cunningham FG, MacDonald PC, Gant NF, Leveno KJ, Gilstrap LC. *William obstetric.* Connecticut: Appleton and Lang, 1997.
19. Becerra JE, Atrash HK, Perez N, Slliceti JA. Low Birthweight and Infant Mortality in Puerto Rica. *Am J Public Health* 1993;**83**:1572-1576.
20. Kotelchuck M. The adequacy of prenatal care utilization index: its US distribution and association with low birthweight. *Am J Public Health* 1994;**84**:1486-1489.
21. Bartlett AV, Paz De Bocaletti ME. Intrapartum and neonatal mortality in a traditional indigenous community in rural Guatemala. *Acta Paediatr Scand* 1991;**80**:288-296.
22. Thapa S. Challenges to improving maternal health in rural Nepal. Lancet 1996;347:1244-1246.
23. Morrison J, Najman JM, Williams GM, Keeping JD, Andersen MJ. Socio-economic status and pregnancy outcome. An Australian study. *Br J Obstet Gynaecol* 1989;**96**:298-307.
24. Kunstadter P, Kunstadter LS, Leepreecha P, *et al.* Causes and consequences of increase in child survival rate: Ethnoepidemiology among the Hmong of Thailand. *Human Biology* 1992;**64**:821-841.
25. WHO. *The World Health Report 1998.* Geneva: WHO, 1998.

Fig. 1: Probability of death in different birth cohorts of 1971-1995

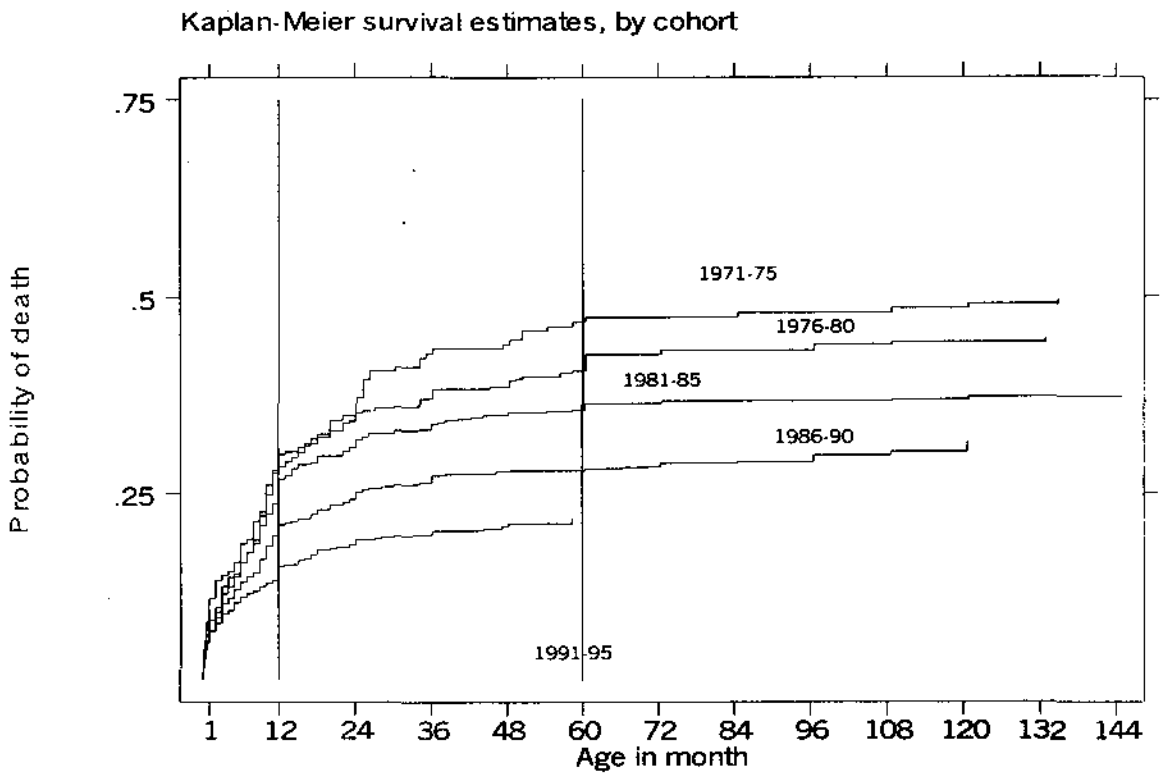

Table 1: Changes in cumulative deaths per 1000 live births in different birth cohort 1971 through 1995

	Cumulative probability of death per 1000 live birth						
Age group	1971/75	76/80	81/85	86/90	91/95	P-value for trend	Total drop*
Neonate	87	70	62	60	59	0.21	32%
Infant	283	299	267	209	156	0.00	45%
Under-5	474	426	362	281	-	0.00	41%

Probability was calculated from life table method. Total drop for under-5 was up to 1986-90 cohort.
- not complete the age, *Total percent of drop in mortality rates.

Table 2: Age-specific mortality rate among under-5 children in different birth cohorts

	Total number		Age-specific deaths per 100 live-birth		
Birth Cohort	Live born N	Deaths N	0-27days N(row%)	28days-1yr N(row%)	1-<5yr N(row%)
1971-75	173	82	15(8.7)	34(21.5)	33(26.6)
1976-80	385	164	27(7.0)	88(24.6)	49(18.1)
1981-85	610	221	38(6.2)	125(21.8)	58(12.9)
1986-90	805	226	48(6.0)	120(15.8)	58 (9.1)
1991-95	976	190	58(5.9)	94*	38*
Total	2949	883	186	461	191

* not the all children in the cohort completed the age.

Table 3: Average change in neonatal mortality rates per 1000 live births, per 5-year interval by socio-demographic characteristics between 1971-1995

Variables	Death rate per 1000 live-births in different birth cohorts					
	1971/75 Rate(N)	1976/80 Rate(N)	1981/85 Rate(N)	1986/90 Rate(N)	1991/95 Rate(N)	Av. 5 yr Change $
Ethnic						
High caste	98(123)	71(294)	61(456)	60(620)	56(762)	-10
Low caste	60 (50)	66 (91)	65(154)	59(185)	70(214)	3
Mother's education						
Literate	0 (5)	62 (16)	42 (24)	77 (26)	89 (45)	22
Illiterate	89(168)	70(369)	63(586)	59(779)	58(931)	- 8
Father's education						
Literate	53 (38)	30 (99)	58(191)	28(289)	39(438)	- 4
Illiterate	96(135)	84(286)	64(419)	77(516)	76(538)	- 5
Father's occupation						
Farming	85(106)	70(256)	54(411)	57(542)	56(711)	- 7
Trading	69 (29)	63 (64)	54(112)	62(162)	74(189)	- 1
Others	105(38)	77 (65)	115(87)	69(101)	53 (76)	- 13
Mother's age						
<20 yrs	81(74)	59(101)	92(119)	114(141)	140(128)	15*
20-24 yrs	95(84)	88(181)	70(243)	42(260)	62(322)	- 8
25-29 yrs	67(15)	36 (84)	43(164)	52(210)	43(256)	- 6
30 yrs +	--	105(19)	36 (84)	51(194)	33(270)	--
Distance from center						
0-2 hrs	114(35)	40(75)	61(115)	72(138)	80(150)	- 9
3-6 hrs	58(52)	77(104)	45(134)	45(180)	50(239)	- 2
7 hrs +	93(86)	78(206)	69(361)	62(487)	58(587)	- 9

* Significant trend of mortality at $p<0.05$.

$ Average drop in absolute mortality rate per 5-year interval.

-- No mothers from particular age group in all cohorts.

Table 4: Average change in post-neonatal mortality rates per 1000 live births, per 5-year interval by socio-demographic characteristics between 1971-1995

Variables	Death rate per 1000 live-births in different birth cohorts					
	1971/75 Rate (N)	1976/80 Rate (N)	1981/85 Rate (N)	1986/90 Rate (N)	1991/95 Rate (N)	Av. 5yr Change $
Ethnic						
High caste	243 (111)	260 (273)	208 (428)	158 (583)	109 (682)	- 33 **
Low caste	149 (47)	200 (85)	250 (144)	167 (174)	107 (187)	- 10 *
Mother's education						
Literate	200 (5)	200 (15)	174 (23)	42 (24)	53 (38)	- 37 *
Illiterate	216 (153)	248 (343)	221 (549)	164 (733)	111 (831)	- 26 **
Father's education						
Literate	167 (36)	135 (96)	94 (180)	53 (281)	69 (391)	- 25 **
Illiterate	229 (122)	282 (262)	276 (392)	223 (476)	140 (478)	- 22 **
Father's occupation						
Farming	258 (97)	248 (238)	200 (389)	161 (511)	115 (634)	- 36 **
Trading	111 (27)	300 (60)	267 (106)	145 (152)	90 (166)	- 5 **
Others	176 (34)	183 (60)	247 (77)	180 (94)	87 (69)	- 2
Mother's age						
<20 yrs	162 (68)	263 (95)	167 (108)	152 (125)	93 (107)	- 17 *
20-24 yrs	276 (76)	212 (165)	231 (226)	209 (249)	132 (288)	- 36 **
25-29 yrs	143 (14)	284 (81)	255 (157)	136 (199)	96 (228)	- 12 **
30 yrs +	--	294 (17)	185 (81)	125 (184)	98 (246)	--
Distance from center						
0-2 hrs	161 (31)	194 (72)	167 (108)	109 (128)	105 (133)	- 14
3-6 hrs	224 (49)	208 (96)	227 (128)	158 (172)	75 (214)	- 37 **
7 hrs +	231 (78)	284 (190)	233 (336)	175 (457)	123 (522)	- 27 **

There was no significant (p=<0.05) different in mortality trend within the categories.

* Significant trend of mortality at p<0.05.

** Significant trend of mortality at p<0.01.

$ Average drop in absolute mortality rate per 5-year interval.

-- No mothers from particular age group in all cohorts.

Table 5 Adjusted odd ratios for mortality among children under 5 years of age in different birth cohorts, 1971-1995

Factors	Neonate ORs(95% CI)	Post-neonate ORs(95% CI)	1-<5 yrs child ORs(95% CI)
Birth cohort			
1971-75	1.0	1.0	1.0
1976-80	0.63(0.3-1.3)	1.2 (0.8-2.0)	0.74(0.43-1.3)
1981-85	0.55(0.3-1.1)	1.1 (0.7-1.8)	0.50(0.29-0.86)
1986-90	0.48(0.2-0.9)	0.85(0.5-1.4)	0.38(0.22-0.67)
1991-95	0.58(0.3-1.1)	0.58(0.4-0.9)	*
P-value for trend	0.294	0.000	0.000

Adjusted for parental education, occupation, maternal age, birth-order, gestational age, inter-pregnancy interval, birth practice and distance from center.

* children who are too young to calculate the risk.