Child Mortality in Jumla District of Nepal : Trend and Socio-economic differentials.

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ABSTRACT:

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. Data were derived from a household survey in September to October 1996. A total of 2949 live born children during the study period were included in the final analysis. The life-table method, rate and Generalized Estimation Equation were used to analyze the data according to specific objectives.

Infant and child death rates in Jumla are high although they exhibited an overall-declining trend over the period of 1971-1995. The declines are more remarkable among infant and under –5 children but neonatal death rate has not shown any significant decline. Non-significant changes in neonatal mortality suggest that the practice of safe pregnancy and delivery has not changes 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.

INTRODUCTION:

Infant and child mortality rate 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 thesociety[1,2] Despite the Government target to reduce the infant and child mortality to 50 and 70 per 1000 live births by 2000 A.D, the infant and child mortality are still a major public health problem in Nepal. It has declined from 123 infant infant deaths per 1000 live births in 1981[3] to 102 in 1991[4] and in 1996[5]. Similarly, the under-5 mortality has declined from 196 to 118 per 1000 live births between 1981[3] and 1996[5]. The neonatal death 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 birth in different studies. 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 aroung 7 per 100 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, the district ranks 6th 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 lives 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].

Basically, Jumal is deprived of modern technology in all aspects, such as transportation, communication and medical care facilities. Most of the people live in mud and stone houses at an altitudes of 2000-3000 m and are economically dependednt on a combination of subsistence agriculture and animal husbandry. 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. In addition to the established health infrastucture, however, there have been several programs on maternal and child health carried out in different period of time[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 important to determine the state and magnitude of child mortality in this 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 and appropriate program to reduce the child mortality in this area.

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. All MRWA (N=929) residing in the study area were included as potential subjects for interview. 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.

STATISTICAL ANALYSIS:

Of the 9292 MWRA interviewed, 828 reported 3498 pregnancies with the following outcomes: 3192 (91.3%) live births 103 (2.9%) stillbirths, and 203 (5.8%) abortions. In the final analysis a total of 2949 neonates, 2714 post-neonates, and 1475 1-<5 live borne children were included.

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. 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 time, interaction between birth cohort and factors of interest were considered. To account for possible intra-mother correlation (children from the same mother), a Generalised Estimation Equations (GEE) was applied to the full data set to construct a final multivariate model.

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 lire until 5 years of age.

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

Kaplan-Meier survival estimates, by cohort
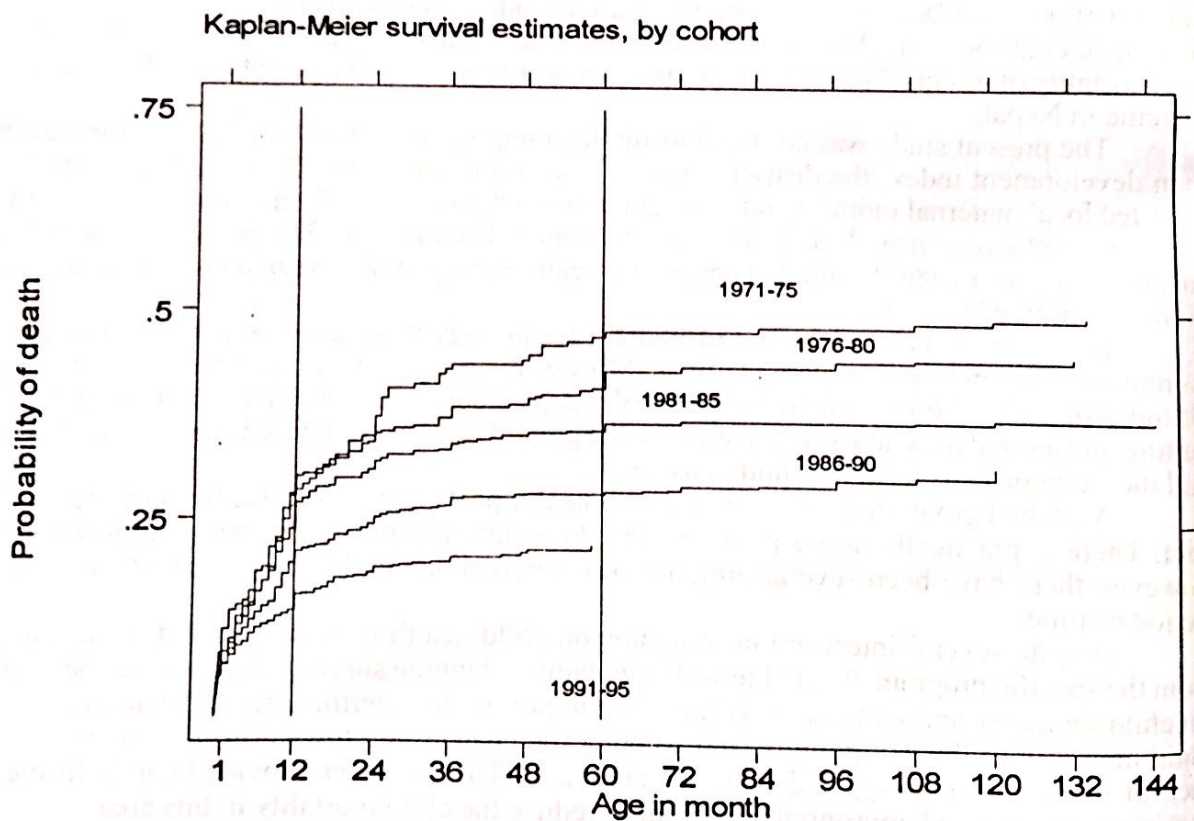
Age-specific mortality among under-5 children in different birth cohorts in shown in Table 1. Of a total 2949 live born children in the period of 1971-1995, 883 (30%) died during their first five years of age. Among all deaths 186 (21%) died in the neonatal period and 461(52%) died after 28 days of life to 1 year of age. 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%,.

Table 1. Age-specific mortality rate among under-5 children in different birth cohorts.

Birth Cohort	Total number Live born N N(row%)	Deaths N	Age-specific deaths per 100 live-birth 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.

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 2. 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 among post-neonates and 1-<5 year children showed a significantly decreasing trend across the cohorts but the trend was not significant in neonatal mortality.

Table 2. 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 socio-economic and biological factors.

* children too young to calculate the risk.

Table 3. Average changes in mortality rate per 1000 live birth by socio-demographic characteristics between 1971-1995

| Variables	Neonatal	Post-neonatal
Ethnic		
High caste	-10	-33*
Low caste	3	-10
Mother's education		
Literate	22	-37*
Illiterate	- 8	-26*
Mother's age		
<20 yrs	15*	-17*
20-24	- 8	-36*
25 and above	- 6	-12
Father's education		
Literate	- 4	-25*
Illiterate	- 5	-22*
Father's occupation		
Farming	- 7	-36*
Trading	- 1	- 5*
Others	-13	- 2

* Significant trend of mortality at p<0.05.

- Total drop in absolute mortality rate through 1971 to 1995.

Table 3 shows changes in mortality trend among neonate and post-neonate by socio-demographic characteristics. Although neonatal mortality rates are declined among the subgroups none of them is significant and surprisingly, the mortality was increased among the young mothers. In contrast among post-neonate children a significant declined trend of mortality was observed over time in all subgroups.

Figure 2 demonstrates the causes of child death reported by their mothers. The major causes of death for the neonates included sudden death (20.9%) and no sucking/no eating (16.8%), and for the post-neonates, diarrhoea (26%) and respiratory tract infection (22.2%). High number of mothers in both groups of the children replied that they did not know the cause.

Figure 2. Reported causes of deaths among neonates and post-neonates.
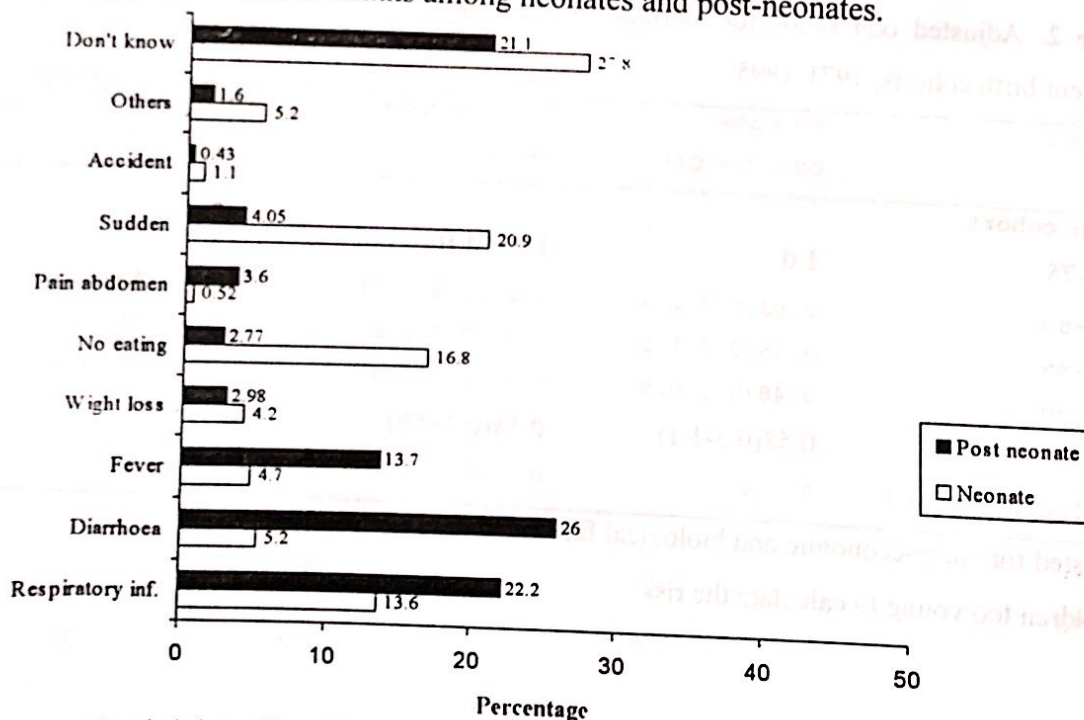
Others include vomiting, cynosis, jaunduce, mouth sore, weaknress and worm infestation

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. 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% in Jumla during the period of 1971 to 1995.

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 prorgram 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]. Other programs, such as FICS and JCHP program were held in the period 1989-1992 and 1992-1994, respectively. These programs also focuses on child health, and included diarrhoeal disease control and treatment, pneunomia 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 (prental, intra-natal, and postnatal care) [15-17].

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 areas, 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 moths 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.

This study has faced limitation regarding the accuracy of information. 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. Under such circumstances it was necessary to resort to 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.

CONCLUSION:

Childhood mortality continued to be higher in the Jumla District than the national and international levels. Most of the Although overall mortality was declining I 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 study revealed poor pregnancy care and childbirth practices, such as giving birth in an animal shed, unattended delivery, and unsafe neonatal care. With the benefit of knowl-

edge and modern medical technology, one part of the world is able to reduce the child mortality less than 1% [18], while Jumla is left far behind with rudimentary health care services and precarious child health. Most of the reported causes of death among post-neonate were preventable by simple medical intervention. 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.

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