ASIA–PACIFIC POPULATION & POLICY

Nepal Survey Shows that "Family Planning Saves Lives"

Results from the 1996 Nepal Family Health Survey (NFHS) show that delaying, spacing, and limiting births can substantially reduce infant and child mortality. Among 33 socioeconomic, demographic, and health variables analyzed, the factors with the largest effects on infant and child mortality could all be addressed by an effective family planning program.

Mortality for children under age five has declined over the past 10 years but is still high by international standards. Between 1981–85 and 1991–95, under-five mortality in Nepal declined by 40 percent—from 196 to 118 deaths per 1,000 births. Nevertheless, Nepal still has one of the highest levels of infant and child mortality in the world. At around the same period as the NFHS, under-five mortality was 117 per 1,000 births in Pakistan, 116 in Bangladesh, 109 in India, 81 in Indonesia, 67 in Thailand, and 54 in the Philippines.

ABOUT THE SURVEY

Conducted from January through June 1996, the NFHS collected data on fertility, family planning, and maternal and child health from 8,429 ever-married women age 15–49. These women provided information on 29,156 children.

Because mortality and its causes vary considerably for different age groups, this analysis distinguishes three categories of under-five mortality—neonatal (first month), postneonatal (exact ages 1–12 months), and child (exact ages 12–60 months) mortality. Because the variables that affect mortality tend to be correlated with each other, it is important to assess what effect each variable exercises on mortality levels independent of other influences. For this reason, all the results reported here use hazard regression analysis to estimate the "adjusted" effects of individual variables after controlling for all other, potentially confounding, variables.

The analysis estimates the effects of 10 demographic variables on under-five mortality. These are: child's year of birth, sex, and birth order; mother's age at childbirth and at first marriage (two variables) and mother's ideal number of boys and girls (two variables); and length of previous birth interval, whether the child has deceased older siblings, and sex composition of the child's surviving older siblings.

Ten socioeconomic variables are also included in the analysis. These are region, urban/rural residence, mother's and mother's husband's education and work status (four variables), ethnicity, mother's exposure to mass media, household economic level, and housing characteristics.

Finally, effects on neonatal and postneonatal mortality are estimated for 13 health- and healthcare-related variables. This portion of the analysis focuses on a subsample of 4,415 children born from 1993 to 1995. The variables covered are: mother's height and weight (two variables), whether the mother has ever

used family planning, whether and when she wanted the pregnancy, whether she had antenatal checkups and how many, whether she was fully immunized against tetanus or took iron and folic acid during pregnancy (two variables), whether she had a long labor or experienced excessive bleeding during delivery (two variables), whether she had a postnatal checkup, whether the delivery was at home or with assistance (two variables), and child's size at birth.

FACTORS RELATED TO FAMILY PLANNING

Eleven percent of all the children covered by the NFHS were born to mothers less than 18 years old, 22 percent had four or more older siblings, and 29 percent of those with an older sibling were born less than 24 months after the previous birth. Results show that all of these factors—young mothers, large families, and short birth intervals—substantially increase under-five mortality risks.

Adjusted mortality for all three age groups is much higher for children of very young mothers than for children of mothers in any other age group (Figure 1). The largest improvements in children's life expectancy occur when mothers wait to give birth until they are at least 20 years old. Neonatal mortality is 69 percent higher for children whose mothers are age 15 at the time of childbirth than for children whose mothers are age 20. Postneonatal mortality is 60 percent higher, and child mortality is 28 percent higher.

Late-born children in large families also suffer high adjusted mortality rates. Neonatal mortality stays fairly constant for first, second, and third children but rises for all children of birth order 4 or above (Figure 2). Postneonatal and child mortality rise steadily—and steeply—as birth order goes up. Neonatal mortality
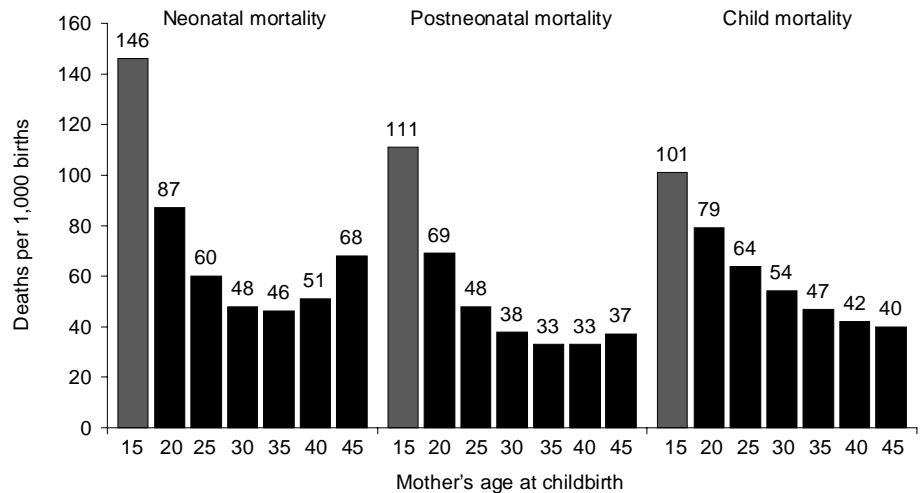

Figure 1 Adjusted neonatal, postneonatal, and child mortality (deaths per 1,000 births) for all children born to the 8,429 ever-married women age 15–49 surveyed by the NFHS, by mother's age at childbirth

Note: Adjusted effects are calculated from a single hazard regression. See note to Table 1.

is 76 percent higher for children born after five or more births than for first-born children, postneonatal mortality is 117 percent higher, and child mortality is 108 percent higher.

In Nepal, as elsewhere, the length of previous birth interval is also an extremely strong predictor of mortality (Figure 3). Adjusted neonatal, postneonatal, and child mortality all drop sharply when the previous birth interval is at least two years. A surprising finding in Nepal is that mortality goes down further when the previous birth interval is extended to three years and still further when the previous birth interval is extended to four years.

SOCIOECONOMIC FACTORS

Nearly all of the children covered by the NFHS (93 percent) live in rural areas. Eighty-seven percent have mothers who are illiterate or have no schooling, and 81 percent have mothers who work outside the home, almost all in the agricultural sector. Fifty percent live in households that do not own a radio, television, bicycle, or telephone, and 57 percent live in households that do not

have piped water, electricity, flooring, or a toilet. Thirty-four percent have mothers who listen to radio every day.

In general, these socioeconomic factors have only limited effect on under-five mortality. For example, although mortality tends to be much higher in rural than in urban areas, the difference shrinks and loses statistical significance when the effects of other socioeconomic and demographic variables are controlled (Table 1). This suggests that much of the urban/rural difference in mortality is due to factors closely related to residence, but not to residence itself.

Mother's literacy has one of the strongest effects on under-five mortality of any socioeconomic variable (Table 1). Interestingly, mortality rates are lower for children whose mothers are literate but have no formal schooling than for children of mothers with only partial or complete primary schooling. Mother's mass media exposure—defined as listening to radio every day—has a small, but statistically significant, effect on postneonatal and child mortality, but not on neonatal mortality. The effect of mother's working outside the home is small and inconsistent.
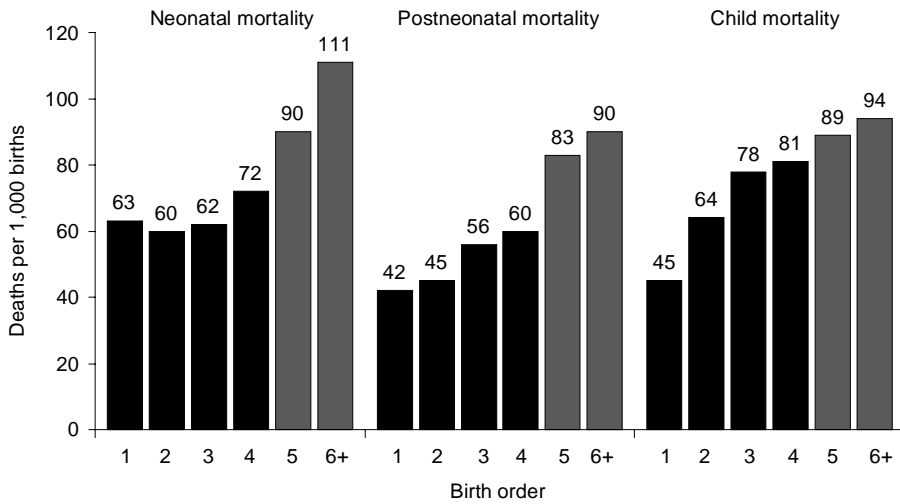
Figure 2 Adjusted neonatal, postneonatal, and child mortality (deaths per 1,000 births) for all children born to the 8,429 ever-married women age 15–49 surveyed by the NFHS, by birth order

Note: Adjusted effects are calculated from a single hazard regression. See note to Table 1.

Mortality rates are slightly lower for children in households with a relatively high economic level, as indicated by ownership of a radio, television, bicycle, or telephone. The effect is statistically significant for postneonatal mortality and nearly so for neonatal and child mortality (Table 1). Housing characteristics—whether a house has water, electricity, flooring, or a toilet—have a significant effect on child mortality, but not on neonatal or postneonatal mortality.

HEALTHCARE INTERVENTIONS

Survey results show that few children in Nepal are receiving the benefits of maternal healthcare. Only 43 percent of all children born during 1993–95 have mothers who received antenatal checkups. Thirty-three percent have mothers who were immunized against tetanus during pregnancy, 23 percent have mothers who gave birth with assistance from a traditional birth attendant, and 37 percent have mothers who received a postpartum checkup.

Results (not shown) indicate positive effects for each of these interventions—antenatal and postpartum checkups, tetanus immunization, and assistance at delivery by a traditional birth attendant. None is statistically significant, however, most likely due to the small size of the subsample.

Children of mothers who are below 145 cm in height have a 70 percent higher risk of neonatal mortality than do children of mothers who are taller. In fact, mother's height is the strongest predictor of neonatal mortality of all the health and healthcare variables.

GIRLS FACE HIGHER RISKS

After the first year of life, girls in Nepal are at significantly greater risk of dying than are boys. Adjusted infant mortality, combining neonatal and postneonatal mortality, is 8 percent higher for boys than for girls, as would be expected on biological grounds, but child mortality is 22 percent higher for girls. Mortality after the first year is influenced more strongly by environmental factors—such as nutrition and healthcare—than by biological factors, which suggests that girls in Nepal receive poorer care than do boys.

Questions on mothers' sex preferences confirm the bias against girls. Sixty percent of the children covered in the survey have mothers who would prefer to have only one daughter, and 11 percent have mothers who do not want any daughters at all.
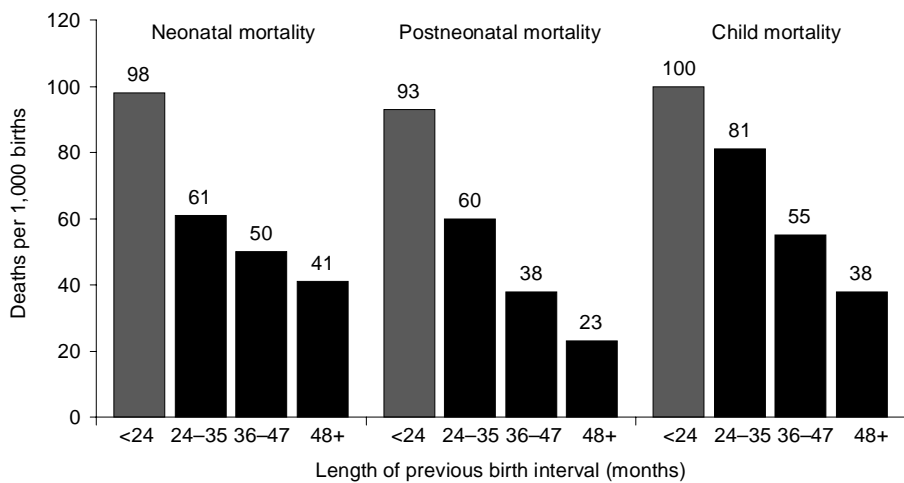

Figure 3 Adjusted neonatal, postneonatal, and child mortality (deaths per 1,000 births) for all second or subsequent children born to the 8,429 ever-married women age 15–49 surveyed by the NFHS, by length of previous birth interval

Note: Adjusted effects are calculated from a single hazard regression as described in the footnote to Table 1, but with 19 other predictor variables.

Table 1 Adjusted effects of six socioeconomic characteristics on neonatal, postneonatal, and child mortality (deaths per 1,000 births) for all children born to the 8,429 ever-married women age 15–49 surveyed by the NFHS

	Mortality		
	Neonatal	Postneonatal	Child
Residence			
Rural†	71	56	69
Urban	62	44	56
Mother's literacy			
Illiterate†	72	59	74
Literate but no schooling	63	26*	49
Schooling: primary or less	69	53	55*
Schooling: secondary or more	47*	33*	29*
Mother's exposure to mass media			
Listens to radio daily	73	47*	61*
Does not listen to radio daily†	69	60	72
Mother's work status			
Works outside the home	68*	57*	68
Does not work outside the home†	78	49	64
Household economic level			
Radio, television, bicycle, or telephone	67	52*	64
No radio, television, bicycle, or telephone†	73	58	71
Housing characteristics			
Water, electricity, flooring, or toilet	68	55	58*
No water, electricity, flooring, or toilet†	72	55	76

Note: Adjusted effects are calculated from a single hazard regression so that rates tabulated by one predictor variable incorporate controls for 16 other predictor variables. Variables are controlled by setting them at their mean values for all children covered by the 1996 NFHS (neonatal mortality), all such children who were alive and at least one month old at the time of the survey (postneonatal mortality), and all such children who were alive and at least one year old at the time of the survey (child mortality).

†Reference category in the underlying hazard regression.

*Variable coefficient in the underlying hazard regression is statistically significant at the 5 percent level.

POLICY IMPLICATIONS

Children born to very young mothers and children born after four or more previous births suffer particularly high mortality rates. Thus efforts to reduce under-five mortality in Nepal should focus on family planning programs that target young mothers and mothers with large families. In addition, children born less than 24 months after a previous birth face especially high mortality risks. This suggests that programs to promote temporary contraceptive methods for child spacing can also play an important role in reducing under-five mortality.

As in other countries, children whose mothers are literate face lower mortality risks than do children of illiterate mothers. The additional finding that mother's literacy has a stronger effect on under-five mortality than does moth-er's minimal formal schooling suggests that women's literacy programs have an important potential for increasing the wellbeing of children. The relatively high mortality rates for girls after the first year of life provide strong evidence that health and nutrition programs need to pay particular attention to girls.

Four maternal healthcare interventions could play a significant role in reducing mortality during the first year of life—antenatal and postpartum checkups, antenatal tetanus immunization, and assistance at delivery by a traditional birth attendant. Yet very few women are currently receiving these services. Improvements in women's long-term nutritional status could also make an important contribution toward increasing child survival.

Finally, these results highlight the importance of multivariate analysis, controlling for the effects of potentially confounding variables, in interpreting survey data for policy recommendations. For example, a preliminary analysis suggests that first-born children and children whose mothers are over age 40 are at a particularly high risk of mortality. Combining the analyses of birth order with mother's age at childbirth, however, reveals that first-born children are only at particularly high mortality risk if their mothers are very young, while children of older mothers are only at high risk if they are born into families that already have many children.

FURTHER READING

Norman Y. Luther and Shyam Thapa. 1999. *Infant and child mortality in Nepal.* East-West Center Working Papers Population Series No. 105. Honolulu: East-West Center.