Changes in Fertility Patterns Can Improve Child Survival in Southeast Asia

HIGH rates of infant and child mortality in developing countries are a focus of worldwide concern and also a stimulus for policy change and action. Despite the impressive achievements of child survival projects in many areas, lasting solutions are still elusive. Policymakers and program planners need new knowledge on which to base service-delivery strategies to reduce the incidence of childhood illness and death.

A new study from the Philippines makes use of the detailed data on fertility and infant mortality collected in the 1988 National Demographic Survey to add to the understanding of infant and child survival. In a more thorough analysis than has been previously attempted, researchers Chai Bin Park, Andrew Kantner, and Marina F. Jose, of the East-West Center's Program on Population, and Josefina Cabigon and Josefa Zafra of the Population Institute, University of the Philippines, sort out the direct and indirect effects of several key determinants of childhood mortality in the Philippines.

A new study, based on data from the Philippines, Indonesia, and Thailand, identifies the links between infant deaths and high-risk fertility behavior.

By comparing their findings with information from Indonesia and Thailand, they have come up with a regional picture of the causal dynamics of child survival in Southeast Asia. Their results point out the links between infant deaths and high-risk fertility behavior, underscoring the importance of family planning as a child-survival intervention in the region.

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In the Philippines, the odds of having an infant die were found to be 39% lower when women spaced their children more than two years apart—indicating that contraception for birth spacing can substantially reduce infant mortality.
Despite declining overall death rates, infant mortality in the Philippines has not decreased significantly over the past two decades. An estimated 57 infants per 1,000 live births die before their first birthday—down only slightly from a level of 64 in 1976.

High infant mortality may cause women to have more children than they want in order to achieve their desired family size. In any case, fertility in the Philippines remains high. Although the trend has been declining over the years, the total fertility rate is still around four children per woman.

A child’s chance of surviving the first year of life has been found to depend on several factors: the number of children already in the family, the spacing of those children, the mother’s age and education, and risks of malnutrition and infection. Among these factors, the role of the birth interval has been particularly well studied. Results generally show an increased risk of death for a child born before or after a short interval—usually 24 months or less.

Although the effects of short birth intervals and other demographic and socioeconomic factors on child survival have been well documented, their dynamics are not well understood. In many developing countries, data have not been available to analyze the interactions among the various risk factors and to determine the direction and strength of their effects. The few attempts to arrive at such a “causal ordering” of risk factors have made use of a two-stage model for analyzing child mortality. The model suggests that some demographic and socioeconomic factors affect infant mortality directly, whereas others have only indirect associations.

By applying this model to data from Indonesia and Thailand, researchers have found that two factors, the survival status of the previous child and the length of the preceding birth interval, have a direct effect on a child’s survival past the first year of life. Other determinants—maternal age and education, birth order, place of residence—act as “background variables.” Their effect on child survival is to change the length of the birth interval rather than directly influence the probability of death.

The availability of detailed information on pregnancy histories from the most recent National Demographic Survey for the Philippines has made it possible to undertake a similar analysis for that country. East-West Center researchers Park et al. applied these data to the same two-stage model to analyze the determinants of infant and child mortality. Their investigation focuses on the causal ordering of explanatory variables and identifies direct and indirect effects of selected determinants.

**Methods**

The researchers made use of data from the 1988 Philippine National Demographic Survey (NDS) to test the two-stage causation model for infant mortality. The 1988 NDS surveyed 13,716 ever-married women of ages 15–49. Respondents provided a 10-year pregnancy history along with shorter-term information on maternal and child health. The NDS sample also included 20,015 index children born during the 10-year period from January 1977 to February 1987.

Infant mortality was defined in the study by the survival status of the index child through infancy (0–12 months of age). The researchers analyzed six explanatory variables: (1) mother’s age at the time of the index child’s birth, (2) birth order of the index child, (3) survival status in infancy of the immediately preceding child, (4) length of the previous birth interval, (5) mother’s education, and (6) place of residence. These variables were chosen on the basis of their strong associations with child survival, as demonstrated in previous research.

The six variables were first analyzed for their independent association with infant mortality. Then, to introduce some causal ordering to the analysis, the researchers controlled for the effect of birth interval. In this way, they could assess whether independent factors had direct effects on infant mortality or whether their influence was mainly indirect—that is, by altering the length of the birth interval. The final step was to compare the findings from the Philippines with corresponding data from Indonesia and Thailand.

The results are expressed as odds ratios. These are measures of the mortality risk in the two groups of children studied for each variable.

**Findings and Policy Implications**

The two-stage causation model was consistent with the Philippine data. According to the authors, “maternal age, birth order, mortality of the previous child, and maternal education directly affect the birth interval, while indirect effects of these background variables operate through the birth interval to influence infant mortality. In addition, mortality of the previous child, birth order, and educational attainment of the mother have direct effects on infant mortality.”

Despite the widely different cultures and levels of family planning program effectiveness in the Philippines, Indonesia, and Thailand, the authors conclude that “explanatory factors that directly influence infant mortality appear to be similar” among the three countries.

The authors highlight the following findings:
• The most important factor in predicting child survival is the survival status of the previous child.

In all three countries, infants were shown to be at greatest risk if their immediately preceding sibling had died within 12 months of birth (see Table). This effect was strongest in Thailand, where a child whose preceding sibling had died in infancy was more than three times as likely to die in the first 12 months of life than a child whose previous sibling had survived infancy.

A child’s death in infancy puts the next child at increased risk of death for three main reasons: (1) lack of time for the mother’s body to recover fully after the last pregnancy (“maternal depletion”); (2) associated nutritional deficits for the infant, and (3) transmission of infectious disease among siblings. The authors suggest that these may be among the most important determinants of infant mortality in Southeast Asia. They conclude that high infant mortality is likely to be clustered within households where poor environmental conditions increase children’s vulnerability to illness and death.

• A child’s survival chances improve with longer intervals between births.

In all three countries, the odds of having an infant die were lower (39% lower in the Philippines) when women spaced their children more than two years apart. According to the authors, this finding strongly supports the view that contraceptive use for birth spacing can have a substantially beneficial impact on the rate of infant mortality.

The odds of having a short birth interval were found to be 133% greater for young (under age 25), urban women than for older women living in rural areas. The urban/rural contrast was more apparent in the Philippines than in Indonesia and Thailand, implying to the authors that “young urban women in the Philippines are less inclined to space their children (and therefore run higher infant mortality risks)” than their urban counterparts in Indonesia and Thailand. The authors conclude that family planning delivery strategies designed to lengthen birth intervals should give priority attention to adolescents and young married women in the urban areas of the Philippines.

In the Philippines, family planning delivery strategies designed to lengthen birth intervals should give priority attention to adolescents and young married women in urban areas.

• Infant mortality risks grow with an increase in parity.

Although short birth intervals were more important than the number of children in predicting a child’s survival chances, infant mortality risks clearly increased with an increase in birth order. In the Philippines the odds for survival increased by 29% if an infant represented a second-order birth, rather than a third- or higher-order birth. This finding further underscores the importance of family planning as a child survival intervention in Southeast Asia.

• In the Philippines and Indonesia, but not in Thailand, maternal education is an important predictor of infant survival.

In the Philippines, the odds of infant survival decreased by 22% when the mother had only an elementary, or lower, level of education. The lack of effect for Thailand may be a reflection of more universal and higher levels of education among women in that country.

• Maternal age is an important factor in predicting survival.
factor in Indonesia but not in Thailand or the Philippines.

Infants born to adolescent women in Indonesia were found to be at far greater risk of dying than were those infants born to older mothers (ages 20–29), and this difference was far more pronounced in Indonesia than in the Philippines or Thailand. This finding suggests that specialized family planning services need to be more effectively directed toward adolescents in Indonesia.

- Place of residence is not an important determinant of child survival.

When considered together, such factors as the preceding child’s survival status, length of the preceding birth interval, birth order, and mother's education appeared to outweigh urban-rural differences in socioeconomic status when predicting child survival. This finding suggested to the authors that family planning interventions can substantially reduce the risk of infant mortality in widely differing socioeconomic and environmental settings.

### Conclusion

Improving the health of children and preventing infant deaths are goals of child survival programs throughout the developing world. Providing family planning information and services can bolster these programs by helping couples avoid high-risk pregnancies and births.

This study identifies clear priorities for service delivery. A key finding was the link between infant survival and the survival status of the previous child. A child’s death in infancy results in a cessation of breastfeeding and a desire to replace quickly the child who has died. Thus, an infant’s death shortens the next birth interval and perpetuates the ill effects of close birth spacing. This finding, along with others related to high-risk childbearing patterns, underscores the benefits of delaying the next conception and extending the birth interval. These benefits persist across socioeconomic and geographic settings.

Other determinants of child mortality—birth weight, duration of breastfeeding, access to and use of health services—could not be addressed in this study. They should be important factors in any future consideration of infant mortality, along with questions of how abortion and the spread of sexually transmitted diseases are modifying birth intervals and infant mortality risks. The authors conclude that “as demographic and health surveys collect more extensive information on these and other topics in the future, it will be possible to conduct more refined causal analysis of infant mortality.”

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