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# Research Paper

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## The Effect of Child Mortality on Fertility

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Using the data derived from the 1996-97 Bangladesh Demographic and Health Survey, this investigation attempts to examine the relationship between the child mortality and fertility. Child mortality is one of the postpartum variables contributing to high fertility. The results of multiple classification analysis suggested that the couples who had the experience of child death had higher mean number of live births.

**Key words:** Fertility, child mortality, multiple classification analysis, path analysis

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## Introduction

Child mortality and fertility are interrelated factors, one influencing the other. That is to say in the societies, where the child mortality is higher, the fertility is correspondingly higher. A high level of childhood mortality keeps the fertility at a higher level through both biological and behavioral mechanisms (Preston, 1978; Chowdhury *et al.*, 1992). During the 1970, a large number of studies were conducted on the effect of child mortality on fertility. Most of the research work attempted to measure the both biological and behavioral effects (Coombs, 1974; Demeny, 1972; Ginneken *et al.*, 1974). The biological effects occur when the early death of a child exposes a mother to a high risk of subsequent conception because of the abrupt truncation of breast feeding. As a result of this effect, in a population where voluntary control of fertility is absent, child mortality results in excess fertility (Chowdhury *et al.*, 1976).

In developing hypothesis, demographers have identified a replacement effect and an insurance effect to explain the behavioral effect of child mortality on fertility. The replacement effect hypothesis proposes that fertility control will be low among parents whose child dies, because they will continue childbearing to replace the child they lost (Rahman, 1998). Taylor (1976) are of the view that so long as the parents do not expect that most of their children will survive, it is unreasonable to expect them to be interested in fertility reduction. Experience with child mortality may pressurize parents to have additional children either to 'replace' those who have already died or as an 'insurance' against the expected deaths (Gopal and Mouli, 1981).

Therefore, the objective of this investigation is to examine the childhood deaths of mothers and their relationship with mean number of live births.

## Materials and Methods

**Source of Data:** This study utilizes the data derived from the 1996-97 Bangladesh Demographic and Health Survey (BDHS, 1996-97). In conducting this survey, a two-stage probability sample design was used. At the first stage a sample of clusters was drawn. Each selected cluster was then mapped and all households were listed. At the second stage, a sample

of households was selected within area. Thus, a total of 9099 households were selected, of which 8682 were successfully interviewed. Finally in these households, 9335 ever married women under 50 years were identified as eligible for the individual interview and interviews were completed for 9127 or 98% of them. The 1996-97 BDHS was conducted by Mitra and Associates with technical support from Macro International, U. S. A and NIPORT jointly.

**Statistical Analysis:** The dependent variable is number of children ever born (CEB). The control variables are those known to or thought to influence CEB. They include respondents' age. The multi variate analysis includes other socioeconomic variables to know whether child mortality contributes to the explanation of fertility differentials over and above other demographic and socioeconomic variables that are usually considered important in determining CEB. This study uses multiple classification analysis (MCA) in order to assess the impact of child mortality on fertility. The gross effects of MCA are the actual means of the dependant variable in each subclass of the independent variables. The net effect measures those of the predictor alone after taking into account the effects of other predictors. The net effect indicates how women in a given subgroup differ from the women in other. Analysis of variance (ANOVA) technique (Graybill, 1961) has also been applied to ascertain the statistical significance and association between the CEB and the number of children died when some socioeconomic and demographic factors are controlled.

## Results

Table 1 presents the results of multiple classification analysis of the effects of selected variables upon number of children ever born. An inverse relationship has been observed between the number of child deaths that the mothers experienced and their fertility behavior. For example, the mean number of children ever born (CEB) for the mothers who did not have the experience of child death was the lowest With 2.67 (Grand mean-net effect), whereas the mean number of live births for the mothers who had the experience of one child death was 3.77 and it was 5.33 for the mothers with the experience

Table 1: Multiple classification analysis of the effect of selected variables upon number of children ever born (CEB)

| Independent variable                  | N    | Gross effect | Eta  | Net effect | $\beta$ |
|---------------------------------------|------|--------------|------|------------|---------|
| <b>Number of children died</b>        |      |              |      |            |         |
| None                                  | 6008 | -1.02        | 0.63 | -0.57      |         |
| 1                                     | 1930 | 1.10         |      | 0.53       | 0.37    |
| 2+                                    | 1164 | 3.42         |      | 2.09       |         |
| <b>Respondent's education</b>         |      |              |      |            |         |
| None                                  | 4966 | 0.49         |      | 0.09       |         |
| Primary                               | 2481 | -0.16        | 0.26 | 0.08       | 0.08    |
| Secondary                             | 1655 | -1.22        |      | -0.40      |         |
| <b>Place of residence</b>             |      |              |      |            |         |
| Rural                                 | 8044 | 0.08         | 0.09 | 0.04       | 0.05    |
| Urban                                 | 1057 | -0.63        |      | -0.33      |         |
| <b>Ownership of agricultural land</b> |      |              |      |            |         |
| No                                    | 3768 | 0.01         | 0.00 | -0.02      | +0.01   |
| Yes                                   | 5334 | -0.01        |      | 0.01       |         |
| <b>Ownership of radio</b>             |      |              |      |            |         |
| No                                    | 5955 | 0.11         | 0.06 | 0.04       | 0.04    |
| Yes                                   | 3146 | -0.21        |      | -0.07      |         |
| <b>Work status</b>                    |      |              |      |            |         |
| Not working                           | 5716 | -0.12        | 0.06 | 0.06       | 0.06    |
| Working                               | 3385 | 0.21         |      | -0.09      |         |
| <b>Mobility status</b>                |      |              |      |            |         |
| Cannot move alone                     | 7314 | 0.00         | 0.00 | 0.04       | 0.03    |
| Can move alone                        | 1788 | -0.01        |      | -0.18      |         |
| <b>Religion</b>                       |      |              |      |            |         |
| Muslim                                | 8144 | 0.03         | 0.04 | 0.05       | 0.06    |
| Non-Muslim                            | 958  | -0.27        |      | -0.40      |         |

Grand mean 3.24  $R^2$  0.658+ Main effect of this variable is insignificant at 5% level.

Table 2: Analysis of variance of the mean number of CEB according to the selected characteristics of ever married women under 50 years of age.

| Source of variation               | Sum of squares | DF   | Mean squares | F        |
|-----------------------------------|----------------|------|--------------|----------|
| Covariate (Age of the respondent) | 29125.89       | 1    | 29125.89     | 13820.75 |
| Main effects                      | 7791.82        | 10   | 779.18       | 369.74   |
| Number of children died           | 5954.60        | 2    | 2977.30      | 1412.72  |
| Respondent's education            | 1191.63        | 2    | 595.81       | 282.72   |
| Place of residence                | 260.17         | 1    | 260.17       | 123.46   |
| Ownership of agricultural land    | 4.53           | 1    | 4.53         | 2.15     |
| Ownership of radio                | 33.86          | 1    | 33.86        | 16.07    |
| Work status                       | 36.94          | 1    | 36.94        | 17.53    |
| Mobility status                   | 83.60          | 1    | 83.60        | 39.67    |
| Religion                          | 226.49         | 1    | 226.49       | 107.47   |
| Explained                         | 36917.71       | 11   | 3356.16      | 1592.56  |
| Residual                          | 19156          | 9090 | 2.11         |          |
| Total                             | 56073.78       | 9101 | 6.16         |          |

Raw regression coefficient of the Covariate 0.009

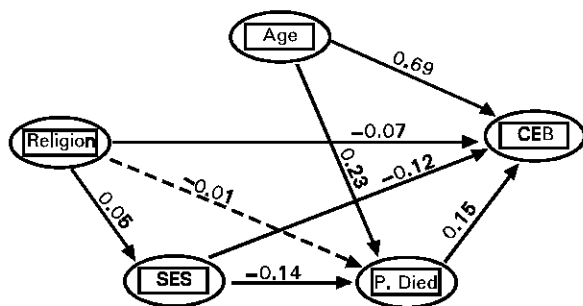


Fig. 1: Path diagram for factors affecting fertility

of two or more child deaths. Among the independent variables, child mortality has the strongest influence ( $\eta = 0.63$ ,  $\beta = 0.37$ ) on the variation of live births. Therefore, it may be concluded that experience of child deaths was the cause for higher mean number of live births.

The analysis of variance in Table 2 showed that raw regression coefficient of the demographic covariate is positive. The covariate accounted for 79% of the total explained variation. Among the demographic and socioeconomic variables, child mortality accounts for more than 50% of the main effects on fertility. This findings may suggested that among the socioeconomic and demographic variables, child mortality is the strongest driving force on fertility. Using a linear recursive path model which provides a direct and indirect relationships between the variables. The relationships among the variables included in the model are shown in the path diagram presented in Fig. 1.

Path analysis is a standardized multiple regression technique in which a chain of relationship among the variables arranged in an orderly manner examined through a series of regression analysis. It gives a quantitative interpretation of the inter-relationships within a known or an assumed causal relationship that exists in some specific population. It also aims to determining the direct and indirect influence of a number of independent variables on the dependent one. Such effects are measured by partial regression beta weights and are called path coefficients.

In the path diagram all the postulated relationships are shown as unidirectional arrows or paths to indicate the causal linkages. In other words, each variable can be affected by the variables lying to the left of it and can influence any variable to the right of it. Four important variables were selected for path analysis and they form the independent variables and number of children ever born (CEB) as the dependent variable. The independent variables are: age of the respondents, socioeconomic status (index), religion (a two category variable

coded unity if the women is non-muslim, zero otherwise), proportion of children died (number of children died divided by number of children ever born). Except the socioeconomic factor, all other variables were single factors.

The socioeconomic status index included seven variables viz., education of the respondents, access to mass media (watch television every week), mobility status, employment status, ownership of agricultural land, electricity connection in the household, ownership of radio. In developing the index all the variables and their score values were included. The principle involved in the path analysis is that any correlation coefficients between two variables or overall measures of empirical relationships are liable for decomposition into a series of paths. The effects are measured by partial regression weights and they are also called as path coefficients. The paths shown in the (Fig. 1) contains the appropriate numerical value of the standardized path coefficients. The path coefficients which are significant at 5% level, are shown as solid lines and those which are not significant by broken lines. In general, the variables that have very small path coefficients are not statistically significant.

Fig. 1 suggested that age has a strong direct effect (0.69) on the number of CEB, which is consistent with the expectation that older women have more children than the younger. Both religion and socioeconomic status index (SES) has negative direct influence on parity. This implies that non-muslim women are less likely to have more children than the muslim women. Proportion of children died has a direct positive effect (0.15) on fertility.

SES has direct negative effect (-0.14) and age of the respondent has direct positive effect (0.23) on proportion of children died. SES has also indirect effect on fertility through proportion of children died (-0.14 x 0.15 = 0.021). Similarly Religion has indirect effect on parity through SES and proportion of children died.

### Discussion

It was observed that the mothers who had the experience of child deaths had been associated with higher fertility. The risk of child deaths has stimulated the couples to have a higher mean number of live births. The findings are supported by the study of other authors (Mosley and Chen, 1984; Roy and Jeyachandran, 1996). Since child mortality motivates the couples to replace the dead child it implies that child survival schemes have to be popularized through better implementation of health services and improving the socioeconomic status of women through increased female education for further decline in fertility. It is postulated that maternal education inculcates modern health knowledge, beliefs and practices; improves the effectiveness of health behavior (feeding practices, child care etc.); and changes the

mother's role within the family, enabling her to take the necessary measures to prompt child health, including effective use of modern health services (Cleland and Ginneken, 1988; Gunasekran, 1997). Government and non-Government organizations also might popularize the old age security schemes so that people come forward to limit the number of live births. Without that prior mortality decline, there would have been much less latent demand or need for birth control and any attempts to popularize family planning would have failed.

In all the probability, there would have been no family planning program, because population growth would have been modest. Family planning programs are a social response to changing mortality. In this sense, also, mortality decline was a chronologically remote but crucial cause of the fall in fertility.

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