

Socioeconomic and Health Implications of Adult Deaths in Families of Rural Bangladesh

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ABSTRACT

Effects of adult deaths on subsequent health and socioeconomic well-being of rural families of Bangladesh were examined. Data for this study were drawn from the longitudinal Sample Registration System (SRS) operational in two rural areas of the then MCH-FP Extension Project (Rural) of ICDDR,B. In total, deaths of 327 married adults aged 15-59 years, during January 1983-December 1987, were reviewed. The families of the deceased were followed up for five years after death. Factors, such as survival status of children, educational status of children aged 6-12 years, and out-migration status among adolescents aged 12-20 years in those families, was observed and recorded. A control group of 3,350 families experiencing no adult deaths was also followed up for five years. The health and socioeconomic impacts on children in both the groups five years after death of the adult were compared. The findings of the study showed that negative impact was more pronounced among the children of poor families, and the female children were most severely affected. Death of a father or a mother was associated with a higher rate of out-migration (especially marriage) of adolescent daughters. An adult death was associated with a significantly higher mortality risk of children during the five years following death of the adult. These child-mortality risks were significantly higher when an adult female died, and when the index child was a female and/or aged less than five years at the time of death of an adult. The children, aged 6-12 years, in families where a parent had died were significantly more likely to be uneducated and out-of-school after the death of a father or a mother compared to the children in families where neither of the parents had died. This finding remained valid even after controlling for the educational status of the parents who died and of those who did not die. Since the study used a limited number of independent variables and since there is a need to understand the specific reasons why such significant differences occurred, it is recommended to conduct a more in-depth qualitative study to know more clearly the nature and mechanisms of the socioeconomic and health impacts of death of an adult on the family and the society.

Key words: Mortality; Child mortality; Health status; Socioeconomic factors; Education; Migration; Impact studies; Bangladesh

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INTRODUCTION

During the past two decades, infant and child mortality rates have reduced universally, and improvements in reproductive health and some reduction in maternal mortality have also been achieved (1). Little academic attention has been given to the level and determinants

of overall adult mortality in developing countries. Moreover, little information is available on the consequences of adult deaths (male or female), particularly with regard to its socioeconomic and health impacts, on the family.

In 1974, a substantial difference (2.8 vs 3.4 per 1,000) between male and female adult death rates was observed at Matlab, Bangladesh (2). Among women of reproductive age who die prematurely, approximately one-fifth die due to maternity-related complications (3). Results of studies showed that, after controlling for maternity-related deaths, the adult female death rate had reduced from 3.4 to 2.5 per 1,000, which is still lower than the adult male death (3,4). Results of the study by Chen *et al.* also showed that only 12% of infants whose mothers died during delivery survived for two months, and only 5% survived for one year (3). Results of other studies in Matlab indicate an enormous gap between the one-year survival rates of infants whose mothers had died (25%) during delivery or within 42 days after delivery, and those (91%) whose mothers had survived (5,6).

Death of an adult member in a family creates many problems for the surviving members. Premature death of the principal income-earner often inflicts serious financial hardship on the family. Since the male provides major financial support to a traditional family, his premature death generally results in the discontinuation of this essential source of income. The situation is particularly serious for young widows since they often have dependent children to care for. In many cases, the women have never worked and have a low level of education or none at all, which limits their opportunities for any higher-paying jobs. Widows are generally compelled to seek employment at the expense of their child-rearing responsibilities. If they have young children, it is often difficult to provide care to them during working hours. Family conflicts may arise as a consequence of unrealistic expectations of other surviving family members under the new circumstances. Such conflicts may result in decreased family solidarity (7).

Although women entering widowhood at an older age are not likely to have young dependent children, they often face the problems of self-support. Since their chances of re-marriage are minimal, they become economically dependent either on their relatives or on their grown-up children, if they have any.

Gender differences become particularly apparent when a spouse dies. Although there is no stigma attached to a man whose wife dies, the position of a woman whose husband has died is markedly different (8).

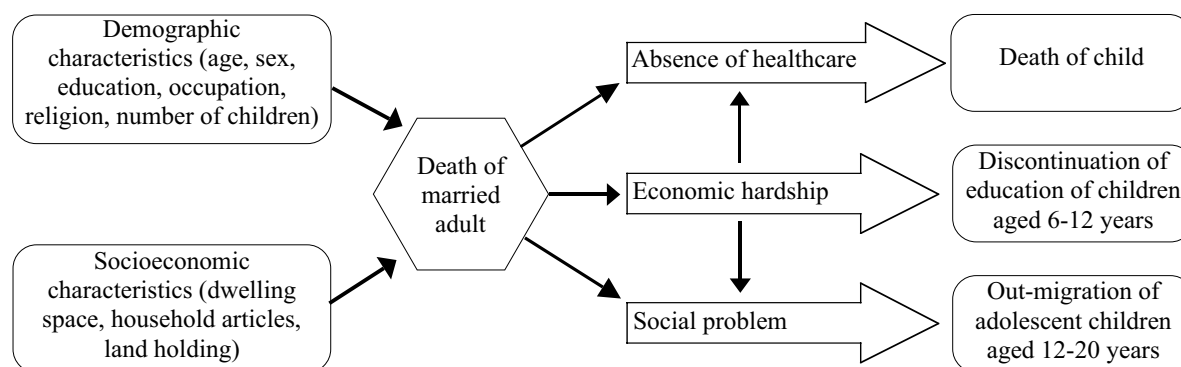
The consequences of an adult death on child health and mortality depend largely on the general economic conditions of the household. For poor families, a mother's outside work or her death may result in negligence or lack of care to a child by other family members, while a wealthy family may hire a skilled and attentive nursemaid (9,10).

In rural Bangladesh, adult males comprise the majority of the labour force and are usually the main income-earners for the families. When the income-earner dies, a substantial decrease in earnings places the household at risk of hunger, poor healthcare, malnourishment, and more limited educational opportunities. The relative risk of a severely-malnourished child coming from a household with an incapacitated earner is 2.5 times greater than that in households without an incapacitated earner. The relative risk is even higher in families where the earner of a household dies (11).

Parental educational level can affect child survival by influencing their choices and increasing skills in healthcare practices relating to contraception, nutrition, hygiene, preventive care, and treatment of diseases (12). When a father or a head of a household dies, children may not continue their education, and the family is likely to accept employment or migrate to an urban area for jobs. This may involve relinquishing the village home. These disruptions play a big role in child truancy.

The conceptual framework given in the next page shows the effects of both demographic and socioeconomic factors on death of a married adult in a family and its consequences on subsequent well-being of a child in that family.

We carried out this study mainly to: (a) examine the impacts of an adult death (male or female) on the socioeconomic and health status of his or her family; and (b) specifically to: (i) examine the current demographic and socioeconomic characteristics of families that have experienced any adult death(s) during the study period; and (ii) assess the subsequent effects on child mortality, child education, and out-migration of adolescent children during a five-year period following adult deaths compared to families which have not experienced any adult deaths.



Source: Mosley WH *et al. Pop Dev Rev* 1984;10(Suppl):25-45 (12)

MATERIALS AND METHODS

Data for this study were collected from the Sample Registration System (SRS), a longitudinal data-collection mechanism operating in two rural upazilas of Sirajganj district and Abhoynagar in Jessore district since 1982. It is a collaborative effort between the Ministry of Health and Family Welfare, Government of Bangladesh and the ICDDR,B: Centre for Health and Population Research.

The SRS information was derived from interviews conducted in a sample of households of the two upazilas identified through scientific sampling methods. The SRS collects data on vital events: births, deaths, migrations and marriages; socioeconomic characteristics; and healthcare-seeking behaviour in the project areas. The SRS warrants a high level of thoroughness and accuracy of data. This is unprecedented in a society characterized by poor socioeconomic conditions. A fieldworker visits each household in the SRS once every two months to record any changes that occurred since the previous visit. These data are then computerized using mini-computers in Dhaka (13). The resulting database is used for investigation of fertility, mortality, nutrition, and other health and family planning-related issues.

Data on all married adults, aged 15-59 years, collected from the two upazilas, during January 1983-December 1992, were extracted from the SRS longitudinal database files. The study analyzed data on all reported deaths of married adults ($n=327$) during January 1983-December 1987. For each adult death, information on age, sex, marital status, education level, date and place of death, and treatment sought before death was collected.

The families of all deceased were observed for five years following the date of death. Children were either

followed for five years from the date of death of the adult family member or were otherwise earmarked using an appropriate exit status indicator to record whether the child had died or had migrated out. In total, 750 surviving children in families of the deceased were identified, and information on their date of birth, sex, and educational achievement was collected.

The households having only married adults who survived ($n=6,700$) and did not migrate out during the reference period served as the comparison group. In total, 14,366 children of these adults, who were with the family and had survived by December 1987, were followed from January 1988 to December 1992. Children who were born within this period were also included and followed. Information on the children of the comparison group was collected exactly in the same manner as was for the study group. For the comparison group, age of the adult was recorded as of 1 January 1988.

Special socioeconomic survey (SES) data from the same families were consulted to determine the socioeconomic history of the families for both the groups. For the purpose of this study, ownership of arable land and household space were used as proxies for the economic status.

Rural families without any land and owning less than one acre of arable land were considered poor. Rural families with one to three acre(s) and those with three acres or more arable land were considered medium- and high-economic groups respectively. Families with <170 sq ft of household space were termed as having small and those with 170 to <350 sq ft, and 350 sq ft or more were termed as having medium- and high-household space respectively. There is a process for continuous updating of the educational status of children in the

sample area each year. Thus, educational information was extracted from the file updated in 1993. In this study, both bivariate and multivariate logistic regression analyses were performed to determine the effects of adult mortality on the family.

For multivariate analysis, the dependent variables included child mortality, education of children aged 6-12 years, and emigration of adolescent children aged 12-20 years. A dichotomy of 1 and 0 of each of the dependent variables was used. For the child mortality variable, a child, aged less than five years, who died was treated as 1, and if survived was coded as 0. Similarly, for child education—a child aged 6-12 years having no education was coded as 1 and with education was coded as 0; an adolescent child aged 12-20 years if migrated out was coded as 1, otherwise it was coded as 0. The independent variables were also entered into the logistic regression as dichotomous variables or categorical variables. The independent variable, survival status and sex of the adult, was coded as 1 if mother died in a family and 0 if she survived. For other independent variables, coding was done as follows: child's sex: male=1, female=0; child's age: <5 years=1 and 5+ years=0; and the number of living children: <3 children=1 and 3+ children=0; education of the deceased: no education=0, primary=1, and above primary=2; household area: <170 sq ft=0, 170-349 sq ft=1, and 350+ sq ft=2; and cultivable land owned by the family: landless=0, 1-100 decimal(s)=1, 101-300 decimals=2, 301+ decimals=3.

RESULTS

Characteristics of adult deaths

Table 1 shows the distribution of adult population in both study (adult deaths) and comparison groups according to their various demographic and socioeconomic characteristics. The number of deaths of female adults that occurred during January–December 1987 was higher than that of male adults. Moreover, 45% of the deaths of male adults occurred between the age of 50 and 59 years, whereas it was 27% in the case of female adults. About two-fifths (38%) of all deaths of female adults occurred during the early reproductive age (15-29 years), whereas it was 16% in the case of male adults.

Of the study population, 88% were Muslims, and 12% were from other religions, which was comparable with the findings of other studies conducted in other areas of Bangladesh (14).

Educational status was lower among the deceased group than the non-deceased group, for both males and females. Twenty-nine percent of the married female adults who died had no living children. The women who died at the time of their first pregnancy outcome fell into this group. Only 3% of the married adults of the families in which there were no adult deaths had no living children.

Most people in the study area (also fairly adult representative of rural Bangladesh in general) were poor. Only 16% and 22%, respectively, of the male and female adults died in families which owned four or more items of articles in their possession; this figure was 30% in the families without any adult death. Deaths of male adults took place more than that of female adults in the families that were either landless or had only one acre of land. The situation was reversed in the case of the groups that had more land.

In terms of occupation of adult females, most women were housewives in the group where no adult died. In the group in which an adult died, some women had businesses, and some were disabled. In the families in which an adult male had died, the male adult was more likely to be a labourer than the adult males in the families that experienced no adult death. The percentage of adults who were disabled or had other professions was higher in the study group than that in the comparison group.

Logistic regression analysis

Statistically significant results of logistic regression analysis, using child mortality, child's education, and child's out-migration as the dependent variables, are shown in Table 2-4. The results are shown in terms of odds ratios obtained by taking the exponential function of estimated regression coefficient.

Table 2 provides two models relating to the effects of mortality and sex of the adults who died and other demographic and socioeconomic factors on child mortality. The Model 1 shows that there was a strong relationship between sex of the adult who died in a family and subsequent death of children in that family. The odds of child death was 61% higher in the five years following death of a female adult in a family than the family that experienced death of a male adult within that period. The Model 1 also shows that, as expected, death among children aged less than five years was significantly higher ($p < 0.001$) in the families that experienced an adult death than it was for children aged five years and more. The likelihood of mortality among the female children was

22% higher than it was among the male children, and this difference was also statistically significant ($p < 0.001$).

Child mortality was significantly lower ($p < 0.001$) among the adults who died and who had secondary education or more compared to the children whose parents had no education and had not died. Families with three or more children had significantly lower ($p < 0.001$) child mortality within five years after the death of an

adult family member. This may be explained by the fact that the family with a number of grown-up children became self-cared, and the younger children were looked after by their elders.

The likelihood of child death was significantly lower ($p < 0.01$) among the children who were from households with a large dwelling space than those who were from households with a medium dwelling space. The land-holding status of a family had the same scenario on child

Table 1. Percentage distribution of married adult population by demographic and socioeconomic characteristics

Demographic characteristics	Adult death cases		No adult death	
	Male (n=147)	Female (n=180)	Male (n=3,331)	Female (n=3,369)
Age of adults (years)				
15-19	0.7	10.0	0.2	0.9
20-29	15.6	27.8	9.2	38.6
30-39	9.5	17.2	35.2	33.2
40-49	29.3	17.8	27.0	19.6
50-59	44.9	27.2	28.4	7.7
Education				
No education	68.0	83.3	53.0	75.5
Primary	18.4	12.8	27.7	19.3
Secondary or more	13.6	3.9	22.3	5.2
Occupation/employment				
Housewife	0.0	88.4	0.0	99.0
Farmer	31.3	0.0	44.0	0.0
Labourer	41.5	2.2	29.2	0.4
Businessman	11.6	1.1	17.9	0.5
Disabled	5.4	6.1	0.6	0.0
Professional	4.8	0.0	7.2	0.2
Others	5.4	2.2	1.1	0.0
Religion				
Muslim	88.4	86.1	87.8	
Non-Muslim	11.6	13.9	12.2	
Number of living children*				
None	15.0	29.4	2.7	
1-2	23.1	41.1	20.3	
3-5	42.9	22.8	54.1	
6+	19.0	6.7	22.9	
Dwelling space* (sq ft)				
1-169	46.3	33.3	35.6	
170-349	37.4	43.9	43.0	
350+	16.3	22.8	21.4	
Household articles owned*				
None	40.2	32.5	28.0	
<4 items	44.2	45.0	42.2	
4+ items	15.6	22.2	29.8	
Land-holding status* (decimals)				
Landless	42.9	30.6	32.0	
1-100	29.9	26.1	26.2	
101-300	18.4	28.3	24.9	
301+	8.8	15.0	16.9	

*Household-level information

mortality, which was significantly higher ($p < 0.01$) in the landless families and in those families that had 100 decimals or less-agricultural land compared to the families with 101-300 decimals of agricultural land.

Model 2 is the main effect model, including the interaction terms of some independent variables to identify the significant effects of the modifiers of Model 1. It was found that the effect of adult-survival status was modified by the small dwelling space of the families that was also the proxy of their economic status.

This finding suggests that the negative impact was more pronounced among the children from poor families. Although in Model 1, adult education and land-holding status of the family had a significant effect on child mortality, we found no significant impact of these variables in the main effect Model 2.

Table 3 presents the effects of adult mortality and different demographic and socioeconomic characteristics on the education of children, aged 6-12 years, five years after the adult death in a family. The likelihood of

Table 2. Odds ratio from logistic regression of effects of adult mortality and other different covariates on the likelihood of child mortality within five years after adult death

Covariates	Model 1		Model 2	
	Odds	95% CI	Odds	95% CI
Female adult-survival status				
Survived (RC)	1.00		1.00	
Died	1.61*	1.0-2.6	1.42	0.6-3.2
Age of children (in years)				
5+ (RC)	1.00		1.00	
<5	21.5†	12.7-36.3	23.1†	13.5-39.4
Sex of children				
Male (RC)	1.00		1.00	
Female	1.22†	1.1-1.4	1.22†	1.1-1.4
Adult education				
No education (RC)	1.00		1.00	
Primary	0.89	0.8-1.1	0.90	0.8-1.1
Secondary+	0.49†	0.3-0.7	0.49†	0.3-0.7
Number of living children				
<3 (RC)	1.00		1.00	
3+	0.52†	0.3-0.8	0.51†	0.3-0.8
Dwelling space (sq ft)				
<170	1.47†	1.3-1.7	1.51†	1.3-1.7
170-349 (RC)	1.00		1.00	
350+	0.73‡	0.6-0.9	0.73‡	0.6-0.9
Land-holding status (decimals)				
Landless	1.33†	1.1-1.6	1.35†	1.1-1.6
1-100	1.25‡	1.1-1.5	1.27‡	1.1-1.5
101-300 (RC)	1.00		1.00	
301+	0.97	0.8-1.2	0.99	0.8-1.2
Adult female died* Primary education			1.01	0.3-3.8
Adult female died* Secondary education and above			0.77	0.1-9.8
Adult female died* Small dwelling space (<170 sq ft)			3.66	0.3-3.8
Adult female died* Higher dwelling space (≥350 sq ft)			0.89	0.2-3.1
Adult female died* Landless group			1.55	0.5-4.5
Adult female died* Small-land group (up to 100 decimals)			1.28	0.4-4.4
Adult female died* Higher-land group (≥301 decimals)			0.60	0.2-2.3
Constant	-3.27†		-2.82†	
-2 log likelihood	8351		8339	
No.	15116		15116	
Df	11		18	

* $0 < p < 0.05$; † $0 < p < 0.001$; ‡ $0 < p < 0.01$

RC=Reference category; CI=Confidence interval

children receiving at least some education was 42% lower in the families that had experienced death of an

Table 3. Odds ratios from logistic regression of effects of adult death and other covariates on children's (6-12 years) likelihood of having some schooling within five years after adult death

Covariates	Odds	95% CI
Female adult's survival status		
Survived (RC)	1.00	
Died	0.58	0.3-1.3
Sex of children		
Male (RC)	1.00	
Female	0.92	0.8-1.1
Adult education		
No education (RC)	1.00	
Primary	2.11*	1.8-2.5
Secondary+	3.27*	2.3-4.6
Number of living children		
<3 (RC)	1.00	
3+	0.40†	0.2-0.9
Dwelling space (sq ft)		
<170	0.28*	0.2-0.3
170-349 (RC)	1.00	
350+	5.53*	4.2-7.3
Land-holding status (decimals)		
Landless	0.69*	0.6-8.8
1-100	0.81‡	0.7-0.9
101-300 (RC)	1.00	
301+	1.38‡	1.1-1.8
Constant	0.04	
-2 log likelihood	4831	
No.	4251	
Df	10	

* 0<p<0.001; † 0<p<0.05; ‡ 0<p<0.01
 RC=Reference category
 CI=Confidence interval

adult female than the families that had experienced death of a male adult. Education of the parents was a significant factor (p<0.001) and was positively associated with the educational status of children. The children of families with three or more living children were significantly (p<0.05) less educated compared to the families with two or fewer number of children.

The likelihood of child's education was significantly lower (p<0.001) in the households with a small dwelling space compared to the families with a medium dwelling space. In contrast, the children of the households with a larger dwelling space were 5.5 times more likely to have some education than the children of the families having a medium dwelling space. A similar pattern existed in

land-holding status of the family. The families with some or no arable land were significantly less (p<0.01 and p<0.001) likely to have educated children than the families that owned medium tracts of land. The families owning larger tracts of land corresponded to significantly higher (p<0.01) likelihood of children having some education than those families that owned medium tracts of land.

Table 4 shows the effects of several covariates on the likelihood of adolescents, aged 12-20 years, to

Table 4. Odds ratio from logistic regression of effects of adult death and other covariates on likelihood of childhood (age 12-20 years) out-migration within five years after adult death

Covariates	Odds	95% CI
Female adult's survival status		
Survived (RC)	1.00	
Died	1.84*	1.1-3.1
Sex of children		
Male (RC)	1.00	
Female	17.30†	14.8-20.0
Adult education		
No education (RC)	1.00	
Primary	0.67†	0.6-0.8
Secondary+	0.59†	0.4-0.8
Number of living children		
<3 (RC)	1.00	
3+	7.41†	4.9-11.2
Dwelling space (sq ft)		
<170	0.88	0.8-1.0
170-349 (RC)	1.00	
350+	1.68†	1.4-2.0
Land-holding status (decimals)		
Landless	0.98	0.8-1.2
1-100	1.14	0.9-1.4
100-300 (RC)	1.00	
301+	0.87	0.7-1.1
Constant	-2.35†	
-2 log likelihood	5928	
No.	10	
Df	6045	

* 0<p<0.05; † 0<p<.001; ‡ 0<p<0.01
 RC=Reference category
 CI=Confidence interval

migrate out of the household within five years after the death of an adult family member (father/mother). The likelihood of out-migration of the adolescents was significantly (p<0.05) higher in the families that experienced death of a female adult. The odds of out-

migration of the female adolescents was 17 times higher than for out-migration of the male adolescents. Out-migration of the adolescents was 33% and 41% lower, respectively, among the families with parents who died having primary and secondary education or above than the families that experienced the death of non-educated parents. These differences were highly significant ($p < 0.001$). The likelihood of out-migration was significantly higher ($p < 0.001$) among the families with three or more children and had an adult death compared to the families where there were no adult death and that had a fewer number (< 3) of children.

Significantly higher ($p < 0.001$) out-migration of adolescents was observed in the families with a higher dwelling space ($p < 0.001$) compared to those with a medium dwelling space. Very little or no effect was observed in the land-holding status of the family on out-migration of the adolescents.

DISCUSSION

During the past two decades, determinants of mortality in developing countries have been studied with some frequency, with special emphasis on examining the covariates of infant, child and maternal mortality. However, the micro-consequences of adult mortality on the well-being of families experiencing these deaths have been virtually ignored in mortality-related studies in the developing-country settings.

In this study, an attempt was made to examine the consequences of deaths of married adult members, subsequent mortality risk and school attendance of children, and likelihood of out-migration of children from the household at an early age, i.e. during their teenage. The findings of the study suggest that there are significant negative consequences in the health and socioeconomic status for children in the families experiencing death of an adult compared to the families that did not experience any death of a parent in the household. The children aged less than five years were significantly more likely to die within five years after the death of an adult member in the family compared to the children of the families where no parents died. This relationship was even more pronounced when the parent who died was the mother.

Another important finding was that the children, aged 6-12 years, who experienced the death of a parent, were significantly less likely to have received any schooling

in five years following the death compared to the children of the same age group who did not experience the death of a parent.

In the households where a married adult died, the children aged 12-20 years were significantly more likely to have migrated out of the households compared to 12-20 years old children of the households that did not experience the death of a parent.

The longitudinal data from the SRS provide a unique opportunity to assess the impacts of adult mortality on a family in the rural area of Bangladesh. Nevertheless, several potential limitations of the present study should be noted. Firstly, causes of death, duration of illness before death, and expenses (if any) incurred for treatment of the deceased were not explored. Secondly, since we reviewed the adult deaths occurred during 1983-1987, the observation period after the death varied, with some ending in 1988 and others ending as late as 1993. More specific durations of exposure after death were not considered in this analysis. Finally, death of an unmarried adult in a family may also have a negative impact in terms of their income and family support, but these deaths were also not addressed in this study. Due to limitations of data, the study did not explore the school attendance of children immediately after the death of an adult member in a family. Instead, we used the educational status of children five years after the death of either of the parents.

We observed that adult death, particularly death of a female, was associated with a higher level of death of children aged less than five years. This may be explained in several ways. One explanation could be that, in some cases, the adult before his/her death due to a communicable disease might have transmitted it to other family members, with fatal consequences, e.g. tuberculosis, human immunodeficiency virus (HIV)/acquired immunodeficiency syndrome (AIDS), meningitis, etc. This is especially relevant in the case of infants. In the case of maternal deaths, the infant often dies at birth or within the first two months following the maternal death. The loss of a mother to infants who are still breastfeeding is likely to have a significant negative impact on the health and nutritional status of these young children. Of great importance is the fact that, with the loss of an adult family member, there is usually a decrease in childcare capacity within the family and a

loss of economic resources necessary to ensure proper safety, nutrition, education, and healthcare for the children. Policies that are designed to protect the health of adults would also protect children to the extent that adult mortality, directly or indirectly, leads to a higher risk of illness or death among infants and children.

Although life insurance, social welfare support, extended family systems, child fostering, and adoption may provide some security to the children who lose an adult family member in such settings in the rural areas of Bangladesh included in this study, it appears that life becomes exceedingly difficult for the children of the deceased parents in the years following the death.

The findings of this study suggest that the death of an adult parent has dire consequences on the rural households in the study area, especially among younger children, often leading to a higher risk of death, particularly when the mother dies. The negative consequences among older children include disruption of education and an increased geographic mobility at an early age. Adolescent girls are compelled to migrate out (may marry) early or seek employment outside their home to support the family. More in-depth, qualitative research is, thus, needed to complement these quantitative findings and to examine more thoroughly the economic, social and health circumstances, and implications of an adult death on the family in this cultural context.

For countries, such as Bangladesh, where maternal mortality is still unacceptably high and where, in the future, it is likely to increase the mortality of parents in their reproductive age due to HIV/AIDS, it is paramount to intensify research efforts to examine the consequences of adult mortality. This is necessary to design and implement effective policies and programmes to prevent, or at least, reduce the devastating effects of adult deaths on the family.

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