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RESEARCH ARTICLE

DIRECT AND INDIRECT EFFECTS OF SOCIO-ECONOMIC AND DEMOGRAPHIC FACTORS ON AGE AT DEATH OF INFANT AND CHILD OF SLUM AREA IN RAJSHAHI CITY, BANGLADESH

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ABSTRACT

Objectives: The aim of this study is to investigate the direct and indirect effects of socioeconomic and demographic factors on age at death of infant and child in the slum area.

Methods: Data have been collected from one hundred and twenty five ever married women from slum dwellers in Rajshahi City through a structured questionnaire. A statistical tool, path analysis has been used to find out the direct and indirect effects on age at death of infant and child.

Results: The study results reveal that respondent's age, order of birth, income, education and immunization practice for their new born babies are directly and indirectly significantly associated with age at death of infant and child. The indirect effects of family income (36.05%) has the highest impact among other characteristics (education, length of breast feeding, and immunization practice) on age at death and also these have similar results in case of birth interval (45.66%) and immunization practice (39.08%) through age. The percentage of other variables (implied effect) is higher for the immunization (50.35%). The direct effects of birth interval, age and order of birth on age at death of infant and child are 0.035, 0.879 and 0.709 respectively which implies order of birth and age of mothers' have much impact on age at death.

Conclusion: Traditional maternal education and immunization practice system are not well recommended in Bangladesh. Slum dwellers of this country are always deprived from their fundamental needs such as treatment, housing, fooding, clothing and education. Thus, the study suggests that mother's education and awareness about infant and child death should improve in slum areas as well.

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INTRODUCTION

Bangladesh, which is bordered by India on three sides, Myanmar in the Southeast and the Bay of Bengal in the South, gained independence in 1971. She has made sound development progress since independence but prospects for better outcomes have been dampened by chronic political instability. Also she experienced strong and steady economic growth since 1990 and has seen improvements across a range of social indicators-including achieving over 91% primary school enrolment, gender parity in primary education and halving the infant mortality rate between 1990 and 2001 (BBS, 2003). It is the 7th populous (162.2 millions) small country (142,776 sq km) with limited natural resources and the geographical setting makes the country vulnerable to natural disasters (PRB, 2009). Her Gross National Income (GNI) is US $ 1440 and the life expectancy for male is 64 years and for female is 66 years with high infant mortality rate (48 per 1000) (PRB, 2009), and mortality under age 5 (54 per 1000), infant with low birth weight (22%) (ESCAP, 2009). In 1985, with the beginning of the third five-year plan, Government of Bangladesh (GOB) has initiated institutionalization of maternal, and childcare and family planning (FP) activities through a phased program on maternal and child health (MCH), and FP services. The overall goal of the MCH program is to improve the health condition of mother's and children. In recent years, FP programs and programs on immunization have successfully implemented in a wide array of fertility and infant and child mortality reduction interventions.

Rajshahi Division is one of six administrative divisions of Bangladesh. The population of Rajshahi Division was 24% of the population of Bangladesh, making it the second most populous division after Dhaka. Rajshahi District has a population of 2,286,874. This district is predominantly rural with 63% residing in rural areas, 39% of households depend on cultivation, livestock and forestry and 34% on agricultural labor as their main source of income. The income from agricultural activities resulted in 61% of the households of the Rajshahi City Corporation (RCC) area and 70% of the households in the extended area earning a monthly income of Tk. 2500-4500 (BBS, 2003). The literacy rates in Rajshahi district are 48% for both sexes; similar to the rest of Bangladesh. Rates are much higher in the RCC area averaging 67% for both sexes. In vast majority of households relying on tube wells for drinking water, although in urban areas some 8% of households have piped water supplies compared to less than 1% in rural areas. The current water demand for the city is 103,000 m^3 per day and will rise to 160,000 m^3 per day by 2010 (BBS, 2005). High levels of arsenic contamination have also been reported and hardness levels are above the WHO standard. Access to sanitation facilities in urban areas is much higher than rural areas but access in Rajshahi Division was lower than in any other division in Bangladesh. In the city area the RCC reported that in 2004, 50% of households had sanitary facilities; but 10% do not have any sanitation facilities and defecate in the open. There are also public urinals from which the urine flows directly into the storm water drains.

The child mortality is a composite index reflecting environmental, social, economic, health care services and delivery situation on the one hand and maternal as well as family and community norms and practices on the other. A child is highly vulnerable to two categories of acquired ailments; one is a heavy load of infectious diseases and the other, those diseases that are caused by inadequate nutrition. The relationship between child mortality and socio-economic factors might be relatively weak in developed countries, may be due to low child mortality. In contrast, in the developing countries, a significant portion of deaths occurs during childhood, which may be due to poor public health measures and lack of access to health care facilities. It is documented that the risk of morbidity and mortality is directly influenced by 14 intermediate or proximate determinates including education of mother, sanitation facilities, access to safe drinking water and maternal and child health care services (Mosley and Chen, 1984). There is evidence of some recent decline in infant and child mortality. Mother education, higher birth order had significant independent effects upon the reduction of infant and child mortality. Other variables such as father education, fetal loss or land ownership had no effect on child

mortality (Amin, 1988). Another study considers some characteristics as mother's age at the birth of child, birth order, previous child loss, mother's residence, father's occupation and mother's work experience since marriage (Adlakha and Suchindran, 1985). The education of the mother is emerged as one of the strongest predictors of child mortality though other factors like women's autonomy, income, working status of parents, standard of living index, household size, place of residence, better conditions of water supply and sanitation have influence upon it (Gokhale et. al., 2002). Some studies indicated that the mother's education is a more decisive determinant of child survival than other family characteristics such as father's occupation and father's education (Ahmed et. al., 1999). Mother's education may be attributed to the children of enjoying better diets and better overall care than the children of non-educated mothers (Bairagi, 1980) and there are strong inverse relationship between mother's education and child mortality (Groose and Auffery, 1989). Another study also identified that mother-working status exerts a significant negative influence on child mortality. But mother education has a greater influence on child survival in Bangladesh than that of father's education (Majumder et. al., 1993). Pandey *et al.* (1998) examined that babies born to young mothers are more likely to be premature, have low birth weights, and sufferer at the time of delivery. Mondal *et al.* (2009) showed that immunization, breastfeeding, mother's age at birth and birth interval were the most significant predictors on infant and child mortality. Therefore, the main objective of this study is to identify the direct and indirect effect of selected socio-economic and demographic factors on age at death of infant and child in the study area.

Data and methods

The data of this study have been collected by using purposive sampling technique through interview method asking question of each respondent with the help of a set of questionnaire. In this case, we were including ever married women in their reproductive age (15-49 years age) in the slum areas of Rajshahi City having been interviewed.

The fieldwork was inaugurated on 1st April 2009 and it was completed on 15th June 2009. Both socio-economic and demographic factors have been considered which were influenced to age at death of infant and child. The considered variables are continuous and these are divided into three different parts as exogenous variables, endogenous variables, and dependent variable. The statistical tool, path analysis has been used to analyze the collected data. To perform the path analysis it is needed to find out the direct and indirect effects of the exogenous and endogenous variables over dependent variable.

Model development

According to the causal ordering of variables, it has been divided the selected set of variables into three groups that are given below:

Exogenous variables	Education of respondents (X_1), family income (X_2), length of breast feeding (X_3), immunization (last child) (X_4)
Endogenous variables	Birth interval (last birth) (X_5), age of respondents (X_6), order of birth (X_7)
Dependent variable	Age at death of infant and child (X_8)

This model is a recursive path model in which each variable is assumed to be dependent upon all prior causal variables. The system of equation for the method can be written as:

$$X_5 = P_{51} X_1 + P_{52} X_2 + P_{53} X_3 + P_{54} X_4 + P_u R_u$$

$$X_6 = P_{61} X_1 + P_{62} X_2 + P_{63} X_3 + P_{64} X_4 + P_{65} X_5 + P_v R_v$$

$$X_7 = P_{71} X_1 + P_{72} X_2 + P_{73} X_3 + P_{74} X_4 + P_{75} X_5 + P_{76} X_6 + P_w R_w$$

$X_8 = P_{81} X_1 + P_{82} X_2 + P_{83} X_3 + P_{84} X_4 + P_{85} X_5 + P_{86} X_6 + P_{87} X_7 + P_x R_x$

where P_n's are path co-efficient from X_1 to X_8 and R_u, R_v, R_w and R_x are random disturbance terms. This system of equations is known as structural equations which give the estimates of path coefficients and help to understand the important links between various variables.

RESULTS AND DISCUSSION

From the path analysis, the direct, indirect and implied effects and various path coefficients of each of the selected explanatory variables are obtained. At the first step we are consider the whole selected variable and a zero order correlation coefficients is shown Table 1 among selected socio-economic and demographic variables. Next the figure, path diagram is shown various types of association between the selected variables.

Table 1. Zero order correlation coefficient among selected socio-economic and demographic variables

Variable	X_1	X_2	X_3	X_4	X_5	X_6	X_7	X_8
X_1	1.000	.219*	.040	-.262**	.146	-.225*	-.242**	-.188
X_2		1.000	.044	-.045	.241**	.208	.202**	-.039
X_3			1.000	-.186*	.072	.002	.091	.122
X_4				1.000	-.090	.410**	.231**	-.166
X_5					1.000	.100	.020	.034
X_6						1.000	.435**	.552
X_7							1.000	.360
X_8								1.000

* Correlation is significant at the 0.05 level,* Correlation is significant at the 0.01 level

Table 2. Direct and indirect effect of socio-economic and demographic factors on age at death of infant of child through endogenous variables

Dependent Variable	Selected Variables	Total Association	Non-causal Effects *	Total Effects	Indirect Effects Through				Direct effects
					X_5	X_6	X_7	Other Variables (Implied Effect)	
	X_1	-.188	0.37	0.182	.096	-.176	-.193	.455	…..
	X_2	-.039	0.702	0.633	.209	.239	.159	.056	……
	X_3	.122	0.283	0.405	.049	.075	.108	.173	…..
	X_4	-.166	0.048	-0.118	-.055	.444	.065	-.572	…..
X_8	X_5	.034	0.021	0.055	……	.079	-.059	…….	.035
	X_6	.552	0.676	1.228	……	……	.349	…….	.879
	X_7	.360	0.349	0.709	……	……	……	……..	.709

** Non-causal Effect = Total Effect-Total Association*

Table 3. Percentage of the total absolute effect on age at death of infant and child

Dependent Variable	Selected Variables	Percentage of Indirect Effects Through			Other Variables (Implied Effects)	Direct Effects
		X_5	X_6	X_7		
X_8	X_1	10.43	19.13	20.97	49.46	……
	X_2	31.52	36.05	23.98	8.44	……..
	X_3	12.09	18.51	26.67	42.72	…….
	X_4	4.84	39.08	5.72	50.35	…….
	X_5	……..	45.66	34.10	…….	20.23
	X_6	……	…….	28.42	……	71.58
	X_7	……	…….	…….	…….	100.00

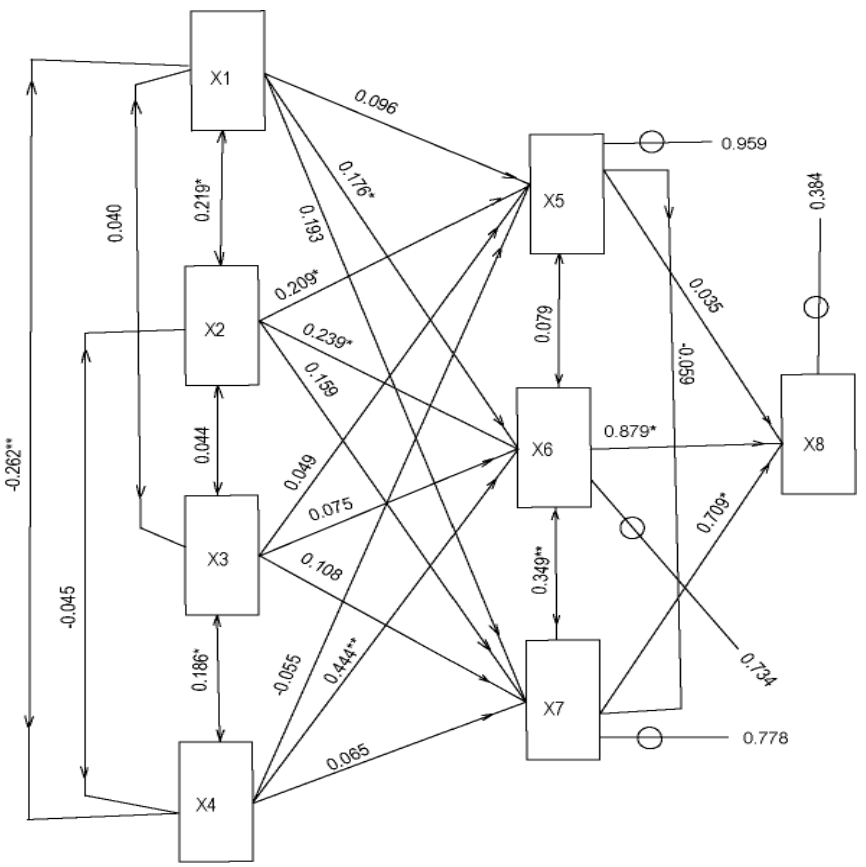

Fig.1. Path diagram of infant and child mortality

Table 2 describes the direct and indirect effect of socio-economic and demographic factors on age at death of Infant of child through endogenous variables. From the table we may calculate the total association, non-causal effect and total association. At the same table we may calculate the indirect effect through birth interval, age, order of birth, other variable (implied effect) and direct effect. Table 3 shows the percentage of the total absolute effect on age at death of infant and child through endogenous variables.

From the above zero order co-relation coefficient table is shows some significant values. We consider the two types of signification that are 5% and 10% level. The correlation between family income and level of education is positively significant at 5% level. We also find that the correlation between education and age, length of breast feeding and immunization are significant at 5% level. Again education and immunization, education and order of birth, income and birth interval, income and order of birth, immunization and age, immunization and order of birth, age and order of birth are significant at 10% level. So we may conclude that both social and demographic variables are significantly correlated with each other.

From the path diagram we see that there are many significant and non-significant variables. Some correlation coefficients are significant at 0.05 level and some correlation coefficients are significant at the 0.01 level. The dependent variable age at death of infant and child is correlated with three endogenous variables; age and birth order are significant relation with age at death of infant and child mortality. Respondent's educational qualification is correlated with income and immunization. So it's clear that those educational qualifications are high have sufficient income and their awareness about immunization is satisfactory level.

From the Table 2 we observe that the total association of education, family income and immunization has shown negative result those are mentioned exogenous variable. And all of the non-causal effects are positive result. Again the total effects are negative for the variable of immunization. Then the indirect effect through birth interval of education, income, length of breast feeding and immunization are 0.096, 0.209, 0.049 and -0.055 respectively while indirect effect through age of education, income, length of breast feeding, immunization, birth interval are -0.176, 0.239,0.075, 0.444, 0.079 respectively. Again the indirect effect through order of birth on education, income, length of breast feeding, immunization, birth interval, age are -0.193, 0.159,0.108, 0.065, -0.059, 0.349 respectively. The direct effect by birth interval, age and order of birth on age at death of infant and child are 0.035, 0.879, and 0.709 respectively.

From Table 3 we observe that the percentage of indirect effect of family income through birth interval is 31.52% on age at death and also similar results have in case of birth interval (45.66%) through age. It appears that, those family incomes is lower whose families, birth interval of mothers are shorter because they cannot meet their basic needs (e.g. education, food ,clothing, housing and treatment) in daily life instead of birth control methods which are not cheaper or available yet. The second highest results reveal that the indirect effect of immunization practice (39.08) through age of respondent's because the aged women are not interested receiving immunization of own and their children consequently mother's and child death gradually increased day by day and the percentage of other variables (implied effect) is higher for the immunization as 50.35%. The direct effect of birth interval, age and order of birth on age at death of infant and child are 20.23%, 71.58%, and 100.0 respectively which implies order of birth and age of mothers' have much impact on age at death.

Conclusion

Population growth, infant and child death in Bangladesh are much higher and have limited resources. So, policies expand to educational opportunities specially women; emphasis the family income that are sufficient to maintain basic need of the family members; its must be ensure that every children feed their mothers breast as long as

possible; immunization practice is vastly spread over the mother and the children; the government should step a communal method for the interval of birth as an effective family planning program for the purpose of small size of family and thereby use modern contraceptive; higher order births should be decreased. Eventually, this study recommends that there is a scope for extended and long observing re-evaluation of the trustful field study with widespread analysis and direct implication.

REFERENCES

Adlakha, AL. and Suchindran, CM. 1985. Factors affecting infant and child mortality, J. Biosoc.Sci., 17(40):481-496

Ahmed, MK, Rahman, M. and Ginneken, JV. 1999. Epidemiology of child death due to drowning in Matlab, Bangladesh. *Int. J. Epidemiol,* 28: 306-311

Amin, R. 1988. Infant and child mortality in Bangladesh, *J. Biosoc. Sci.,* 20: 59-65.

Bairagi, R. 1980. Is income the only constraint on child nutrition in rural Bangladesh? Bull. World Health Organ., 58(50):767-772

BBS, 2003. Population Census 2001, Bangladesh Bureau of Statistics (BBS) 2003, Dhaka,. Bangladesh.

BBS, 2005. Compendium of Environment Statistics of Bangladesh. Bangladesh Bureau of Statistics (BBS), Dhaka.

ESCAP 2009. Population Data Sheet, Social Development Division United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), United Nations Building, Bangkok, Thailand.

Gokhale, MK, Rao, SS. and Garole, VR. 2002. Infant Mortality in India: Use of Maternal and Child Health Services in Relation to Literacy Status. *J. Health Popul. Nutr.,* 20(2):138-147.

Groose, R. and Auffery, C. 1989. Literacy and Health Status in Developing countries. *Ann. Rev. Public Health*, 10: 281-298

Majumder, AK. and Islam, SMS. 1993. Socioeconomic and Environmental Determinant of Child Survival in Bangladesh. *J. Biosoc. Sci.,* 25:311-318

Mondal, MNI, Hossain, MK and Ali, MK. 2009. Factors Influencing Infant and Child Mortality: A Case Study of Rajshahi District, Bangladesh. *J Hum Ecol,* 26(1):31-39

Mosley, WH. and Chen, LC. 1984. An analytical framework for the study of child survival in developing countries. Population and Development Review, 1984, 10 (Supplement): 25–45.

Pandey A, Choe, MK, Luther, NY, Sahu, D. and Chand, J. 1998. Infant and Child Mortality in India. Mumbai, India and Honolulu. USA: NFHS Subject Report No. 11. IIPS and East-West Center, Population and Health Studies.

PRB, 2009. World Population Data Sheet, Population Reference Bureau. NW, Washington, DC; USA.

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