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Poverty and Child Mortality in Pakistan

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The Pakistan Institute of Development Economics, established by the Government of Pakistan in 1957, is an autonomous research organisation devoted to carrying out theoretical and empirical research on development economics in general and on Pakistan-related economic issues in particular. Besides providing a firm foundation on which economic policy-making can be based, its research also provides a window through which the outside world can see the direction in which economic research in Pakistan is moving. The Institute also provides in-service training in economic analysis, research methods, and project evaluation.

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INTRODUCTION

Death is inevitable, everyone who is born alive, has to die sooner or later. In the developed world, people are largely successful in postponing death. On the other hand in the developing world although there has been a substantive decline in the overall mortality rate during the last four or five decades, yet infant and child mortality remain quite high. In Pakistan, every eleventh child who is born alive dies before reaching one year of age. The mortality rate of children under 5 years is 111 per 1000 live births [Cleland, Hakim and Farooqui (1998)].

The incidence and level of child death varies between various groups of population. Some of these differences are due to biological reasons and partly due to socio-economic variables. It is commonly observed that the mortality rate is higher among poor people than non poor. Is it due to the poor peoples' attitude and behaviour towards life which brings more deaths among them? Or is it because of their being poor that they experience a different mortality pattern than the non poor?

There are various ways of measuring poverty. According to demographers, high level of infant and child mortality is an important indicator of poverty [Mosley and Chen (1984); Martin *et al.* (1983)]. In other words, poverty may be measured through the incidence of infant and child mortality and thus both of these may be labeled as complimentary variables. However, in the study of cause and effect probably it is better to examine how poverty affects mortality?

Mosley and Chen (1984) identify factors such as nutritional status, environmental contamination measured by intensity of household crowding (persons per room), drinking water contamination and potential faecal contamination by presence of latrine or toilet types in addition to health care services. These factors are labeled as the proximate determinants through which social, economic and demographic factors affect mortality.

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An effort is made here to identify correlates of child mortality and also to establish linkages between child mortality and poverty, intensity of household crowding water and faecal contamination and other socio-economic variables such as mother's education and mother's working status. Mother's education and working status has purposely been used in our analysis instead of father's education or father's occupation because of the fact that mothers are known and considered to be the first provider of health care when needed. And because of her innate feelings of care for her children, mother's behaviour in seeking and providing health care to her sick children may be an important determinant of child survival. Such a behaviour may vary from an uneducated mother to an educated mother and also by her working status.

DATA SOURCE

The present analysis is based on the Pakistan Socio-Economic Survey (PSES) data. The survey was conducted nation wide between April and July, 1999 and collected data on household information, incidence of poverty, household and personal income, source of income, labour market, fertility, child mortality, health and nutrition from 3564 households.[1]

SOCIO-ECONOMIC AND DEMOGRAPHIC DIFFERENTIALS OF CHILD MORTALITY

Table 1 shows that the incidence of child mortality is high when the age at marriage is less. This is due to the fact that the girls who marry early and produce children at a young age, lack the maturity to take care of the new borns. This inverse relationship is quite obvious at least upto 'age at marriage group' 19-21 years. In rural areas, the incidence of child mortality is quite high for all categories of 'age at marriage groups' when compared to urban areas.

Although female labour force participation is low in Pakistan [Ahmed and Ali (1992)] but the incidence of child mortality is higher among working than non working mothers. Interestingly, child mortality is considerably higher among rural working than urban working mothers. Possibly it is because of the fact that in rural areas, majority of

[1]For details on 1998-99 PSES , see Arif, Ali, Nasir and Nabeela (1999).

Table 1

Percentage Distribution of Women who have Reported At Least one of Her Children's Death by Age, Age at Marriage and other Background Variables

Characteristics	Pakistan		Urban		Rural	
	%age	N	%age	N	%age	N
Age at Marriage						
<16	35.22	318	26.67	105	39.44	213
16-18	28.73	1152	25.27	368	30.36	784
19-21	23.18	660	16.80	244	26.92	416
22+	23.44	738	20.38	314	25.71	424
Current Work Status						
Working	39.32	557	24.14	87	42.13	470
Not Working	23.56	2402	21.69	973	24.84	1429
Educational Status						
No Education	30.19	2249	29.85	583	30.31	1666
Primary	19.79	283	12.68	142	26.95	141
Secondary & Higher	11.71	427	11.94	335	10.87	92
Food Poverty						
Below or on Poverty Line	30.29	1121	30.89	369	30.05	752
Above Poverty Line	24.21	1838	17.08	691	28.51	1147
Persons per Room						
≤2	19.18	730	14.10	312	22.97	418
>2 – 4	27.29	1385	24.49	490	28.83	895
>4	31.17	879	25.74	272	33.61	607
Gas Connection						
Yes, Connection	17.67	662	17.50	600	19.35	62
No, Connection	28.89	2316	27.27	473	29.30	1843
Phone Connection						
Yes, Connection	12.50	328	12.83	265	11.11	63
No, Connection	28.21	2637	24.97	797	29.62	1840
Electricity Connection						
Yes, Electricity	25.48	2304	21.63	1045	28.67	1259
No, Electricity	29.62	692	28.12	32	29.70	660
Water Source						
Tap, Motor Pump etc.	21.59	1005	19.20	672	26.43	333
Others	28.87	1992	26.11	406	29.57	1586
Toilet Facility						
Flush Connected to Sewer/Septic Tank	23.14	1089	20.18	783	30.72	306
Other Systems	26.59	662	25.42	236	27.23	426
No System	29.36	1243	29.31	58	29.37	1185
Total	**26.45**	**2994**	**21.79**	**1074**	**29.00**	**1920**

Source: Pakistan Socio-economic Survey, 1998-99.

Note: No-response cases were dropped from the analysis. Hence, totals for various characteristics may vary.

women work as family helpers on fields and hence they do not have cash at hand to provide better health care to their sick children.

In Pakistan, majority of women are uneducated and the proportion of uneducated women is considerably high in rural than urban areas. As expected, there exists an inverse relationship between incidence of child deaths and mothers education. An urban-rural comparison shows that while acquisition of primary or less education by mothers in urban areas brings substantive decrease in the incidence of child mortality, rural women with the same level of education do not produce much change in child mortality. Yet, it was noticed that rural women who have acquired higher education do bring a visible downward change in child mortality. On the whole, educational attainment has multiple benefits. An educated mother is generally more aware of her responsibilities especially when her child is sick she takes good care of her child. Educational attainment also brings rationality in her reproductive behaviour. Lesser number of children born could be better cared for, and thus there is less likelihood of children's death.

As expected, incidence of child death was lower in households that are above poverty line. Interestingly, an urban-rural comparison indicates substantial differentials of child death in urban area where as, such differentials are negligible in rural areas. The situation in rural areas is a matter of concern and needs to be investigated further.

The crowding or persons per room also shows a clear positive relationship with the incidence of child death. An urban-rural comparison indicates lower child deaths in urban than rural areas. Moreover, urban-rural differentials of child mortality are highest among mothers who live in households where room crowding is 2 or less persons per room.

The quality of water used by the households is recognised as an important factor for the incidence of morbidity and mortality in children. In Pakistan, water borne diseases account for substantial number of deaths. According to Ali and Nasir (1990), about 2 years could be added to the life expectancy at birth if water borne diseases were eliminated.

The incidence of child mortality is less when the source of water is either tap or motor pump/tubewell. The child mortality differentials by source of water are relatively higher in urban than rural areas.

The faecal contamination is another important factor that can cause child morbidity and mortality. Surprisingly, in rural areas, child mortality differential by various types of toilet facilities available, do not show any clear cut direction. On the other hand, in urban areas, such differentials are quite obvious among households using various types of toilet facilities.

The gas, electricity and phone connections are the basic amenities of life. But in Pakistan not all people have the privilege to have these amenities. The socio-economic status of a person may be measured by his accessibility to various amenities. The households having these connections clearly indicate less child mortality. The accessibility to telephone in the households shows the highest child mortality differentials in rural areas.

Overall, in Pakistan, the incidence of child mortality is reported by over 26 percent of mothers. The child mortality is higher in rural than urban areas. The lower child mortality in urban areas, could largely be due to the concentration of medical facilities in urban areas. Lack of similar facilities in the rural areas brings about higher child mortality.

METHODOLOGY

The analysis in this paper is based on the ever-married women of reproductive age who have at least one live birth. Since the objective here is to examine the effect of predictor variables on the level of child mortality, the dependent variable is the number of children who have died. In order to smooth out some of the skewness in the distribution of dependent variable, square root of this variable is taken as dependent variable. The technique of Multiple Classification Analysis (MCA) is used. The MCA assumes an additive effect of predictor variables on the dependent variable. Although MCA requires dependent variable to be not badly skewed yet it gives good results even if the normality condition does not quite hold [Andrew *et al.* (1973)]. In order to study infant and child mortality, Karim *et al.* (1991) and Huda (1980) have employed MCA technique on a data set of Baba Island, near Karachi and Bangladesh national data respectively.

VARIABLES

The dependent variable in the model is entered on an interval scale whereas, the predictor variables are either dichotomous or on ordinal scale. The predictor variables employed in the analysis are the following:

Mother's Education

Among the predictor variables, education of the mother may be the most important variable because of its close link with the proximate determinants of mortality. Educated mothers may provide better health care. They are likely to be a better provider of nutrition and hygiene. By acquiring education, women are exposed to the outside world thus improving their perspectives and attitudes. However, in Pakistan most of the mothers are illiterate and being illiterate they believe in fate[2] and value the traditions prevalent in the society. For example, many women (21 percent) had reported to have reduced the amount of fluid to children during diarrohea episode [Rukanuddin and Hasan (1992)]. Such an attitude directly influences child care. In the analysis, the mother's education is employed on an ordinal scale (see Table 2).

Women's Work Participation

Another variable which is taken as predictor variable of the child mortality is Mother's Labour Force participation. This variable is used in the analysis as dichotomous variable i.e., working and non working. It is hypothesised that working women especially the ones who go out for work devote less time to the rearing of their children and thus expose them to a greater risk of sickness and death.

Nutritional Status

Other variables used in the analysis are the ones which are termed as proximate, determinants of mortality. Nutritional status in our analysis is measured by food poverty. The food poverty line is measured on the per capita calorie intake. The poverty line differs in urban and rural areas and is estimated as per international standards.[3] In the analysis food poverty is used as a dichotomous variable.

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[2]In the Pakistan Demographic and Health Survey, while responding to the question on ideal family size, 60 percent women leave the decision upto Allah and termed the question as interference in God's affairs—a clear indication of conservatism and fatalism of the Pakistani women. See [Ali and Rukanuddin (1992)].

[3]For details about the measurement of food poverty see Qureshi and Arif (1999).

Table 2

Multiple Classification Analysis of Child Mortality and Selected Predictor Variables Controlling for Age and Age at Marriage

Variable + Category	N	Predicted Mean: Unadjusted Values	Eta	Predicted Mean: Adjusted Values	Beta
		Pakistan			
Phone Connection					
Yes, Connection	323	0.1439		0.2580	
No, Connection	2600	0.3428	0.112	0.3286	0.040
Current Work					
Working	553	0.4790		0.4501	
Not Working	2370	0.2839	0.137	0.2906	0.112
Mother's Education					
Uneducated + 4 Classes Passed	2297	0.3657		0.3411	
Primary and Above	626	0.1560	0.155	0.2463	0.070
Household Crowding					
≤2 Persons per Room	706	0.2370		0.2620	
> 2 – 4 Persons per Room	1354	0.3270		0.3314	
> 4 Persons per Room	863	0.3796	0.094	0.3522	0.062
Housing Sanitation					
Available	424	0.1822		0.2671	
Not Available	2499	0.3443	0.103	0.3299	0.040
Food Poverty					
Below or on Poverty Line	1116	0.3725		0.3421	
Above Poverty Line	1807	0.2889	0.073	0.3076	0.030
Multiple R					0.290
Multiple R Squared					0.084
		Urban			
Phone Connection					
Yes, Connection	261	0.1426		0.2375	
No, Connection	782	0.3064	0.136	0.2747	0.031
Current Work					
Working	86	0.2873		0.2744	
Not Working	957	0.2634	0.013	0.2646	0.005
Mother's Education					
Uneducated + 4 Classes Passed	603	0.3634		0.3135	
Primary and Above	440	0.1310	0.221	0.1994	0.108
Household Crowding					
≤2 Persons per Room	303	0.1641		0.2060	
>2 – 4 Persons per Room	478	0.2988		0.2973	
>4 Persons per Room	262	0.3215	0.126	0.2757	0.075
Housing Sanitation					
Available	404	0.1793		0.2374	
Not Available	639	0.3198	0.132	0.2831	0.043
Food Poverty					
Below or on Poverty Line	362	0.3837		0.3405	
Above Poverty Line	681	0.2025	0.166	0.2255	0.105
Multiple R					0.341
Multiple R Squared					0.116
		Rural			
Electricity Connection					
Yes, Connection	1246	0.3465		0.3583	
No, Connection	650	0.3609	0.012	0.3381	0.017
Current Work					
Working	470	0.5153		0.4999	
Not Working	1426	0.2974	0.164	0.3025	0.149
Mother's Education					
Uneducated + 4 Classes Passed	1709	0.3665		0.3598	
Primary and Above	187	0.2139	0.079	0.2749	0.044
Household Crowding					
≤2 Persons per Room	408	0.2882		0.2922	
>2 – 4 Persons per Room	887	0.3442		0.3522	
>4 Persons per Room	601	0.4050	0.074	0.3905	0.061
Housing Sanitation					
Available	20	0.2414		0.2544	
Not Available	1876	0.3526	0.020	0.3525	0.017
Food Poverty					
Below or on Poverty Line	750	0.3704		0.3553	
Above Poverty Line	1146	0.3390	0.027	0.3489	0.005
Multiple R					0.268
Multiple R Squared					0.072

Household Crowding

Environmental contamination measured by intensity of household crowding (persons per room) is used as another proximate determinant of mortality. It is observed that household crowding leads to unhygienic conditions within the household which in turn make the inhabitants particularly the infants and children vulnerable to illness. Likely prevalence of poverty in these household aggravates the matter, as unaffordable treatment leads to worsening of health and ultimately death. In the analysis this variable is broken down into three categories. First category consists of those households where two persons or less live per room. In the second category are those households where more than two to 4 persons live per room. The third category consists of households where more than 4 persons live per room. It is important to note that in PSES, number of rooms in a household refer to living and bed rooms. Therefore, room crowding may be even more intense when only bed rooms are taken into account.

Housing Condition

In the analysis "housing conditions" is used as a composite variable represented by availability of safe drinking water, presence of latrine with flush facility connected to underground sewerage line or to septic tank and house connected to underground sewerage. All those who have all these facilities are put in one category. The second category consisted of other forms of facilities. In other words, this variable is used as a dichotomous variable. Housing conditions directly affect household environment. The contaminated environment may facilitate the dissemination and incidence of various infectious diseases, particularly diarrhoea and other gastroenteritis diseases, occurrence of which may be fatal.

Socio-economic Status

In developed countries, access to telephone and electricity is the basic amenities of life but in Pakistan, for example, having a telephone facility in the house is considered a status symbol. According to PSES data, access to telephone is not more than 10 percent in the country [Ali, Arif and Nasir (forthcoming)]. On the other hand, the electricity is available almost universally in the cities. Nevertheless, a considerable number of rural households are without electricity. Non availability of electricity in a way compels people to maintain a primitive style of life with all its drawbacks.

THE MULTIVARIATE ANALYSIS RESULTS

In the analysis of variance table, the F-statistics shows that all the predictors except food poverty in the equation pertaining to Pakistan are statistically significant. Nevertheless, in the equation pertaining to urban areas, the variable of 'food poverty' becomes significant (see Appendix Table 2). In rural areas, the predictor variables such as electricity, housing condition and food poverty are found to be not significant. The variables 'age of mother' and 'age at marriage' used here in the equations as covariates are generally found to be highly significant in Pakistan as well as in rural area. In the urban area, age at marriage is not significant.

Generally, the predictability of all independent variables denoted by adjusted R^2 value is low (8.4 percent). The predictability of independent variables is relatively better in urban than rural areas (see Table 2).

The access to telephone in the household shows some effect as shown by eta value on the survival of children. However, this effect as indicated by beta value decreases substantially when other predictors and covariates were adjusted. Contrary to our expectations, this variable does not exert expected influence even in urban areas. It is likely that the effect of covariates and predictors together has resulted into this diminished effect. Nevertheless the relationship remains in the right direction suggesting fewer child mortality among those women who have a telephone facility in the house.

In view of quite a limited number of telephones in the rural households, we replaced this variable with the presence of electricity connection in the house. Unlike expectation, this variable does not show any effect on child survival. Many other studies based on the data from developing countries indicated similar results [cited in Hill (1991)].

Only a few studies based on Pakistani data have investigated mother's work participation status with child mortality. Whereas, Afzal, Raja and Mohammed (1988) found out an inverse relationship of mother's work participation with child mortality, Zeba (1987) indicated that the infant mortality rate was higher only among women working in low paid jobs. In this study, child mortality was higher among working than non-working mothers. An urban-rural comparison indicates that such differentials are conspicuous in rural areas.

The possible explanation of this association may be sought in the fact that in Pakistan, a majority of women workforce start working after marriage and only a few of the women are in white collar jobs [Ahmed and Ali (1992)]. The majority enters into menial jobs or work in the fields as family helpers. These working women devote less time to the rearing of their children and thus expose them to a greater risk of ill-health. In rural areas, a majority of women work as unpaid family helper on fields, are financially on leash and hence are constrained to provide better health care to their children.

Mother's education is another variable which is used as a predictor variable for child mortality. It may be noted that we have merged mothers 'less than primary' classes passed with the uneducated ones. Whereas, the second category was made up of mothers who are primary and above classes passed. The reasons for creating these two categories are two: Firstly, in a few earlier runs of analysis we have found almost no effect on child mortality of those mothers who are 'less than primary' passed. In other words, primary may be the possible threshold level of education, the attainment of which may be useful for mothers in protecting their child's life. Secondly, owing to a few numbers of mothers with secondary and higher level of education in rural areas, a further disaggregation beyond primary level may lead to biased results.

The mother's education shows a considerable reducing effect on child mortality. The effect diminishes to almost half once predictors and covariates are adjusted. The effect of mothers education on child survival is stronger in urban than rural areas. Infact in urban areas, it is one of those variables which brings maximum change in child survival. The importance of mother's education for child survival cannot be understated in the rural area as well.

As expected, the variable 'household crowding' brings an increase in child mortality (see Table 2). Nevertheless, the effect diminishes from 0.094 to 0.062 when other predictors and covariates are adjusted. Although the effect of 'household crowding' on child survival is stronger in urban than rural areas but in urban areas because of interaction effect (see Appendix Table 2) a linear relationship changes into curvilinear relationship.

Housing conditions represented by a composite variable as described above shows expected negative effect on child mortality. However, after controlling for the effect of

other predictors and covariates, this variable looses its strength although direction of the relationship remains the same. As expected, because of extremely limited applicability of this variable in the rural areas, it shows a little effect on the dependent variable.

The variable of food poverty used here in our analysis as a proxy for nutritional status shows strong negative effect only in urban areas. Although the relationship remains in the right direction yet its effect is negligible in rural areas. In the study on malnutrition in Central America, Teller (1978) has found that in Panama and Guatemala, between 1965 and 1975, the prevalence of more severe malnutrition has increased among children less than 5 years while mortality has decreased. Likewise, Huda (1980) also found that the differentials in mortality between the malnourished and the well nourished children were non-existent in Bangladesh. Nevertheless, this finding in our analysis requires further investigation. Still, some explanation may be sought in the fact that owing to homogenous nature of socio-economic and cultural characteristics of rural population generally the food habits are not grossly different in rural areas. Our argument may further be substantiated from the fact that genie-coefficient[4] estimated on 1998-99 PSES data is also smaller in rural than urban areas [Nasir (1999)].

SUMMARY AND CONCLUSION

In the present analysis, it was found that all other variables, employed in the analysis produced an expected direction of association with child mortality but variables such as 'mother's work participation' and 'electricity connection' as well as 'food poverty' in rural areas affected differently. Generally urban-rural comparison shows visible differentials. Overall, the incidence and level of child mortality is higher in rural than urban areas.

Latest evidence [Qureshi and Arif (1999)] indicates that the level of Poverty in Pakistan is on an increase in the 90's. In other words, the structural adjustment programme that started in Pakistan since 1988-89 [Amjad and Kemal (1997)], not only had an adverse effect on the purchasing power of the people but have affected the incidence of infant and child mortality. That is evident from the fact that Infant mortality rate has shown an increase from an average rate of 91 per 1000 live births during 1985-90 to 103 in 1993-94 (see Appendix Table 4). This is despite strong preventive measures

[4]A measure of income inequality.

against six deadly yet preventable children diseases taken by the government through Expanded Programme on Immunisation (EPI) and Information Education and Communication (IEC) compaign for the use of ORS packets in case of diarrhoea. Moreover, in the social sector too, Pakistan is lagging behind. A majority of our population remains illiterate. Although, the importance of female education has been established in several studies on child survival [Irfan (1986); Sathar (1985, 1991)] yet the female literacy rate remained low. The findings of this study also shows that excepting 'mother's work participation' at the highest risk of child mortality are the ones whose mothers have no or incomplete primary education. Provision of education to females at least upto primary level will ensure lowered child mortality. Provision of more and better housing may reduce room crowding and thus improve living conditions which inturn may lower child mortality. The scenario in the provision of health care and nutrition is also not good.

Although the Social Action Programme (SAP) has been started in Pakistan since 1993 [Pakistan (1995)] so as to redress the situation and lot of efforts and resources have been expended yet the situation did not change much, especially in the health and nutrition sector and more so in the rural areas where these facilities are even lesser. Considering that the majority of our population lives in rural areas, a relatively grim situation in rural areas demands immediate attention of the policy makers and planners to improve upon the situation there so that child survival is ensured.

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