Statistical Analysis of Factors Affecting Child Mortality in Pakistan

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ABSTRACT

Child mortality is a composite indicator reflecting economic, social, environmental, healthcare services, and their delivery situation in a country. Globally, Pakistan has the third highest burden of fetal, maternal, and child mortality. Factors affecting child mortality in Pakistan are investigated by using Binary Logistic Regression Analysis. Region, education of mother, birth order, preceding birth interval (the period between the previous child birth and the index child birth), size of child at birth, and breastfeeding and family size were found to be significantly important with child mortality in Pakistan. Child mortality decreased as level of mother's education, preceding birth interval, size of child at birth, and family size increased. Child mortality was found to be significantly higher in Balochistan as compared to other regions. Child mortality was low for low birth orders. Child survival was significantly higher for children who were breastfed as compared to those who were not.

Key Words: *Child mortality.   Binary logistic regression model.   Millennium development goals 4 (MDG4).   Sustainable development goals (SDGs).*

Child mortality is a sensitive marker of health situation prevailing in a family, community or a country. United Nations considers it as a factor for human. Under-five mortality rate has declined globally to 53% but it is still far from attaining the Millennium Development Goals 4 (MDG4), i.e. 31 deaths per 1000 live births. The pace of change and magnitude of progress differ considerably from one country to another. South Asian countries have still high under-five mortality rate, i.e. 51 deaths per 1,000 live births in 2015. One out of 19 children dies before reaching their 5th birthday in this region, which is the second highest in the world. The target of new proposed Sustainable Development Goals (SDGs) by international community is to lower the under-five mortality to 25 deaths per 1,000 live births by 2030.

Child mortality reflects the state of public health, socio-economic development, sanitation condition, cultural norms about feeding, and also the people's attitude towards the value and quality of human life.[1] Globally, Pakistan has the third highest burden of fetal, maternal, and child mortality. Although child mortality rate has been consistently declining in Pakistan and has decreased to 89 deaths per 1,000 live births in 2012 - 13 as compared to 117 in 1990 - 91. However, this reduction is considered slow and Pakistan has missed its MDG4 target.

Child health and healthcare disparities can be defined as "an inequitable difference in health or healthcare based on demographic characteristics such as race, ethnicity, generational status, socio-economic position, and geography".[2] Reduction in this disparity is one of the key targets of MDGs. The disparities in the outcomes of child health arise not only due to differences in the family characteristics that children are born into but also due to differences in the socio-economic factors of the communities where they live.[2]

To identify the health risks associated with specific community ecologies and social structures, there is a need to incorporate community-level factors in the analysis of child mortality. These factors include immunization, poverty level, proportion of educated women in community or literacy rate, ethnicity, availability of health care facilities, availability of clean water, hygiene condition of community, cost of healthcare facilities, social or cultural norms towards healthcare, residence (urban/rural) etc.

Being a developing country, Pakistan has insufficient resources to meet MDGs or SDGs related to child mortality. Cost-effective planning should be devised to attain these targets. This requires allocating resources in the areas or focus on certain segments of society after determining the importance of socio-economic factors. Current study would help identify, quantify and prioritize the relative significance of factors having positive or negative effect on child mortality in Pakistan.

For this study, data from Pakistan Demographic and Health Survey (PDHS) 2012 - 13 was used to identify significant social, economic, and demographic factors affecting child mortality in Pakistan by using Binary Logistic Regression Analysis. The sample consisted of births occurring during 5 years preceding the survey.

The dependant variable was dichotomous, i.e. whether the child was alive (or not). The studied variables were region, education of mother, wealth index, family size (number of household members), age of mother at first

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Table I: Parameter estimates of final logistic regression model for child mortality for PDHS (2012-2013).

Parameter	B	p-value	Odd ratio=Exp(B)
(Intercept)	-1.312	0.004	0.269
Region			
Punjab	1.138	0.002	3.120
Sindh	1.448	<0.001	4.255
KPK	0.724	0.060	2.062
Balochistan	1.532	<0.001	4.626
Gilgit Balistan	1.358	0.001	3.890
Islamabad (ICT)	0.000	N/A	1.000
Education of mother			
No education	0.762	0.010	2.142
Primary	0.674	0.049	1.961
Secondary	0.166	0.596	1.181
Higher	0.000	N/A	1.000
Birth order number			
2-3	-0.546	<0.001	0.579
4-5	-0.379	0.016	0.685
6+	0.000	N/A	1.000
Preceding birth interval			
Less than 24 months	1.070	<0.001	2.915
Greater than or equal to 24 months	0.000	N/A	1.000
Size of child at birth			
Very small	0.861	0.001	2.366
Smaller than average	0.035	0.841	1.036
Average or larger	0.000	N/A	1.000
Breastfeeding			
Yes	-3.288	<0.001	0.037
No	0.000	N/A	1.000
Family size	-0.039	0.009	0.962

birth, education of father, father's occupation, mother's occupation, birth order number, child is twin, gender of child, preceding birth interval, prenatal care, water and sanitation facility, breastfeeding, antenatal visits for pregnancy, place of delivery, and size of child at birth. In PDHS (2012 - 13), subjective assessment provided by mother about the size of child at birth was used as proxy for the birth weight.

Region, education of mother, birth order number, preceding birth interval, size of child at birth, breastfeeding, and family size were found to have significant effect on child mortality. The impact of wealth index, age of mother at first birth, education of father, father's occupation, mother's occupation, child is twin, gender of child, prenatal care, water and sanitation facility, antenatal visits for pregnancy, and place of delivery on child mortality was insignificant. Results of these factors are presented in Table I.

Child mortality is found to be significantly highest in Balochistan as compared to other regions. Political instability is the major hindrance in deployment of healthcare projects in this region. Maternal education has strong positive impact on child survival. Un-educated mothers have highest risk of child mortality. Mother's education is a strong determinant of child survival in India.[3] Empowerment in decision-making and awareness for healthcare works behind this phenomenon. Long birth spacing between siblings played a role of protective factor against child mortality. Similar trend was documented for Zimbabwe.[4] Children categorized as small, according to size at birth, have higher risk of mortality when compared to those of average or normal size. Low birth weight is a threat for child survival, which generally results from maternal malnutrition.[5] Children born in families of big size are found to have better survival chances. Probability of child survival increases with increase in household members in Uganda.[6] More members in a family means more persons to look after and take care of child. Birth order has inverse relationship with child survival. Low birth order resulted in improved chances of survival in childhood in Zimbabwe.[4] Higher order of births is associated with sibling competition for resources and cares which affect child health. Breastfeeding has strong significant role in reducing child mortality in Pakistan.

Current study suggests that Balochistan should be given priority for the provision of child healthcare services. Study supports combined family system for child health care as family size is generally large in such system. Government should promote women's education, long birth interval, family planning, and behavior of exclusive breastfeeding for substantial reduction in child mortality. Interventions at Government and household level should be used to avoid low birth weight.

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