

**DETERMINANTS OF CHILD MORTALITY IN PAKISTAN:
MODERATING ROLE OF MOTHER'S EDUCATION**

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ABSTRACT

Child mortality (CM) is an essential indicator used to gauge a country's socioeconomic development. Like many other developing countries, CM is notably higher in Pakistan than higher-income countries. In Pakistan, 69 children (per one thousand live births) expire before reaching the five years age. The prevalence of CM can be linked with different socioeconomic factors. The purpose of this research is to explore the impact of unmet need for family planning (UMNFP) along with some socioeconomic factors on CM. Furthermore, we have examined the moderating effect of mother's education and their employment on CM. A comprehensive household level dataset on 48,501 women from Pakistan Demographic and Health Survey (PDHS) 2017-18 is used. Child mortality is used as dependent and different socioeconomic characteristics of parents and households as well as prevalence of UMNFP are used as independent variables in Binary Logistic Regression analysis. The findings show that odds of CM declines with rise in the parent's education. In contrast, the likelihood of CM increases for the case of employed mothers. Mothers' involvements in decision making as well as their exposure to mass media decrease the probability of CM. The likelihood of CM is found to be lower in wealthier households as compared to poor households. Similarly, availability of toilet facility and safe drinking water at household significantly decreases the likelihood of CM. The odds of CM tend to decline with the decrease in the prevalence of UMNFP. Thus, UMNFP has been found as an important determinant of child mortality in Pakistan. UMNFP is likely to reduce the birth intervals and can lead to poor health of newborn babies; as a result, chances of child mortality are increased. The interaction effect of mother's education and their employment on CM is negative. We conclude that mother's education works as a moderator on the relationship of mother's employment and child mortality. The positive effect of women's employment on child mortality vanishes and turns to be negative in the case of highly educated women.

KEYWORDS

Child mortality, Unmet need for family planning, Mother's education, Pakistan.

INTRODUCTION

Child mortality is an essential and commonly used factor to assess the socioeconomic development of a nation (Mundial, 1993; Asif et al., 2021; Asif et al., 2022). "The right to

health is considered as a well-recognized fundamental human right all over the world. As an upcoming human capital, children are a valuable asset of a country and must have a better and healthy life. This can only be possible if children survive in the early years of their life” (Asif et al., 2021; PP-1). According the UNICEF (2019), around 5.3 million children died globally in the year 2018; of these 2.5 million children died within 30 days of their birth, 1.5 million children died before reaching the age of one year and 1.3 million children died in first 5 years.

Over the last three decades, a reasonably good progress has been made in the reduction of child mortality globally. However, the situation is not satisfactory in many developing nations. The major brunt of under-5 mortality is in Sub Saharan Africa, where under-5 mortality in 2018 was 78/1,000 lives births, which is about 16 times higher than high income countries (HICs). In Pakistan, child mortality was 69/1,000 live births in the year 2018 (UNICEF, 2019; GOP, 2019) and the country ranks at 36th position in the world in terms of under-five mortality (UNICEF, 2019) which indicates a dire scenario of nation’s health.

The differences of child mortality among countries can be attributed to different biological, economic, environmental, social and cultural factors (Fazzio et al., 2011; Rabbani and Qayyum, 2017). Dissemination of health knowledge, and improvements in medical technology as well as living standards can help in reducing child mortality (Mundial, 1993).

Existing studies differ in their scope and context whereby a global, regional or country specific analyses have been conducted (Fazzio et al., 2011; Arber, 1997; Brockerhoff and Hewett, 2000; Das-Gupta, 1990; Haines, 2011; Hobcraft et al., 1985; Hobcraft et al., 1984). Different ecological (Merike and Mojekwu, 2012), socioeconomic, and demographic factors have been investigated as potential factors of child mortality in literature (Rabbani and Qayyum, 2017; Hobcraft et al., 1984; KEMBO and Van-Ginneken, 2009; Asif et al., 2022). UMNFP can possibly be one of the essential factor of child mortality. It has major consequences for female and their families, i.e. unsafe abortion, physical exploitation, and weak mother health; all these are considered leading contributors to high child mortality (Wulifan et al., 2017; Asif and Pervaiz, 2019; Asif et al., 2021; Asif et al., 2022). The role of socioeconomic status (SES) on child mortality is very important. SES can be measured at the individual level by examining educational attainment, relative income and occupational status (Arber, 1997; Asif et al., 2020). Usually, individuals of higher SES have better health indicators. Low education, low income, poor working and living conditions are the “social determinants” that are generally associated with poor health outcomes (Costa-Font and Hernandez-Quevedo, 2012).

Several research studies have been conducted on the factors of infant and child mortality in Pakistan (Ali, 2001; Arif and Arif, 2012; Batieha et al., 2016; Bennett, 1999; Patel et al., 2021; Zahid, 1996). However, the effect of UMNFP on CM has been hardly discussed in the literature, particularly in case of Pakistan. This research is an endeavor to study the effect of UMNFP on child mortality and to study the moderating effect of mother’s education and their employment on child mortality in the case of Pakistan by utilizing the comprehensive data set of PDHS 2017-18 (PDHS, 2018).

DATA SOURCE

The data for this study is obtained from PDHS 2017-18. The data of 48,501 married women of reproductive age is used for analysis.

Variables and Measurement

The model of the study is as given below:

$$CM = f(\text{MEDU, MES, FEDU, MPD, EMM, WSH, POR, ATT, ASW, UMNFP, MES * MEDU})$$

where

Table 1
Variables and Measurement

Symbol	Variables	Measurement
CM	Child Mortality	1 = Mother has ever experienced the death of their child 0 = Otherwise
MEDU	Mother's Education	1 = if mother has attained less than ten year education 2 = if mother has attained at least ten year education
MES	Mother's Employment Status	0 = Currently unemployed 1 = Currently employed
FEDU	Father's Education	1 = if father has attained less than ten year education 2 = if father has attained at least ten year education
MPD	Mother Participation in Decision Making Regarding Consumption	1 = if mother has participated in decision making 0 = Otherwise
EMM	Exposure to Mass Media	1 = if a home has a television (considered exposure) 0 = Otherwise
WSH	Wealth status of Household	1 = if mothers have belong to poorest, poorer and middle wealth quintile (considered poor) 2 = if mothers have belong to richer and richest wealth quintile (considered non-poor)
POR	Place of Residence	1 = Urban 2 = Rural
ATT	Availability of Toilet	1 = Availability of toilet 0 = Otherwise
ASW	Availability of safe Drinking Water	1 = Availability of safe drinking water 0 = Otherwise
UMNFP	Unmet need for Family Planning	0 = No 1 = Yes
MES*MEDU	Interaction term of mother's employment and their education	

METHODOLOGY

The dependent variable of this study is categorical with two categories i.e. mother has ever experienced the death of their child or mother has never experienced the death of their child. Thus, we have applied binary logistic regression for empirical investigation. All analyses are done in SPSS version 20. “We have investigated the interaction effect using bootstrap-based Hayes’ PROCESS macro (Hayes, 2012). It is well-proven statistical method of resampling that evaluations the factors of the model and their standard errors strictly from the sample” (Zafar et al., 2022; Yasir et al., 2021; Abid et al., 2021; Asim et al., 2021; Rafique et al., 2020; Ali et al., 2020; Asif et al., 2022; pp-4).

RESULTS

Socioeconomic characteristics of MWRA are presented in Table 2. Of total 48,501 MWRA, 7.6% had experienced a child dying under the age of 5 years. Majority of the women belonged to rural areas (54.6%), and poor wealth status (66.3%), had education less than 10 years (74.2%), had currently unemployed (85.9%), had husband with at least secondary schooling (52.7%), did not participate in decision making (55.1%), had no mass media exposure (57%), availability of toilet facility (83.9%), no availability of clean drinking water (75.1%), and no UMNFP (79.1%).

Table 2
Different Characteristics of Respondent

Characteristics of Respondent		Frequency	Percent
Child Mortality	No	44,827	92.4 %
	Yes	3,674	7.6 %
Mother’s Education	Less than ten-year education	35,991	74.2%
	Atleast ten-year education	12,510	25.8%
Mother’s Employment Status	Currently unemployed	41,652	85.9%
	Currently employed	6,849	14.1%
Father’s Education	Less than ten-year education	22,943	47.3%
	Atleast ten-year education	25,558	52.7%
Mother’s Participation in Decision-making	No	26,742	55.1%
	Yes	21,759	44.9%
Exposure to Mass Media	No exposure	27,623	57.0%
	Exposure	20,878	43.0%
Wealth Status of Household	Poor	32,174	66.3%
	Non-poor	16,327	33.7%
Place of Residence	Urban	22,038	45.4 %
	Rural	26,463	54.6 %
Availability of Toilet Facility	No availability	7,812	16.1%
	availability	40,689	83.9%
Availability of Safe Drinking Water	No availability	36,409	75.1%
	availability	12,092	24.9%
Unmet Need for Family Planning	No	38,346	79.1 %
	Yes	10,155	20.9%

The results (Table 3) demonstrate that mother's education ($\beta = -0.370$, $p < 0.01$), father's education ($\beta = -0.172$, $p < 0.01$), her participation in decision making ($\beta = -0.068$, $p < 0.05$), her mass media exposure ($\beta = -0.053$, $p < 0.05$), wealth status ($\beta = -0.299$, $p < 0.01$), availability of toilet facilities ($\beta = -0.180$, $p < 0.01$), availability of safe drinking water ($\beta = -0.221$, $p < 0.01$) and no UMNFP ($\beta = -0.107$, $p < 0.01$), are protectively related with child mortality. The impact of mother's employment ($\beta = 0.105$, $p < 0.05$), on child mortality has been found to be positive similarly, effect of place of residence on CM is positive but statistically insignificant ($\beta = 0.063$, $p > 0.05$).

Table 3
Results of Binary Logistics Regression

Independent Variables		B	Sig.	OR
Mother's Education	Less than ten year education	Ref		
	Atleast ten year education	-0.370	0.000***	0.691
Father's Education	Currently unemployed	Ref		
	Currently employed	-0.172	0.000***	0.842
Mother's Employment Status	Less than ten year education	Ref		
	Atleast ten year education	0.105	0.028**	1.111
Mother's Participation in Decision-making	No	Ref		
	Yes	-0.068	0.039**	0.935
Exposure to Mass Media	No exposure	Ref		
	Exposure	-0.053	0.018**	0.948
Wealth Status of Household	Poor	Ref		
	Non-poor	-0.299	0.000***	0.741
Place of Residence	Urban	Ref		
	Rural	0.074	0.065	1.077
Availability of Toilet Facility	No availability	Ref		
	availability	-0.180	0.000***	0.835
Availability of Safe Drinking Water	No availability	Ref		
	availability	-0.221	0.000***	0.802
Unmet Need for Family Planning	Yes	Ref		
	No	-0.107	0.013**	0.898

***P<0.01; **P<0.05

The interaction factor of mother's employment status and mother's education ($\beta = -0.184$, $p < 0.001$) is protecting for CM (Table 4).

Table 4
Results of Moderation/Interaction

	β	p-value
Constant	-1.109	.000
Mother's education	-.242	.000***
Mother's employment status	.228	.000***
Mother's employment status * Mother's education	-.184	.001***

*** $P < 0.01$; ** $P < 0.05$

Slope examination is performed to additional exemplify the interaction between mother's employment status and CM in Fig 1.

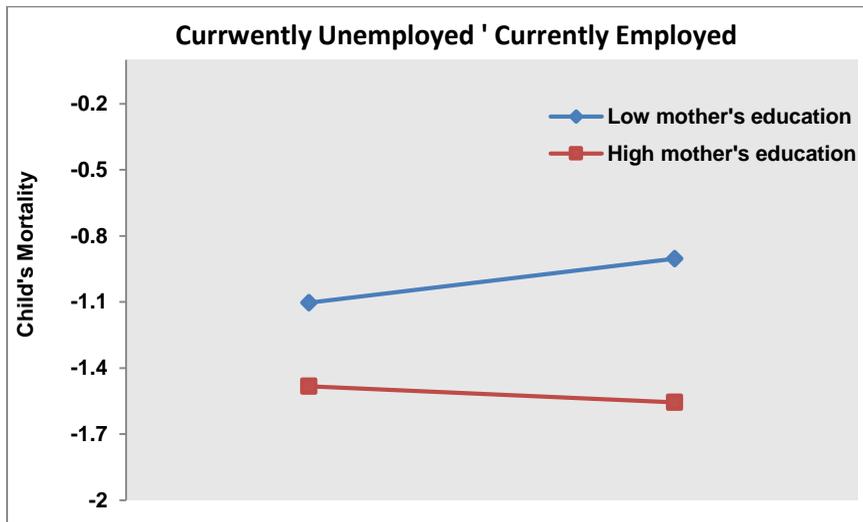


Figure 1: Graphical Representation of Moderation Analysis

The figure shows that mother's education is important to change the association between mother's employment and child mortality. Both slopes are significantly different which illustrates that the relationship of mother's employment and child mortality is contextual specific and dependent upon the education of mothers. The positive effect of mother's employment on child mortality vanishes and turns to be negative in the case of highly educated mothers. Thus, education of women proves to an important factor which is helpful to reduce the likelihood of child mortality.

DISCUSSIONS AND IMPLICATIONS

Parents education, mother's employment status, her participation in decision making, exposure to mass media, wealth status of household, access to toilet facility, availability of clean drinking water and UMNFP have been identified as important determinants of CM in Pakistan. It is to be noted that the maternal education and child mortality are negatively associated with each other. With the increase in mother's education, child mortality decreases. This is because highly educated women can take care of herself during pregnancy and her child in a better way (Zahid, 1996; Kabir et al., 2011; Khan et al., 2020). The second reason of this negative relation is that the educated mothers are more likely to use modern health facilities which are important for their children's health (Chawdhury et al., 2010; Folasade, 2000; Mondal et al., 2009; Uddin, 2009; Qaiser et al., 2021). "The coefficient of child mortality is positive for employed female. The impact of women's employment on maternal and child health services utilization has been inconsistent across studies. Number of studies which exhibit positive association states that women's employment enhances their influence over earned money, which make them empowered to seek maternal and child health services" (Asif et al., 2021; pp-8; Fawole and Adeoye, 2015; Asif et al., 2017; Hydari et al., 2021). Mother's participation in decision making has a negative effect on child mortality. Usually men prefer larger family size and demand less contraception as compared to women (Becker, 1999; Khan et al, 2020). That's why when women acquire relatively greater bargaining power, i.e. female autonomy; we observe lower fertility rates (Balk, 1994; Eswaran, 2002) and greater use of contraception (Ashraf, Field and Lee 2014).

It was determined that the unwanted births reduced up to 57% in the case of those women who participated in decision making (Eswaran, 2002). Maitra (2004) found that greater female participation can help to decline the child mortality because empowered women have greater parental care and they have more intentions for delivery in hospital. Exposure to mass media can help to diminish CM. It is found that the likelihood of child mortality will be less for those mothers who have access to television (Bennett, 1999).

Wealth status of household indicates the income level and living standards of the population. Wealthier households are less likely to have child mortality than poorer households. Because, poorer households are less probable to have basic health services. In such circumstances, child mortality is high in a poorer household (Ali, 2001; Batieha et al., 2016; Chauhan and Rai, 2015; Nisar and Dibley, 2014; Harttgen and Misselhorn, 2006; Quamrul et al., 2010; Susuman, 2012). Poverty has been stated to rise child mortality by decreasing access to proper healthcare (Afridi et al., 2021; Lawn et al., 2005). Availability of toilet facilities has a inverse effect on child mortality. Our results are same with the results of Mondal et al. (2009) and Wang and Jacoby (2004). Similarly, availability of safe drinking water can also reduce the likelihood of child mortality. This is because the contaminated water can be an important reason of the problems of diarrhea and other health diseases which remain the major reason of child mortality and morbidity (NAFDAC, 2001). There is a positive relationship between no UMNFP and child mortality. UMNFP is likely to reduce the birth interval of child which can lead to poor health of newborn babies. As a result, chances of child mortality are increased. The moderating effect of mother's education on the relationship of mother's employment and child mortality is also negative. It is so because the likelihood of child mortality is expected to

decrease if he or she is born to well-educated women. It is more likely that educated mothers who are also employed will have better awareness about child's health and can also avail child health care facilities in a better way.

CONCLUSIONS

Parents education, mother's participation in household decision making, wealth status of household, exposure of media, availability of clean drinking water and availability of toilet facility have been identified as important predictors of child mortality in Pakistan. Furthermore, UMNFP has been explored as an important determinant of child mortality as the probability of child mortality increases with the rise in UMNFP.

The goal of reduction in child mortality can be attained by increasing the opportunity of education for all segments of society and particularly by focusing on the availability of female's education. Television can be used as an effective media tool to create awareness among people. They may be sensitized about the use of hygienic practices which can help to diminish the probability of child mortality. Such media campaign can also be used to sensitize women about their rights. It can help to increase their empowerment and participation in household decision making which has also been proved to be an important factor to reduce CM. The probability of UMNFP can be brought down by improving the availability of contraceptives and by reducing the fear of side effects of using family planning methods among women through effective media campaign. Engagement of community and religious leaders, NGOs and media can be supportive for this purpose. Government must amplify the efforts for the provision of clean and safe drinking water and modern sanitation facilities to avoid the threat of diseases like malaria and diarrhea which are the important causes of child mortality.

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