Influence of Maternal Education on Child Health Status in Sindh, Secondary Data Analysis

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ABSTRACT

Objective: To determine the influence of maternal education on childhood under-nutrition, timely vaccination, breastfeeding and weaning practices among children under 5 years of age, Sindh, Pakistan.

Methods: A secondary data analysis was conducted by using the data from Pakistan Demographic Health Survey 2017-18. About 1691, mothers between ages of 15-49, who had at least one living child in the past five years, were included. The education of these mothers was the independent variable while the dependent variables were child mortality, immunization, nutrition status, breastfeeding and weaning practices. SPSS version 27 was used to analyze the data. Mean and Standard deviation for continuous variables while Frequencies and percentages were calculated for categorical data. Logistic regression analysis was performed, . P-value of less than 0.5 was considered significant and 95% Confidence intervals were also measured.

Results: In this study the mean age of children were 2.82 ± 1.8 SD. About 96% of children were found to be vaccinated. Children of educated mothers had 1.8 times higher odds of being fully vaccinated (p= 0.058), 1.3 Odds of starting weaning at 6 months of age (p=0.033), 30 times higher odds to be not stunted (p=0.001) and a 1.2 times higher odds of immediate initiation of breast feeding (p=0.003).

Conclusion; In this study we were able to highlight the importance of maternal education on a child's health since children of educated mothers had far better health outcomes than of those who were not educated. Therefore, maternal education is considered as one of the most important factor in child's health.

Keywords: Maternal Education, Vaccination Status of Child, Exclusive Breastfeeding, Weaning, Nutritional Assessment

(Citation: Syed Haji Banadi[1], Nawab Faryal[2],Naqvi Ali Sanower[3] , Fatima Kiran[4], Malik Tehreem[5], Mengal Anum[6]
MedChannel 2026, 32 (4) 32-40

ARTICLE INFORMATION

Received on: 04-05-2022
Correction: on: 11-12-2022
Accepted: 30-11-2023

Authors Contribution:
All authors equal contribution in all aspects vide lead author study design and manuscript drafting

Conflict of Interest Disclosures: None
Disclose of Funding: None

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INTRODUCTION

According to UNICEF in 2019, 14000 children under five years of age died each day, the causes being largely preventable. The major contributors to this figure were the underdeveloped countries like certain parts of Africa and Asia. Although quite a number of factors led to this immense loss of future lives, lack of maternal education was one of the leading causes1. Maternal education has been suggested by a large number of studies to be linked with child mortality, growth, nutrition, immunization, breastfeeding practices and utilization of child health services. Although researches are going on regarding this statement, and there are many other factors affecting a child's health outcome such as: the environment, socioeconomic status, lack of government services, gender biasness etc. the majority of studies have agreed that there is significant association between a mother's education and multiple components of her child's health[2].

In 2019 a research conducted in Ethiopia observed that the mortality of children under 5 years of age was 7.5% and 2.6% in uneducated and educated mothers, respectively[3]. Another research from Bangladesh in 2013 concluded that 65% of children were stunted and maternal literacy rates were low, 71% of the mothers in the country were either illiterate or had received less than primary education4. According to a study in Kenya, children of mothers who had received primary education were 2.17 times more likely to get fully vaccinated than in children of mothers who had received no education at all5. Data from a European survey indicated that at [4] months, mothers with high education levels from Denmark, Netherlands and Germany had the highest exclusive breast-feeding rates of 71%, 52% and 50%, respectively. Hence, data from these international researches establishes the impact of maternal education on different aspects of child health[6]. A study done in Turkey showed that women with primary, secondary, and college/university education were between 2.21 ($p < 0.01$) and 9.10 ($p < 0.001$) times more likely to immunize their children than those who had less than a primary education[7].

In Pakistan, 50% of women are illiterate while 25% have received secondary or higher education. According to the recent UNICEF data, Pakistan has an under five-year childhood mortality rate of 67.2 per 1,000 live births. Different studies have shown that Pakistan has the highest growth rate of stunted children (45%), followed by Afghanistan (43%) 8. In 2017, 66% of children aged 12-23 months have had all basic vaccines done while 51% had been given age-appropriate vaccines and 4% had no vaccination done. Breast-feeding practices showed that 48% of children under the age of 6 months are exclusively breastfed. A study conducted in Pakistan showed the association of maternal stature, maternal education and child growth in which it was seen that mothers with short statures and low education levels have a higher number of stunted, and underweight children. The overall prevalence of stunting, underweight, wasting, and overweight in our sample was 45%, 26.2%, 9.9%, and 9.5%, respectively9.

Local studies of Pakistan however, have not paid sufficient attention to the association between maternal education and child health outcomes. A study was conducted (Raja-2020) to determine the predictors of infant mortality in (Tharparkar) Sindh. The research reflected that the predictors of infant mortality in Thar- Parkar were famine, low income, scarcity of safe water, lack of medication and health care services and poor parental education especially maternal. Females schooling had a significant improvement in child health10.

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As a third-world country, Pakistan has yet to catch-up with the world when it comes to literacy of the population and female education specifically is given little priority within the country. Hence, this study may help to establish the impact of maternal education on a child's life and thereby help the government devise strategies to promote female and maternal education in the country, and consequently improve child health outcomes. The objective of this study was to determine the influence of maternal education on the child health aspects including; child nutrition, under-5 mortality, vaccination status, breast-feeding and weaning practices.

This study therefore, aims to determine the influence of maternal education on child's health status

Table 1 : Distribution of Socio-demographic characteristics of Study Participants

Sociodemographic characteristics	Frequency (n)	Percentages (%)
Age in years		
Mean SD	30.61	-
	6.523	-
Area of residence		
Urban	753	44..5
Rural	938	55.5
Wealth Index		
Poorest	836	49.4
Poor	376	22.2
Middle	202	11.9
Richer	148	8.8
Richest	129	7.6
Educational attainment		
Uneducated	**1077**	**63.7**
Primary	**233**	**13.8**
Secondary	**242**	**14.3**
Higher	**139**	**8.2**
Total number of living children born in past five years		
One	**1161**	**68.7**
More than one	**530**	**31.3**

in Sindh, Pakistan using data from Pakistan Demographic Health Survey 2017-18. It will emphasize on the role of maternal education in childhood mortality, nutritional status, vaccination and breast-feeding practices of the children under 5 years of age.

METHODS

This study was secondary data analysis of child health factors using data that was acquired from the latest Pakistan Demographic Health Survey carried out in 2017-2018. PDHS collects data and provides estimates of multiple basic demographic and health indicators from all over Pakistan.

The present research was carried out after formal approval of the project by Jinnah Medical and Dental Hospital's Ethics Review and Research Committee but we limited our analysis to the population of Sindh province from PDHS 2017-18. About 1691 females who were ever married between the ages of 15-49 years, who had one or more living children in the past five years (before survey) and belonged to Sindh province were included in the analysis. Women's Questionnaire which was used to collect information from all eligible ever-married women age 15-49. In the PDHS survey these women were asked questions regarding their Background characteristics (including age, education, and media exposure), Pregnancy history and child mortality, Knowledge, use, and source of family planning methods, Antenatal, delivery, and postnatal care,

Table 2 ; Frequency Distribution of Children included in the analysis

Sociodemographic characteristics Current age of child	Frequency(n)	Percentage (%)
Mean	**2.82**	—
SD	**1.8**	—
Child immunization status		
Vaccinated	**160**	**96.4**
Not vaccinated	**361**	**3.6**
Child nutrition status		
Stunted	**162**	**9.6**
Not stunted	**1529**	**90.4**
Immediately put to breastfeed after birth		
Yes	1691	1000
No	0	0
Exclusively breastfed for six months		
Yes	**1520**	**89.9**
No	**171**	**10.1**
Weaning started at 6 months of age		
Yes	**286**	**169**
No	**1405**	**83.1**
Had diarrhea in last 2 months		
Yes	**943**	**55.76**
No	**748**	**44.23**
had fever/cough in last 2 months		
Yes	**1077**	**63.7**
.No	**614**	**36.3**

Vaccinations and childhood illnesses, Breastfeeding and weaning practices.

As the purpose of this research is to determine the influence of maternal education which was our Independent variable, the mothers were assessed for how much education they had received which in this case was classified into 4 groups: illiterate/uneducated, having received primary, secondary or higher education. Child health factors such as infant mortality, breastfeeding practices, nutrition and vaccination were studied in children of the participating mothers. Breastfeeding practices was assessed by whether the child was immediately breastfed after birth, whether child was exclusively breastfed for 6 months and if child was weaned at 6 months (WHO recommends exclusive breastfeeding for the first 6 months of life, followed by continued breastfeeding with appropriate complementary foods for 2 years or more). Child nutrition was estimated by the growth of a child using height-for-age which is a measure of linear growth retardation and cumulative growth deficits. Children whose height-for-age Z-score is below minus two standard deviations (-2 SD) from the median of the reference population are considered short for their age (stunted), or chronically undernourished. Children who are below minus three standard deviations (-3 SD) are

considered severely stunted. Vaccination status was also confirmed by mother's report or vaccination card where child was considered to have basic vaccination if child had one dose of BCG vaccine (which protects against tuberculosis), three doses of DPT vaccine (which protects against diphtheria, Pertussis (whooping cough), and tetanus), three doses of polio vaccine and one dose of measles vaccine. These above-mentioned factors were considered as the dependent variables.

As this is a secondary-data analysis, no fieldwork, questionnaires or ethical consent were required. However, the sampling frame used for the 2017-18 PDHS, is a complete list of enumeration blocks (EBs) created for the Pakistan Population and Housing Census 2017, which was conducted from March to May 2017. The 2017-18 PDHS followed a stratified two-stage sample design. Data collected was analyzed with SPSS version 26. Mean and standard deviation were calculated for continuous variables like the age of mother. Proportions were calculated for categorical data like the vaccination status of the child and education of mothers. Odds ratio and 95% confidence intervals were estimated. P value less than 0.5 was considered significant. Binary logistic regression analysis was performed to determine the association between maternal education and children health indicators.

RESULTS:

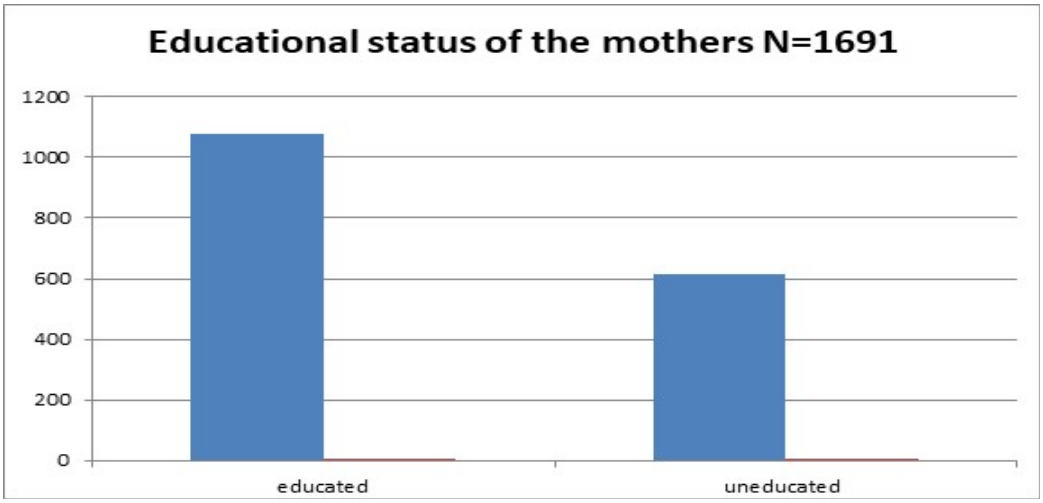
Table 1 shows that the mean maternal age of the mothers was 30.61 ± 6.523 SD. 753 (44.5%) came from urban areas and 938 (55.5%) came from rural areas. The wealth index of subjects was classified into 5 categories; poorest, poor, middle, richer and richest with 836 (49.4%) of the mothers belonging to poorest category, 376 (22.2%) belonging to poor, 202 (11.9%) categorized to the middle group, 148 (8.8%) belonging to richer and 129 (7.6%) classified into richest category. 63.7% were uneducated, while percentage of mothers with primary, secondary or higher education was 13.8%, 14.3% and 8.2% respectively. A total of 1161 (68.7%) of our subjects had one child birth in past five years and 530 (31.3%) of women had more than one child.

In table 2 the socio-demographic characteristics of children from our analysis. The mean age of children were 2.82 ± 1.8 S.D. The vaccination and nutrition status of the total 1,664 children was satisfactory with 1,603 (96.4%) of children vaccinated and 61 (3.6%) unvaccinated while 162 (9.6%) were stunted and 1,529 (90.4%) were not stunted. This showed a good health status and a green flag for the health of children. According to the history from the data, 100% of subjects (children) were breast fed immediately after birth. There was no delay in breastfeeding. Among those, 89.9% were on exclusive breastfeeding for six months whereas 10.1% had alternative nutritional means along with breast milk. The weaning of majority of the subjects did not comply with WHO guidelines as only 16.9% of children had started weaning at the age of six months while a major chunk of our subjects which is 83.4%had not. As stated in data, 55.76% of children presented with a history of diarrhea in the last two months (prior to PDHS study) and it was not reported in the remaining 44.23% children. History of fever/cough in last two months was positive for 63.7% of children and negative in 36.3% of children.

Table 3 shows the Uni-variate, children whose mothers were educated had 1.84 times more odds of getting vaccinated as compared to the children of illiterate mothers (p-value= 0.058 ,95% CI=0.898-3.791). There were significantly higher odds of children being stunted among uneducated mothers (p=0.000, 95% C.I. = 7.638-12.581). The odds of weaning at 6 months among children of educated mothers were significantly high (p=0.033, OR=1.358, 95%CI=0.996-1.851) as compared to the children of uneducated mothers. Children whose mothers were educated had higher odds of having exclusive breastfeeding for six months (p=0.004, OR=0.594, 95% CI=0.411-0.859).We found that there was no significant association between having diarrhea and respiratory illness among children in context to the education level of mothers. In Multivariate analysis it is shown that educated mothers had better vaccination status (AOR= 2.45, 95% CI=1.206-2.586,p=0.04), Stunting (AOR= 11.78, 95% CI=6.894-11.85,p=0.001), Good Weaning practices (AOR= 2.56, 95% CI=1.95-2.85,p=0.002) and exclusive Breastfeeding AOR= 1.421, 95% CI=1.114-3.475,p=0.001) hence became more significant . However, Diaarheal diseases and ARI re-

Table 3; Association between Maternal Education and Various Child Health factors

Characteristics Odds ratio	Un adjusted Confidence interval	95 %	p-value	AOR	95% CI	p-value
Completely Vaccinated **Yes** **No**	**1.84**	**1.39-3.791**	**0.058**	**2.45**	**1.206-2.586**	**0.04**
Stunted Yes No	**30.971**	**7.638-12.581**	**0.001**	**11.78**	**6.894-11.85**	**0.001**
Weaning started at 6 months Yes No	**1.358**	**0.996-1.851**	**0.033**	**2.56**	**1.95-2.85**	**0.002**
Exclusive breastfeeding for six months Yes No	**0.594**	**0.411-0.859**	**0.004**	**1.421**	**1.14-3.475**	**0.001**
Had diarrhea in past 2 months Yes No	**0.918**	**0.721-1.169**	**0.262**	**0.875**	**0.325-0.652**	**0.358**
Had fever/cough in past 2 months Yes No	**1.008**	**0.783-1.297**	**0.502**	**2.75**	**0.657-1.254**	**0.285**



mained non-significant.

DISCUSSION

This study highlights that certain socio-demographic variables have a significant impact on child health. Maternal age, maternal education, wealth index, family size, and residence are some examples of the variables that are associated with child health. However, the main objective of this study was to analyze how maternal education could impact a child's health outcomes. Using data from a nationally representative data (PDHS 2017-18), the study gives an insight about child health conditions and maternal literacy specific to the province of Sindh.

We found that a notable proportion of women subjected to the study belonged to rural areas and their socioeconomic status measured in accordance with the wealth index indicated that majority of them were poverty-stricken. The data also shows that the majority of the woman had minimal education with a significant number of them being illiterate. Thereby reducing the likelihood of utilization of health care resources, which is the main contributing factor in explaining the deteriorating health conditions of children.

Maternal education is one of the most important factors in building a healthier and more prosperous society as mothers are the primary household caretakers responsible for a child's nutrition, immunization and overall daily requirements. A study carried out in Malawi, Tanzania and Zimbabwe in 2015 found that the higher level or at least 10 years of maternal schooling is necessary in order to attain the basic health care knowledge. This shows that educated mothers understand the benefits of nutrition on child's growth and development, and so, establish healthy eating habits to prevent their children from predisposition to chronic health conditions[11].

Educated families usually don't have underage marriages, which has a positive impact on the health of both mothers and children due to the maternal age. Similarly, the wealth index of a family has a notable influence on child health both directly and indirectly. People who belong to low socioeconomic class have lesser accessibility to health care facilities and low access to proper education further leads to lack of awareness among the parents regarding child health[12].

Results showed that maternal education also has a substantial effect on the child immunization status. Children in the rural areas lack immunization due to the widespread taboos and religious myths regarding vaccinations[13]. However, a greater number of the subjects were surprisingly vaccinated as opposed to a small percentage who were not immunized. A study done in 2015 in Kenya and another in India demonstrated that immunization status of children was positively influenced by better education status of their mothers[14&15]. Another done in Uganda in 2020 also showed that maternal education significantly influenced a child's immunization status[16].

The study further shows that there is a significant association between maternal education and diarrhea among children. Prevalence of diarrhea decreases as the level of maternal education increases. It reduces from 15.5% among children of women who have no formal education to 6.4% among those whose mothers have tertiary education [17]. As there is no direct relation between maternal education and diarrhea among children, this result is probably attributed to the better nutrition, health care utilization and vaccination status of children of educated mothers[18]. It is also important for a mother to have the awareness about the proper intake of nutrients during her pregnancy because undernourished mother who do not eat enough can cause adverse effects on the growth of the fetus leading to restricted fetal growth and low birth weight as evident in one of the studies Cognitive development is also influenced by nutrition, so the children deficient of micro and macronutrients not only become stunted, wasted and underweight but suffer from intellectual disabilities as well. Moreover, even immediately after birth maternal education effects child health[19,20].

Breast milk is one of the most ideal sources of nutrition for an infant as it not only provides fats, vitamins and proteins, but also helps improve the child's immunity as it contains antibodies. It also lowers

the risk of a child developing asthma or allergies. With better breast-feeding practices, better nutrition and immunity are ensured in children. Both the present study as well as the previous studies showed that children of educated mothers were immediately put to breastfeeding after birth and were exclusively breastfed for 6 months. The children were also weaned at 6 months of age[21,22 & 23].

Therefore, many studies support that there were significant improvements seen in child health with educated mothers[24]. This improvement in child health outcomes leads to decreased infant and child mortality rates.

There are several strengths of this study as the secondary data have been obtained by the PDHS 17-18 which is one of the most reliable data sources of Pakistan. Secondly, in this data analysis we only included population of Sindh, as we wanted to know the regional data but there were few limitations of study as well Firstly this analysis was conducted used data from PDHS 2017-18 which was a cross-sectional study and was questionnaire based therefore information bias can occur.

Another limitation is that as it is a survey hence we cannot establish temporal relationship between the exposure and outcome.

CONCLUSION

Using the data from Pakistan demographic Health Survey 2017-18, we studied the effects of maternal education on various child health factors such as; child nutritional status (stunted/not stunted), vaccination status, mortality (under 5 years), and breastfeeding practices. The results of the study estimated that children with educated mothers had better nutritional status, were vaccinated, had been exclusively breastfed for 6 months and weaned at 6 months of age. These results were better in comparison to children whose mothers were uneducated. Estimated results overall suggested that maternal education can influence child health outcomes in a more positive way with better mortality rates, nutritional status, vaccination status and breastfeeding practices.

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