

Association of Educational Status of Mothers and Incomplete Immunization in Children of Tertiary Care Hospital

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Abstract

Objective: To determine the association of educational status of mothers and incomplete immunization in children presented at Tertiary Care Hospital, Karachi.

Methods: This Case-control study was conducted at Pediatric department, Abbasi Shaheed Hospital, Karachi; from July 2018 to January 2019. The data were prospectively collected from 434 subjects with consent out of which 217 had an incomplete vaccination status and 217 had completed vaccination status. Case group included unvaccinated children whose mothers were uneducated (mothers were labeled un-educated who were never enrolled in school, madrasa and received primary education), whereas control group included vaccinated children whose mothers were educated (mothers were labeled educated who were enrolled in school, madrasa and received primary education). Quantitative data were presented as simple descriptive statistics giving mean and standard deviation and qualitative variables were presented as frequency and percentages. Chi-square test was applied to compare both groups and the odds ratio was calculated. Effect modifiers were controlled through stratification to see the effect of these on the outcome variable. Using post-stratification chi-square test, a p-value of 0.05 was considered as significant.

Results: A total of 434 (217 cases and 217 controls) were included in this study. The mean age was 3.27 ± 1.79 years (case) and 3.49 ± 1.40 years (controls). Educational status of mothers was assessed verbally. Uneducated mothers are defined as those who did not receive formal education of any level, while educated mothers are defined as those who were enrolled in school or madarsa and received primary education or more. On the basis of which the uneducated mothers in case group were 144 (66.4%) while in control group was 52 (24%). Children with incomplete immunization were 6.25 times more likely to have uneducated mothers than those with complete immunization, after controlling for the other factors.

Conclusion: This study has strengthened the value of maternal education in context of complete childhood immunization because acquisition of literacy and health-seeking behavior enhance vaccine uptake for their children.

Key Words: Immunization, educational status, children.

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Introduction

According to WHO, immunization prevents 3 million deaths every year worldwide thereby reducing child mortality¹. Hesitation in immunization is reported by most of the developed and developing countries in spite of maximum advantages². In Pa-

In Pakistan, vaccine preventable diseases are mainly associated with the refusal of vaccination³. There are various factors that affect vaccine coverage. This suboptimal vaccine coverage is often associated with socioeconomic inequities⁴. Among the socioeconomic factors that affect vaccination, maternal education has often been suggested to be the most important factor explaining differentials in child health outcomes. The woman who acquires formal education is better in staking child healthcare⁵. Vaccine uptake is influenced by maternal education, socioeconomic conditions and empowerment. The 2017-18 Pakistan Health Development Survey (PDHS) reveals that maternal education has been

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neficial role in vaccine uptake. According to this survey, age specific vaccination was done in 51% of the children. A child is deemed age-appropriately immunized if he has received all the basic vaccines, as well as a dose of polio vaccine at birth, two doses of inactivated polio vaccine, one dose of typhoid conjugate vaccine and three doses of pneumococcal vaccine. Among age-appropriate vaccinations, 82% of children had mothers with a higher degree of education compared to 50% of children whose mothers had received no formal education⁶.

Another study revealed that the probabilities of receiving all the recommended vaccinations were 2.3 times higher among those children whose mothers had completed secondary education or higher than children of uneducated mothers⁷. As compared to developed countries, immunization coverage in Pakistan and India is very low⁸. The primary cause of this is ignorance about the importance of immunization caused by a lack of education and false beliefs about vaccines⁹. In Pakistan and India, people do not allow their women to leave the house for work or other errands, hence these nations have very low literacy rates¹⁰. Negussie and Colleagues in Ethiopia studied the effect of maternal knowledge regarding the merits of immunization and the negative perception of mothers regarding vaccine side effects in 584 samples¹¹. This study aims to target our efforts on at-risk populations only after understanding factors associated with suboptimal coverage of vaccination like maternal education. Educating women and especially regarding child health and vaccination can improve vaccination uptake. Maternal education will not only improve vaccine uptake, but it will also improve child health.

Patients And Method:

Following the ethical review board's acceptance of the synopsis of College of Physicians and Surgeons of Pakistan, this case-control study was carried out at the paediatrics department of the Abbasi Shaheed Hospital in Karachi over a period of six months, from July 7, 2018, to July 1, 2019.

For sample size calculation, we took 95% two-sided significance level (1-alpha), and 90% power. 55% (Educated mothers with incomplete immunization) in cases and 68.6%¹⁵ in control (un-educated mothers with incomplete immunization). A total of 434 patients were enrolled in study; 217 in the case and 217 in the control group. The required sample size was calculated using WHO software. Sampling technique was non-probability consecutive sampling. Inclusion criteria was that children with incomplete vaccination were labeled as cases while those with complete vaccination were labeled as control of either gender. Age ranged from 2-5 years.

Exclusion criteria included non-consenting mothers, caregivers other than mother responsible for immunization, mothers with a history of mania, bipolar affective disorder, or posttraumatic stress are diagnosed as per DSM-V criteria. Mothers with a history of having depression or on anti-depressant treatment and mothers with a history of postpartum blues or brief psychotic disorder were also excluded from the study.

Operational definition of incomplete immunization would be "any missed age-appropriate vaccine according to EPI schedule for vaccination". Some of the important vaccines are Bacillus Calmette–Guérin (BCG) vaccine primarily used to prevent tuberculosis and given at birth, oral poliovirus vaccines primarily used to prevent polio and given at 6th10th and 14th week after birth, pentavalent vaccine primarily used to prevent diphtheria, tetanus, pertussis (whooping cough), hepatitis B and Haemophilus influenzae type b (Hib) and given at 6th, 10th and 14th week after birth, pneumonia conjugated vaccine used to prevent pneumonia and given at 6th, 10th and 14th week after birth and MMR vaccine used to prevent measles, mumps and rubella and given at 9th and 15th month after birth.

After approval from the College of Physicians and Surgeons Pakistan, this study was conducted. Permission from the institutional ethical review committee was taken before the conduction of the study. Mothers who fulfilled the inclusion criteria

were selected from the Department of Pediatrics, Abbasi Shaheed Hospital, Karachi after taking informed consent. Children with incomplete vaccination were labeled as (Case) and children with complete vaccination were labeled as (Control). While immunized children are defined as children who have received vaccination according to EPI. a brief history of immunization was taken from the mother and confirmed from the immunization record/card of child. Incomplete immunization was labeled as per operational definition by the researcher. The findings of the quantitative variable (age) and qualitative variable (family monthly income status, occupational status, decision-making status i.e. empowered/un-empowered, family history of incomplete immunization, and incomplete immunization) were entered in the Performa attached as annexure.

Data were analyzed by SPSS version 16.0. Mean and standard deviation was calculated for age. Frequency and percentages were calculated for family monthly income status, occupational status, decision-making status (empowered/un-empowered), family history of incomplete immunization, number of children, and incomplete immunization (yes/no). Chi-square test was applied to compare both groups taking a p-value of ≤ 0.05 as significant with 95% CI. The odds ratio will also be calculated to see the association between maternal education and child immunization. Confounders were controlled through stratification of age, family's monthly income status, occupational status, number of children, decision-making status (empowered/un-empowered), and family history of incomplete immunization to see the effect of these on the outcome variable. Post-stratification chi-square test was applied to take a p-value of ≤ 0.05 as statistically significant with 95% CI.

Results

The total participants were 434 who were equally divided into case and control groups. In Table-1 mean age of the case group was 3.27 ± 1 of .79 whereas the mean age of the control group was 3.49 ± 1.40 . The mean age of the mother in the

case group was 36.28 ± 5.89 whereas the mean age of the mother in the control group was 37.23 ± 6.45 . The gender of children in the case group was 95 (43.8%) boys and 122 (56.2%) girls whereas in the control group is 89 (41%) boys and 128 (59%) girls. The educational status of mothers in the case group in which 144 (66.36%) were uneducated and 73 (33.64%) were educated whereas in the control group, 165 (76.04%) were educated and 52 (23.96%) were uneducated. The number of children in case group in which 95 (43.8%) were < 4 and 144 (66.4%) were > 4 whereas in control group in which 89 (41%) were < 4 and 128 (59%) were > 4 . The family monthly income group showed that out of 217 patients in the case group, 24 (11.1%), 46 (21.2%), 48 (22.1%), 65 (30%), and 34 (15.7%) belonged to the family monthly income group lower income group, lower-middle-income group, middle-income group, upper-middle-income group, upper-income group respectively. Out of 217 patients in the control group, 46 (21.2%), 46 (21.2%), 55 (25.3%), 52 (24%), and 18 (8.3%) belonged to the family monthly income group lower income group, lower-middle-income group, middle-income group, upper-middle-income group, upper-income group respectively. The family history of incomplete immunization of the case and control group was described. 44 (20.28%) participants in the case group had a history of incomplete immunization whereas 173 (79.72%) did not have a history of immunization. In the control group, 22 (10.14%) had a history of incomplete immunization whereas 195 (89.86%) did not have a history of incomplete immunization. The occupational status in the case group, 84 (38.7%) were employed and 133 (61.3%) were unemployed respectively. In the control group, 65 (30%) were employed and 152 (70%) were unemployed respectively. In the decision-making status in the case group, 99 (45.6%) were empowered and 118 (54.4%) were un-empowered respectively. In control group, 140 (64.5%) were empowered and 77 (35.5%) were un-empowered.

Fig 1 shows the stratification for occupational status concerning maternal education status showed that in the patients who had employed mo-

thers 28 (33.3%) and 61 (93.8%) in the case and control groups were educated respectively. Stratification for occupational status concerning maternal education status showed that in the patients who had unemployed mothers 45 (33.8%) and 104 (68.4%) in the case and control group were educated respectively. P-value was 0.00. The odds ratio was 0.30.

Table 1. Demographic details of study participants

| Variables | case | Control |
|---|--------------|--------------|
| Age of child | 3.27 ± 1.79 | 3.49 ± 1.40 |
| Age of Mother | 36.28 ± 5.89 | 37.23 ± 6.45 |
| Gender of child- | | |
| Boys- | 95 (43.8%) | 89 (41%) |
| Girls | 122 (56.2%) | 128 (59%) |
| Educational status of the mother | | |
| Educated- | 73 (33.6%) | 165 (76%) |
| Uneducated | 144 (66.4%) | 52 (24%) |
| Number of children | | |
| < 4- | 95 (43.8%) | 89 (41%) |
| > 4 | 122 (56.2%) | 128 (59%) |
| Family monthly income status- | | |
| Lower income group- | 24 (11.1%) | 46 (21.2%) |
| Lower-middle-income group- | 46 (21.2%) | 46 (21.2%) |
| Middle-income group- | 48 (22.1%) | 55 (25.3%) |
| Upper-middle-income group- | 65 (30%) | 52 (24%) |
| Upper-income group | 34 (15.7%) | 18 (8.3%) |
| Family history of incomplete immunization - | | |
| Had history of incomplete immunization- | 44 (20.3%) | 22 (10.1%) |
| Did not have a history of incomplete immunization | 173 (79.7%) | 195 (89.9%) |
| Occupational status - | | |
| Employed- | 84 (38.7%) | 65 (30%) |
| Unemployed | 133 (61.3%) | 152 (70%) |
| Decision-making status - | | |
| Empowered- | 99 (45.6%) | 140 (64.5%) |
| Un-empowered | 118 (54.4%) | 77 (35.5%) |

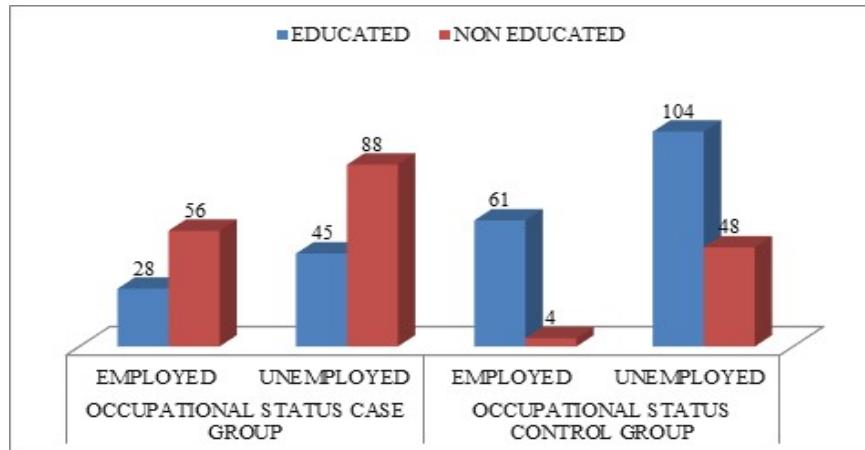


Fig 1. Maternal educational status of case and control according to occupational status N=434 (217 case and 217 control)

Discussion

The Pakistan Expanded Programme on Immunization (EPI) offers vaccinations and associated services on large scale. It provides life-saving vaccines to 7 million infants in addition to 7 million expectant mothers each year. In spite of these successes, our immunization programme has failed to reach to its full potential¹².

Our study showed that there was a female predominance in both case (56.2%) and control (59.0%) a finding which is contrary to a study done in Afghanistan by Mugali et al. which showed a male predominance (57%) in children aged 12-23 months¹³. Another study by Ayenew Engida et al. in Ethiopia showed 52.8% boys presented to the vaccination department with incomplete vaccination¹⁴.

Women empowerment and higher socioeconomic standing have a vital role in the promotion of complete immunization of children, as reflected by the study done by Lu Xinran, et al in Congo¹⁵. In our study, 45.6 % of cases and 64.5% of controls represented empowered mothers for the childhood vaccination. Similar results were seen in a study done on 2941 children by Jane O. et al. in Ethiopia who studied that socioeconomic status of mother and household autonomy strongly affect immunization status of children¹⁶.

This study showed that maternal ages were 36.28 ± 5.89 and 37.23 ± 6.25 in case and control groups respectively which are comparable to a study done by Ogundele et al. In Nigeria it was studied that the odds of incomplete vaccination were reduced among children of mothers aged 35 and above ($AOR = 0.75$; 95% C.I: 0.63-0.90)¹⁷.

In our study, educational status of mothers showed that in the case group, 144 (66.4%) were uneducated and in the control group, 52 (24%) were uneducated. After adjusting for the other characteristics, patients with incomplete immunization were 6.25 times more likely to have mothers without a high school diploma than those with complete immunization. According to research by Balogun et al, out of 661 kids, 40% had received

all their shots. In children with educated mothers compared to those without educated mothers, the prevalence ratio (PR) of full vaccination was 1.44 (95% CI: 1.16-1.77)¹⁸. Another study by Lakshmanasamy T, conducted in India on 12817 subjects, on nationwide data from 2015-16 the overall results showed that female education dominates over all other factors in generating a significant impact on child immunization coverage⁶. Another study supported that the knowledge of immunization was found to be related to mother's education and residing area¹⁹. More or less similar factors were studied by A. Ali et al and Desalew A, et al in Pakistan and south Ethiopia respectively^{20,21}.

Limitation of our study is single centered and lacking comparison of mothers without formal education.

Conclusion

It is concluded that a higher number of educated mothers get their children completely vaccinated for EPI vaccines. Uneducated mothers and family history of incomplete immunization are directly related to incomplete child vaccination. There is still a lot to learn about how to enhance execution and scale up ideas and practices that have been shown to be successful. The researchers recommend that the mass media for mothers and an educational program about immunization must be provided by the ministry of health to all maternal and child health care centers in Pakistan, and encourage the mother to use breastfeeding to decrease the risk for infection. Health education through the group in the Maternal and Child Health center must be provided.

Conflict of Interest

Authors have no conflict of interest and no grant/funding from any organization.

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