

ASSESSMENT OF MOTHERS' KNOWLEDGE REGARDING IMMUNIZATION OF CHILDREN UNDER 5 YEARS

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ABSTRACT

Background: Childhood immunization is among the most effective public health interventions for preventing vaccine-preventable diseases and reducing childhood morbidity and mortality. Maternal knowledge substantially influences the timely uptake and completion of routine childhood vaccination. In Pakistan, inadequate awareness and persistent misconceptions about vaccine safety and contraindications may contribute to suboptimal immunization practices. **Objective:** To assess mothers' knowledge regarding immunization of children under five years of age. **Study Design:** Descriptive cross-sectional study. **Settings:** Ittefaq Hospital Trust, Lahore, Pakistan. **Duration of Study:** March 2025 to August 2025. **Methods:** A total of 153 mothers with children under five years of age were enrolled through convenience sampling. Data were collected using an adopted and translated structured questionnaire comprising demographic characteristics and 13 knowledge-based items related to childhood immunization. Data were analyzed using SPSS. Descriptive statistics were computed as frequencies, percentages, mean, and standard deviation. Knowledge was categorized as low, average, or high based on predefined scoring criteria. **Results:** Among 153 participants, the mean age was 30.4 ± 6.8 years, and most mothers were aged 26–35 years (58.2%). The majority were married (90.2%), while 41.8% had a bachelor's-level education. Overall, 69 (45.1%) mothers had low knowledge, 56 (36.6%) had average knowledge, and 28 (18.3%) had high knowledge regarding childhood immunization. Although most participants acknowledged the importance of vaccination and its protective role against infectious diseases, notable misconceptions persisted regarding vaccine contraindications and safety. **Conclusion:** Maternal knowledge regarding childhood immunization was suboptimal, with most mothers demonstrating low to average knowledge. Targeted health education and clearer communication by healthcare professionals may improve maternal awareness and support better immunization coverage in children.

Keywords: Childhood Immunization, Maternal Knowledge, Vaccination, Under-Five Children

INTRODUCTION

Immunization remains one of the most cost-effective and evidence-based public health interventions available for reducing childhood morbidity and mortality globally (1). Vaccines protect children from a wide range of preventable diseases, and adequate vaccination coverage is essential for achieving herd immunity and preventing disease outbreaks (2). The World Health Organization (WHO) has consistently emphasized childhood vaccination as a cornerstone strategy for reducing vaccine-preventable diseases and under-five mortality rates (1). Despite these well-established benefits, immunization coverage remains suboptimal in many low- and middle-income countries (LMICs), where structural, social, and knowledge-related barriers continue to impede progress (3).

Mothers, as primary caregivers, play a pivotal role in determining whether children receive timely and complete immunization (4). Research consistently demonstrates that maternal knowledge, attitudes, and practices (KAP) are critical determinants of immunization uptake (5). Studies have shown that parents with adequate knowledge tend to exhibit positive attitudes and better vaccination practices for their children (1). In contrast, inadequate or inaccurate knowledge is associated with vaccine hesitancy, delay, and refusal (5). Misconceptions, cultural beliefs, and limited awareness further compound these challenges, particularly in high-risk communities (6).

Pakistan presents a particularly compelling case for studying maternal knowledge regarding childhood immunization. The country is one of only two nations where wild poliovirus transmission persists, making it a high-priority country for global immunization (2). Pakistan's Expanded Programme on Immunization (EPI) faces persistent challenges, with overall routine immunization coverage for fully

immunized children reported at approximately 66%. In comparison, coverage in provinces such as Balochistan is as low as 29% (7). Misperceptions rooted in cultural and religious beliefs have been identified as critical barriers to vaccine uptake, with misconceptions propagated by community leaders and extremist groups further undermining immunization efforts (6).

Studies conducted in Pakistan have highlighted that poor immunization rates contribute significantly to childhood mortality, with 20–30% of deaths among children attributed to acute respiratory and other preventable infections (8). Furthermore, vaccinators themselves have been found to possess only moderate to poor knowledge regarding EPI guidelines, underscoring systemic gaps across the immunization delivery chain (2). Integrated community-based interventions targeting maternal KAP have demonstrated feasibility and effectiveness in improving immunization coverage in Pakistani settings (9), yet significant data gaps remain regarding the baseline knowledge of mothers, particularly in rural and underserved areas. This study, therefore, aims to assess mothers' knowledge regarding immunization of children under five years, providing evidence to inform targeted educational interventions and policy decisions in Pakistan.

METHODOLOGY

The study used a descriptive cross-sectional design to assess mothers' knowledge of immunization for children under 5 years of age. The research was carried out at Ittefaq Hospital Trust, Lahore, Pakistan. Data were collected over a period of six months (March 2025 to August 2025) from mothers visiting the pediatric ward, pediatric intensive care unit, outpatient department, and the Expanded Program

on Immunization (EPI) center for routine child immunization services. The target population consisted of mothers with at least one child under 5 years of age who were present at the hospital during the data collection period.

The sample size was calculated using Slovin’s formula with a population size of 250 mothers attending the immunization department and a margin of error of 5%. Based on this calculation, the final sample size was determined to be 153 participants. Convenience sampling was used to recruit eligible participants who met the inclusion criteria. Mothers with children under five years of age and willing to participate were included in the study, whereas mothers without children under five and those working as healthcare professionals were excluded to minimize potential knowledge bias. Data were collected using an adopted and translated structured questionnaire designed to evaluate maternal knowledge regarding childhood immunization. The questionnaire consisted of two sections. The first section included demographic characteristics of the participants, such as age, marital status, educational level, and residence. The second section comprised 13 knowledge-based items assessing mothers’ understanding of childhood vaccination, its benefits and safety, and the sources of information. Each item was measured on a nominal response scale. The total possible knowledge score was 26. Based on the scoring criteria, knowledge levels were categorized as high (>66.6%), moderate (33–66.6%), and poor (<33.3%).

Prior to data collection, formal permission was obtained from the administration of Ittefaq College of Nursing and the concerned hospital authorities. Eligible participants were approached in the clinical areas, and informed consent was obtained after the purpose of the study was explained. Confidentiality and anonymity of the participants were ensured throughout the research process.

Data were entered and analyzed using the Statistical Package for Social Sciences (SPSS). Descriptive statistics were used to summarize the findings. Frequencies and percentages were calculated for categorical variables, including demographic characteristics and knowledge responses. Reliability of the knowledge assessment scale was evaluated using Cronbach’s alpha coefficient, while construct validity was assessed using the Kaiser–Meyer–Olkin (KMO) test and Bartlett’s test of sphericity. Data distribution was examined using the Kolmogorov–Smirnov test. A p-value of less than 0.05 was considered statistically significant. Ethical principles were maintained throughout the study, and all procedures were conducted in accordance with institutional research guidelines.

RESULTS

A total of 153 mothers with children under 5 years of age participated in this study conducted at Ittefaq Hospital, Lahore. The demographic characteristics of the participants included age, marital status, educational level, and residence. The mean age of the participants was approximately 30.4 ± 6.8 years, with the majority of mothers belonging to the 26–35 years age group (58.2%). Most respondents were married (90.2%), while a smaller proportion were widowed (7.8%) or unmarried (2.0%). Regarding educational status, 41.8% of mothers had a bachelor’s degree, 41.2% had completed matric/intermediate education, and 17.0% were uneducated. In terms of residence, 55.6% of participants belonged to urban areas, while 43.1% resided in rural areas (Table 1).

The descriptive analysis of knowledge-related questions showed that the majority of mothers had a positive understanding of childhood immunization. Most respondents reported that their children had received vaccinations (96.7%), while only 3.3% indicated that their children had not. Similarly, 92.8% of mothers believed that vaccination is important from the first day of birth, and 97.4% agreed that vaccination prevents infectious diseases.

Furthermore, 88.2% of mothers believed that vaccination reduces death and disability, while 90.8% recognized that diseases such as diphtheria, tetanus, and pertussis can be controlled through vaccination. Knowledge of hepatitis B prevention through vaccination was reported by 82.4% of respondents, while 75.8% believed that measles can be controlled through childhood vaccination (Table 2).

The study also explored mothers’ knowledge about vaccine safety and common misconceptions. Only 37.3% of mothers correctly recognized that mild fever, diarrhea, or malnutrition are not contraindications to vaccination, while 62.7% believed these conditions may prevent vaccination. Regarding vaccine side effects, 91.5% of participants acknowledged that some vaccinations may cause mild fever or pain. In comparison, 26.8% believed that vaccines can cause cramps or rashes, indicating some misconceptions regarding adverse effects.

Additionally, 94.8% of mothers agreed that even a healthy child requires vaccination, and 96.1% believed that vaccination helps keep children healthy (Table 3).

Table 1: Demographic characteristics of study participants (n = 153)

Variable	Category	Frequency (n)	(%)
Age (years)	18–25	28	18.3
	26–35	89	58.2
	36–45	36	23.5
Marital Status	Unmarried	3	2.0
	Married	138	90.2
	Widow	12	7.8
Education Level	Uneducated	26	17.0
	Matric/Intermediate	63	41.2
	Bachelor (B.A)	64	41.8
Residence	Urban	85	55.6
	Rural	66	43.1
	Other	2	1.3

Table 2: Mothers’ knowledge regarding benefits of vaccination (n = 153)

Statement	Yes n (%)	No n (%)
The child has received a vaccination	148 (96.7)	5 (3.3)
Vaccination is important from birth	142 (92.8)	11 (7.2)
Vaccination prevents infectious diseases	149 (97.4)	4 (2.6)
Vaccination reduces death and disability	135 (88.2)	18 (11.8)
Vaccines control diphtheria, tetanus, and pertussis	139 (90.8)	14 (9.2)
Hepatitis B can be prevented by vaccination	126 (82.4)	27 (17.6)
Vaccination can control measles	116 (75.8)	37 (24.2)

Table 3: Knowledge regarding vaccine safety and misconceptions (n = 153)

Statement	Yes n (%)	No n (%)
Mild illness (fever/diarrhea) is not a contraindication	57 (37.3)	96 (62.7)
Some vaccines may cause fever or pain	140 (91.5)	13 (8.5)
Vaccines can cause cramps or rashes	41 (26.8)	112 (73.2)
A healthy child still needs vaccinations	145 (94.8)	8 (5.2)
Vaccination keeps children healthy	147 (96.1)	6 (3.9)

Participants were asked about their main sources of information regarding childhood vaccination. The majority of mothers reported

social media as their primary source of information (55.6%), followed by friends and relatives (41.8%), while only 2.6% reported receiving information from primary health care centers (Table 4).

Table 4: Sources of information regarding vaccination (n = 153)

Source of Information	Frequency (n)	Percentage (%)
Primary health care center	4	2.6
Friends and relatives	64	41.8
Social media	85	55.6

Based on the scoring criteria used in the questionnaire, mothers' overall knowledge levels regarding childhood immunization were categorized as low, average, or high. The results indicated that 45.1% of mothers had low knowledge, 36.6% had average knowledge, and only 18.3% demonstrated high knowledge regarding immunization of children under five years (Table 5).

Table 5: Overall knowledge level regarding immunization (n = 153)

Knowledge Level	Frequency (n)	Percentage (%)
Low knowledge	69	45.1
Average knowledge	56	36.6
High knowledge	28	18.3

DISCUSSION

The present study assessed mothers' knowledge of childhood immunization at Ittefaq Hospital, Lahore, revealing that 45.1% had low knowledge, 36.6% had average knowledge, and only 18.3% had high knowledge. These findings are broadly consistent with, yet contextually nuanced against, existing literature from Pakistan and beyond. Regarding general awareness of vaccination benefits, the current study found that 97.4% of mothers agreed that vaccination prevents infectious diseases, and 96.7% reported their children had received vaccination. Hussain et al. similarly reported that 96.85% of parents in Rawalpindi and Islamabad believed child immunization was important. However, they noted that overall parental knowledge remained inadequate despite positive perceptions Hussain et al.¹⁰ Sebastian et al. further corroborated that adequate KAP scores were observed in only 51.19% of parents, underscoring persistent knowledge gaps even where positive attitudes exist (5).

A critical finding of the present study was that only 37.3% of mothers correctly identified that mild illness is not a contraindication to vaccination, indicating widespread misconceptions. Soofi et al. similarly documented that fear of adverse effects and misconceptions were significantly associated with routine immunization refusal in high-risk areas of Pakistan (11). Akram et al. further reported that most vaccinators in Pakistan themselves demonstrated moderate to poor knowledge regarding EPI guidelines, suggesting systemic knowledge deficits across the immunization delivery chain (2).

Concerning information sources, 55.6% of mothers in this study relied primarily on social media, while only 2.6% received information from primary health care centers. Fadl et al. reported that parents who used social media as their primary information source demonstrated significantly higher vaccine hesitancy than those relying on healthcare providers (12). This finding is particularly concerning, given Pakistan's documented challenges with vaccine misinformation (6).

Noh et al. identified that the source of maternal and child health information was a significant determinant of immunization coverage in Sindh, Pakistan, reinforcing the importance of healthcare-provider-led education (13). Faisal et al. further demonstrated that maternal education level was significantly associated with complete immunization in Punjab, with bachelor's -educated mothers more likely to vaccinate their children (14), which partially aligns with our sample's educational distribution, where 41.8% held bachelor's

degrees, yet overall knowledge remained predominantly low or average. Atteraya et al., analyzing DHS data across South Asia, confirmed that a higher maternal educational level was the strongest predictor of complete childhood immunization in Pakistan (15). At the same time, Desalew et al.'s meta-analysis in Ethiopia found that maternal knowledge significantly reduced incomplete vaccination (OR = 0.31) (16), collectively suggesting that knowledge-enhancement interventions targeting mothers are universally critical. Khalil et al. demonstrated that health education interventions significantly improved mothers' knowledge and practices regarding immunization, with good knowledge increasing from 28.6% pre-intervention to 75.7% post-intervention (17), highlighting the transformative potential of structured educational programs.

Thus, the predominantly low knowledge levels observed in this study, particularly regarding contraindications and vaccine safety, alongside heavy reliance on social media for health information, underscore the urgent need for targeted, healthcare-provider-led educational interventions for mothers in Pakistan.

CONCLUSION

The study indicates that maternal knowledge regarding childhood immunization remains insufficient despite generally positive attitudes toward vaccination. Targeted educational interventions and improved health communication strategies may help address misconceptions and improve immunization practices among mothers.

DECLARATIONS

Data Availability Statement

All data generated or analysed during the study are included in the manuscript.

Ethics approval and consent to participate

Approved by the department Concerned. (IRBEC-ICN-092/25)

Consent for publication

Approved

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Not applicable

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTION

AMNA ZAIB (Student)

Conceived the study, coordinated data collection, performed analysis, and prepared the first draft of the manuscript
Provided academic supervision, contributed to study design and critically reviewed the manuscript

QURT-UL-AIN ANJUM (Student)

Assisted in data collection, literature review, and manuscript preparation

Participated in data acquisition, data entry and results organization

GHUZALA ANWAR (Supervisor)

Assisted in compilation of results, referencing and proofreading
Provided academic supervision, contributed to study design and critically reviewed the manuscript

HUMAIRA SADDIQUE (Assistant Professor)

Contributed to survey administration, documentation and preliminary analysis

IQRA YASIN (Principal)

Provided academic supervision, contributed to study design and critically reviewed the manuscript

All authors read and approved the final version of the manuscript.

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