

## Article

# Knowledge, Attitude and Practice of Mothers Towards Expanded Program on Immunization in District Poonch AJK

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## ABSTRACT

**Background:** Childhood immunization is a cornerstone of public health, yet vaccine hesitancy, misinformation, and regional disparities remain critical barriers to full coverage in low-resource settings. In rural areas like District Poonch, AJK, limited data exist on maternal perspectives, leaving a gap in understanding the sociocultural and knowledge-based determinants influencing immunization adherence. **Objective:** This study aimed to assess the knowledge, attitudes, and practices (KAP) of mothers toward the Expanded Programme on Immunization (EPI) in District Poonch, Azad Jammu and Kashmir, and examined the association between maternal education and knowledge level to identify key areas for intervention. **Methods:** A descriptive cross-sectional survey was conducted among 60 mothers (n = 60) with at least one child under 10 years. Participants were selected using simple random sampling. A structured, pretested questionnaire assessed KAP variables. Data was collected via face-to-face interviews in Urdu and analyzed using SPSS v27. Ethical approval was obtained from the IRB of NN University (IRB/2018/IM-001), and the study followed the Helsinki Declaration. **Results:** 91.5% of mothers were classified as highly knowledgeable. A significant association was found between maternal education and knowledge level ( $\chi^2 = 10.21$ ,  $p = 0.0371$ ). Nearly all mothers (98.3%) completed their children's immunization schedules and proved strong positive attitudes. **Conclusion:** While overall maternal knowledge and immunization practices were commendable, gaps stay in technical understanding of contraindications and vaccine timing. Education-focused strategies are vital for enhancing immunization uptake in underserved regions like AJK.

**Keywords:** Immunization Coverage, Vaccine Hesitancy, Maternal Knowledge, Public Health, Cross-Sectional Studies, Primary Health Care, Attitude to Health

## INTRODUCTION

Immunization has played a transformative role in reducing the burden of communicable diseases globally. Over the past few decades, prompt and complete vaccination coverage has significantly reduced the incidence of preventable illnesses and associated mortality. The World Health Organization (WHO) estimates that immunization currently prevents between 2 to 3 million deaths annually by protecting children from life-threatening diseases such as childhood tuberculosis, measles, tetanus, diphtheria, polio, and pertussis. These vaccine-preventable diseases, if not addressed early through routine immunization, can result in long-term disability, preventable deaths, and a reduced quality of life, particularly among children in low- and middle-income countries. In Pakistan, the national immunization schedule includes several doses of essential vaccines from birth to two years of age, aimed at protecting children during their most vulnerable period of development.

Despite public health initiatives and nationwide efforts through programs such as the Expanded Programme on Immunization (EPI), the uptake of childhood immunization in Pakistan faces critical challenges. Health authorities aim to eradicate vaccine-preventable diseases, yet hesitancy and misconceptions among parents remain substantial barriers. Multiple studies, including reports from the Centers for Disease Control and Prevention (CDC), have highlighted a general distrust or lack of awareness among parents regarding the safety, efficacy, and necessity of childhood vaccines. Some parents believe that vaccines can cause disabilities or long-term side effects, while others express concerns about infertility or productivity loss due to specific vaccines, such as the polio vaccine. These beliefs significantly influence parents' decisions about immunizing their children and can undermine national immunization targets. Thus, the parental knowledge, attitudes, and practices (KAP) toward

immunization are pivotal in shaping both community health outcomes and the effectiveness of national programs.

Globally, while nearly 2 million deaths are prevented annually due to immunization, vaccine-preventable diseases continue to cause up to 2.5 million deaths per year, especially among children under five in low-resource settings across Africa and Asia. In many developing countries, although national immunization programs report high overall coverage, significant disparities exist in under-immunized or completely unimmunized populations. These gaps are often linked to geographical barriers, misinformation, health system limitations, and sociocultural resistance. There is thus an urgent need to explore the barriers to full immunization coverage, especially at the community level, and to identify strategies that can increase vaccine acceptance among parents.

A multiregional study conducted in countries such as Bangladesh, Malawi, the Philippines, India, and Ethiopia revealed both a strong community demand for vaccination and widespread dissatisfaction due to weak communication between mothers and healthcare providers. Similar findings have been reported in South Asian countries, including Nepal, where ineffective provider-parent communication and weak service delivery systems hinder program impact. Supply-side factors, such as limited availability of trained vaccinators, poor healthcare infrastructure, and lack of culturally sensitive communication strategies, have been found to play a larger role in immunization coverage than demand-side factors alone. Studies by Matsuda (2002) and Donzales et al. (2014) have emphasized the importance of the healthcare provider's attitude, interpersonal skills, and perceived credibility in shaping a mother's decision to vaccinate her child. These interactions not only build trust but also influence knowledge retention and behavior adoption.

Importantly, access to immunization services alone does not guarantee their utilization. Acceptability of services depends on multiple factors including affordability, parental knowledge, cultural beliefs, and opportunity costs such as time, distance, or income loss associated with clinic visits. Social attitudes toward education and health literacy, as well as parents' trust in healthcare systems, play central roles in determining immunization behavior. Although research is still evolving, growing evidence suggests that health advocacy, community-based education, and targeted social mobilization campaigns can significantly improve immunization awareness and participation rates. However, the effectiveness of these strategies varies greatly across geographic and sociocultural contexts. Hence, there is a strong case for conducting localized KAP studies to assess specific community-level barriers and facilitators to immunization, which can then inform tailored health interventions.

In addition to behavioral and social determinants, understanding the biological basis of immunization can help correct misinformation. The immune system protects the body through cells that identify and eliminate harmful substances called antigens. Immunization facilitates this process by introducing weakened or inactivated components of pathogens, prompting

the body to develop antibodies without causing disease. This acquired immunity can be temporary or long-lasting, depending on the antigen type and immunological response. Maternal antibodies passed to the infant during pregnancy or breastfeeding offer passive immunity for a limited time, but vaccination remains essential to ensure lasting protection. The concept of "herd immunity" further underscores the importance of widespread immunization, where a critical proportion of immune individuals in a population serves as a barrier against disease transmission, especially protecting those who cannot be vaccinated due to medical reasons.

Despite the clear scientific rationale, vaccine-related risks—whether real or perceived—affect parental decision-making. Mothers often weigh potential side effects, anecdotal reports of adverse events, and community beliefs before choosing to vaccinate their children. Studies, including those by Devkota (2013) and Irene et al. (2012), have shown that many parents perceive vaccination as a strain on the child's immune system, sometimes fearing long-term consequences. Such concerns are exacerbated by inconsistent messaging from health workers, media, or peers. Real-world decision-making is also influenced by psychological shortcuts and cognitive biases, which can either support or hinder immunization uptake.

In Pakistan, these dynamics are compounded by systemic issues such as inadequate public health infrastructure, particularly in rural and hard-to-reach areas. As of 2010, Pakistan ranked low in life expectancy among South Asian countries, with rural areas facing the brunt of healthcare inaccessibility. High transportation costs, limited availability of primary health units, and poor health education outreach result in poor health-seeking behavior. Traditional beliefs and widespread misconceptions about vaccines further complicate the picture. Government and non-governmental organizations have responded with awareness campaigns and communication strategies to address these gaps, yet more needs to be done at the grassroots level.

The National Immunization Program in Pakistan operates under the Department of Health and provides vaccines free of cost, supported by global alliances such as GAVI, WHO, UNICEF, and international development agencies. Vaccines are distributed from centralized depots to regional cold storage facilities across the country. Despite the logistical framework in place, mountainous regions like District Poonch in Azad Jammu and Kashmir (AJK) remain underserved due to geographic and infrastructural constraints. Many areas are only accessible by foot, and health services are not evenly distributed according to population need. The Expanded Programme on Immunization (EPI) is overseen by district-level health managers, but disparities in service delivery persist.

Moreover, health policy in Pakistan has often been subject to political influence. Resources are frequently centralized in urban hubs like Islamabad, leaving peripheral regions underfunded. While policies exist to provide essential services such as clean water, immunization, and rural development, their implementation has been inconsistent. These factors collectively affect immunization coverage and highlight the need

for localized assessments of maternal perceptions and practices.

Given these concerns, the current study was designed to explore the knowledge, attitudes, and practices of mothers in District Poonch, AJK, regarding childhood immunization under the EPI. The study aims to identify gaps in awareness, barriers to access, and misconceptions that may hinder immunization uptake. By doing so, it seeks to contribute data-driven insights for local health authorities and policymakers to improve vaccine coverage in underserved areas.

## MATERIALS AND METHODS

This study was designed as a descriptive, community-based cross-sectional survey conducted between June and July 2018 in District Poonch, Azad Jammu and Kashmir (AJK), Pakistan. The aim was to assess the knowledge, attitude, and practices (KAP) of mothers regarding the Expanded Programme on Immunization (EPI). The study targeted mothers who had at least one child under ten years of age and resided in one of the four tehsils of District Poonch: Rawalakot, Thorar, Hajira, and Abbaspur. Mothers who met these criteria and were mentally and physically capable of responding were included, while those who declined consent or had language or cognitive barriers preventing meaningful participation were excluded.

Participants were recruited using a simple random sampling method from a pre-identified list of eligible households provided by local health officials. A total of 70 mothers were initially selected. Following a preliminary screening for eligibility and willingness, eight mothers either declined to participate or were unable to respond adequately. Two additional responses were excluded due to incomplete data or inconsistencies in questionnaire answers. Consequently, 60 mothers were included in the final analysis. Each participant provided written or verbally documented informed consent before participation. Confidentiality was ensured by anonymizing responses and securely storing all data.

The primary outcomes were the levels of knowledge, attitude, and practices of mothers regarding routine childhood immunization. A structured questionnaire was developed in consultation with healthcare providers and reviewed for contextual appropriateness. Although the instrument was not validated through a formal psychometric process, it was pretested in a small subset of the population to assess face validity and clarity. The questionnaire was divided into three thematic sections addressing knowledge (e.g., disease prevention, vaccine schedules), attitudes (e.g., beliefs about vaccine safety and efficacy), and practices (e.g., adherence to immunization schedules and healthcare-seeking behavior). Each item was presented in a clear True/False or Likert-scale format. The questionnaire was translated into Urdu and administered orally to account for varying literacy levels. Data were collected through face-to-face interviews conducted by the principal researcher, ensuring consistent delivery of questions and clarifications where needed. To further aid interpretation, the interviewer used visual cues and

paraphrasing techniques when necessary, particularly for participants with low educational attainment.

In line with observational research ethics, the study protocol was approved by the Institutional Review Board of NN University (Approval Reference: IRB/2018/IM-001), and all procedures involving human participants were conducted in accordance with the ethical standards of the 1964 Helsinki Declaration and its later amendments. Participants were informed of their voluntary participation rights, and that they could withdraw at any stage without penalty. No personal identifiers were collected, and data were kept confidential and used solely for research purposes. There were no potential risks to participants, and no monetary or material incentives were provided to avoid coercion.

Data were entered and analyzed using IBM SPSS Statistics version 27. Descriptive statistics including frequencies, percentages, means, and standard deviations were used to summarize sociodemographic variables and KAP outcomes. Items in the knowledge section were scored and categorized using predetermined cut-off points to classify mothers as highly knowledgeable (70–100%), knowledgeable (50–69%), moderately knowledgeable (30–49%), or slightly knowledgeable (<30%). Likert-scale items on attitudes and practices were assigned weighted means to examine response tendencies. No inferential statistics or multivariable regression models were applied in this study. Missing data were minimal and handled through case-wise deletion. Sensitivity analysis or imputation was not deemed necessary due to the small number of incomplete entries. Confounding variables such as maternal education, age, and access to healthcare services were not controlled for statistically but were considered qualitatively during the interpretation of results.

This methodological approach was chosen to provide a detailed and community-specific understanding of maternal perceptions toward childhood immunization, particularly in a geographically and socially marginalized area where little prior research exists. The findings are expected to support local policymakers and public health professionals in designing context-sensitive strategies to improve immunization coverage in AJK and similar settings.

## RESULTS

A total of 60 mothers from four tehsils of District Poonch, AJK, were included in the final analysis. All participants had at least one child under the age of ten. The response rate was 85.7% (60/70), with 10 responses excluded due to non-response or incomplete data. Most respondents reported that they had previously received information regarding childhood immunization, with hospitals cited as the predominant source (76.7%), followed by health posts, neighbors, and other informal community sources.

The analysis of knowledge indicators revealed that overall awareness regarding routine immunization was high among the respondents. All mothers (100%) correctly identified that routine immunization helps prevent infectious diseases and that the first vaccine dose should be administered at birth. A similarly

high proportion (above 95%) demonstrated awareness about the importance of multi-dose vaccines, vaccination campaigns, and the absence of any religious prohibition against immunization.

Approximately 88.3% were also aware that multiple vaccines given simultaneously do not pose a health risk. However, only 65% accurately recognized that common illnesses like colds, ear infections, and diarrhea are not valid contraindications to immunization, indicating some misconceptions in clinical understanding. Overall, based on the scoring rubric, 91.45% of participants fell into the "highly knowledgeable" category regarding immunization objectives.

Attitudinal responses demonstrated a predominantly positive outlook toward childhood vaccination. A majority of mothers either strongly agreed or agreed that vaccines contribute to child protection against major diseases, increase immunity, and should be administered at fixed intervals. Half of the respondents strongly believed in the efficacy of the measles and tetanus toxoid (TT) vaccines, particularly in protecting both mothers and their unborn children. However, only 15% strongly agreed that the DPT vaccine offers protection against three major illnesses, and 70% disagreed or remained undecided regarding whether DPT and hepatitis vaccines are given immediately after birth, indicating a knowledge gap related to vaccine timing and schedule.

**Table 1: Sources of Immunization Information**

Source of Information	Frequency (n)	Percentage (%)
Hospital	46	76.7
Health Post	1	1.7
Neighbors	3	5.0
Others	9	15.0

**Table 2: Knowledge of Immunization (n and %)**

Knowledge Item	Correct Response (n)	Percentage (%)
Immunization prevents infectious diseases	60	100.0
First dose should be given at birth	60	100.0
Common cold, ear infection & diarrhea are contraindications	39	65.0
Multi-dose vaccines are important	58	96.7

**Table 3: Attitudes Toward Immunization (n and %)**

Attitude Statement	Agree/Strongly Agree (n)	Percentage (%)
Vaccines reduce child mortality and morbidity	30	50.0
Vaccines should be administered at fixed duration	60	100.0
Polio vaccine immediately after birth	58	96.6
Immunization makes children brilliant	48	80.0

Perceptions surrounding myths and misconceptions were also assessed. An overwhelming majority (96.7%) disagreed with the belief that only hospital-born children receive immunization, while 100% agreed that immunization is the right of every newborn. This suggests a broad normative acceptance of immunization regardless of birth setting. Moreover, almost all

mothers reported having their children immunized, with 98.3% stating that their children received complete vaccination doses and were brought to hospitals or health centers for this purpose. These findings affirm the existence of strong health-seeking behavior among the sampled population.

**Table 4: Immunization Practices (n and %)**

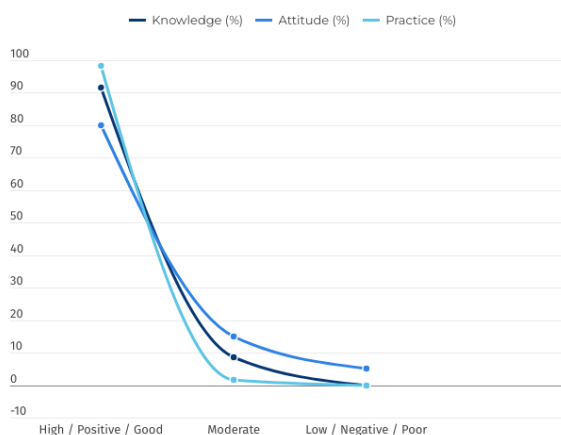
Practice Item	Yes (n)	Percentage (%)
Child ever immunized	60	100.0
Received complete doses	59	98.3
Brought to health center for immunization	59	98.3
Heard about vaccination on radio/TV	45	75.0

Regarding exposure to vaccine-related information, 75% of respondents acknowledged having heard about immunization through radio or television, and 80% had sought information directly from healthcare centers. This suggests that both mass media and interpersonal communication channels play important roles in disseminating health education.

Descriptive statistics further supported these trends. Items measuring positive beliefs about immunization (e.g.,

"Immunization is the most important part of child care," "Vaccine should be at fixed duration," "Polio vaccine should be administered immediately after birth") had weighted mean scores below 2.0, reflecting a strong level of agreement. Conversely, statements expressing misconceptions, such as "DPT and hepatitis vaccines are given immediately after birth," or "All vaccines are injected except polio," showed higher mean scores, indicating disagreement or uncertainty. One particularly

telling indicator was the item “Immunization makes children brilliant,” which had a mixed response with a mean of 2.35, reflecting divergent beliefs about non-medical benefits of vaccines.



**Figure 1 KAP Level Distribution**

## DISCUSSION

This cross-sectional study assessed the knowledge, attitudes, and practices (KAP) of mothers regarding childhood immunization under the Expanded Programme on Immunization (EPI) in District Poonch, Azad Jammu and Kashmir. The results demonstrate an overall high level of awareness and a favorable attitude toward immunization among the surveyed mothers, reflected by a 100% reported vaccination history for their children and widespread support for the rights and benefits of immunization. However, despite the strong foundational knowledge, several misconceptions persist, especially regarding vaccine timing, contraindications, and multi-dose vaccine administration.

The majority of respondents correctly identified immunization as an essential tool for preventing childhood infectious diseases and knew that the first vaccine dose is administered at birth. These findings are consistent with similar studies conducted in low-resource settings across South Asia, such as in India, Nepal, and Bangladesh, where mothers demonstrated high baseline awareness but often lacked technical knowledge about vaccine schedules and contraindications (Devkota, 2013; Paudyal, 2013). Our study also found that only 65% of mothers understood that minor illnesses like colds and diarrhea are not valid contraindications to vaccination—a critical gap in clinical understanding that may result in delayed or missed immunizations. Comparable misconceptions have been reported in other community-level studies, highlighting the global relevance of targeted health education to address specific misunderstandings (Irene et al., 2012; Matsuda, 2002).

Attitudinal findings were overwhelmingly positive. Most mothers expressed strong support for timely and complete immunization and rejected common myths, such as immunization being restricted to hospital-born children or being prohibited by religion. These findings align with previous research indicating that health education and personal experience with healthcare

services enhance acceptance of vaccination in culturally conservative settings (Kligman et al., 2011; Acharya, 2008). The fact that 100% of respondents brought their children for immunization and nearly all completed the schedule reflects positive health-seeking behavior and trust in the local health system. However, items like “Immunization makes children brilliant” received mixed responses, suggesting the presence of folklore or non-scientific associations that could distort understanding of immunization benefits.

An important statistical finding in our study was the significant association between maternal education level and knowledge of immunization. Mothers with tertiary education were far more likely to be classified as “highly knowledgeable” compared to those with primary or no formal education ( $p = 0.0371$ ). This result underscores the critical role of education in empowering women to make informed health decisions. It also echoes similar findings in the literature which establish maternal education as a predictor of childhood immunization adherence (Julie et al., 2008; Donzales et al., 2014).

Despite these encouraging trends, the study has several limitations. First, the small sample size ( $n=60$ ) and localized geographic focus limit the generalizability of findings beyond the District Poonch region. Second, the questionnaire used was not formally validated, though it was pretested for face validity. Third, responses were self-reported and may be influenced by social desirability bias, particularly due to interviewer-administered data collection. Additionally, while the survey touched on multiple components of knowledge, attitude, and practice, it did not statistically adjust for confounders such as socioeconomic status or parity. These limitations should be considered when interpreting the data, and future studies may benefit from employing multivariable models or larger, more representative samples.

From an ethical standpoint, this study was approved by the relevant Institutional Review Board, and all respondents gave informed consent. Anonymity and confidentiality were maintained throughout. While ethical compliance was stated, future publications should ensure the inclusion of explicit conflict of interest declarations, detailed data availability statements, and funding source roles, in line with international guidelines.

The implications of this study are both local and national. The positive maternal attitude toward immunization, coupled with the influence of education, suggests that investments in female education and community-based health awareness can significantly improve immunization coverage. Given the challenges in rural and geographically isolated regions like Poonch, strategies must prioritize consistent communication, targeted education, and culturally sensitive messaging delivered through trusted healthcare workers. Strengthening the relationship between vaccinators and mothers, as emphasized in prior multi-regional studies (WHO, 2013), remains key to improving not only acceptance but also retention in vaccination programs.

## CONCLUSION

In conclusion, the study highlights that while general awareness and uptake of childhood immunization in District Poonch are commendable, knowledge gaps persist in specific technical areas. Misconceptions about vaccine schedules and contraindications must be addressed through locally tailored health education efforts. Maternal education emerged as a significant determinant of knowledge, underscoring the need to integrate immunization advocacy into broader educational and social development frameworks. These findings can inform policy design and health education strategies to strengthen EPI implementation in similar underserved regions.

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