

Knowledge, Attitude and Practice of Parents to Childhood Immunization: A Cross-Sectional Study in Gandaki Province of Nepal

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ABSTRACT

Introduction: Childhood immunization is one of the most cost-effective public health interventions to prevent vaccine-preventable diseases and improve child survival. In Nepal, the national immunization program aims to ensure that all children receive the recommended vaccines, yet challenges remain in achieving universal coverage. The Knowledge, Attitude, and Practice (KAP) of parents towards immunization play a critical role in vaccine uptake. This study was designed to assess their understanding, attitudes, and behaviors toward vaccinating their children.

Methods: A prospective observational cross-sectional study was conducted from April 22, 2023, to October 2023 GP Koirala National Centre for Respiratory Diseases and Hospital, Tanahun, Gandaki Nepal, involving 227 parents of children under 18 months. The participants were selected through purposive sampling from Pediatric OPD of this hospital.

A structured questionnaire was used to collect data about their knowledge, attitude, and practices regarding childhood immunization. The data were analyzed using SPSS version 23 with descriptive statistics, with results expressed as frequencies and percentages and Chi-square tests employed to identify associations between demographic variables and KAP levels.

Results: The study revealed that 73.6% of parents had good knowledge about childhood immunization, recognizing the importance of vaccines and being aware of the vaccination schedule. However, only 64.3% of parents demonstrated a favorable attitude toward immunization, reflecting mixed perceptions about the necessity of vaccines and their safety. Additionally, 60.3% of parents exhibited good practices, indicating that while a majority ensured their children received vaccines, there were still gaps in adherence to the full immunization schedule. Demographic factor such as education level significantly influenced KAP scores.

Conclusion: The study highlights the need for continuous efforts to enhance parental knowledge, improve attitudes, and reinforce good practices regarding childhood immunization in Nepal. Although the majority of parents showed a reasonable understanding of vaccines, the discrepancies in attitudes and practices suggest that targeted interventions, including education and outreach, are necessary to improve vaccination rates. Addressing these gaps is crucial to ensuring complete immunization coverage and safeguarding children from preventable diseases.

Keywords: Childhood immunization, parental knowledge, vaccination practices, public health, vaccine uptake.

INTRODUCTION

Childhood immunization is one of the most significant public health measures to reduce morbidity and mortality associated with vaccine-preventable diseases globally. Immunization programs have contributed to significant reductions in child mortality, helping control or eliminate diseases like measles, polio, and diphtheria, particularly in low- and middle-income countries¹. In Nepal, the National Immunization Program (NIP) offers free vaccines under the Expanded Programme on Immunization (EPI), with a goal to ensure that all children receive the full immunization schedule as recommended by the World Health Organization (WHO)². Despite these efforts, challenges persist in achieving universal immunization coverage in Nepal. A comprehensive understanding of the factors influencing vaccine uptake is essential for bridging the existing gaps in immunization coverage. The Knowledge, Attitude, and Practices (KAP) of parents, who are the primary decision-makers regarding their children's health, play a pivotal role in determining immunization rates³. Studies in other low-resource settings have shown that

parental misconceptions about vaccines, concerns regarding side effects, and limited access to healthcare facilities are common barriers to achieving complete immunization⁴. In Nepal, the national full immunization coverage rate is reported to be 84%, leaving a significant proportion of children under-immunized or not immunized at all². This discrepancy is often more pronounced in rural areas where access to healthcare services is limited, and educational levels are generally lower⁵. While several factors affect immunization coverage, the role of parental KAP is critical, as it influences their decision-making and actions regarding timely vaccinations and adherence to the recommended schedule⁶.

The present study aims to assess the KAP of parents concerning childhood immunization in the Gandaki Province of Nepal. Specifically, it investigates the extent of parental knowledge about vaccines, their attitudes towards the necessity and safety of immunization, and their practices related to following vaccination schedules. By identifying the gaps in KAP, the study seeks to inform targeted interventions that could improve childhood immunization rates and contribute to broader public health goals.

MATERIALS and METHODS

Study Design and Setting

This was a prospective observational cross-sectional study conducted at GP Koirala National Centre for Respiratory Diseases and Hospital, located in Tanahun, Gandaki Province, Nepal. The study was carried out from April 22, 2023, to October 2023, targeting parents of children under 18 months of age who visited the Pediatric Outpatient Department (OPD) during the study period.

Study Population

The study included parents (either mother or father) of children under 18 months old who were attending the Pediatric OPD.

Sample Size Determination

The sample size was calculated using the formula for estimating the sample size in prevalence studies:

$$n = \frac{Z^2 \cdot p \cdot (1 - p)}{d^2}$$

Where:

- $Z=1.96$ (Z-score for 95% confidence level) that is z is the standard normal distribution equals 1.96 at 95% confidence level
- $p=0.84$ (the proportion of children fully immunized) that is p is the percentage of children who underwent complete immunization schedule in Nepal as per the latest data in Annual-Health-Report-2079-80 of Nepal (84%)²
- $1-p= 0.16$ (the proportion of children not fully immunized)
- $d=0.05$ (margin of error, 5%) that is Considering 5% of permitted error

The calculated sample size is approximately **207** participants. After adjusting for a 10% non-response rate, the sample size becomes approximately **227** participants.

A total of 227 participants were selected through purposive sampling. Inclusion criteria were parents who provided informed consent and had children eligible for immunization as per the national schedule. Parents with incomplete vaccination history or who refused to participate were excluded from the study.

Data Collection Tools and Techniques

A structured questionnaire was designed based on previous studies^{1, 3, 6} to assess the Knowledge, Attitude, and Practice (KAP) of parents regarding childhood immunization. The questionnaire was divided into three sections:

1. Knowledge: Questions related to awareness of vaccines, timing, benefits, side effects, and access to immunization services.

2. Attitude: Questions focused on parents' beliefs regarding the necessity, safety, and importance of immunization.

3. Practice: Questions addressed parental actions, including vaccine adherence, record-keeping (immunization cards), and follow-up on missed vaccinations.

The questionnaire was pre-tested on a small sample of 15 participants from the same setting to ensure clarity and relevance of the questions. Modifications were made based on the feedback received.

Data Collection Procedure

The data were collected by trained healthcare workers including myself during the participants' visit to the Pediatric OPD from April 22, 2023, to October 2023 after getting ethical approval for study. Informed consent was obtained from each parent before administering the questionnaire. Data collection was conducted through face-to-face interviews, ensuring that respondents understood the questions fully. The interviewers adhered to ethical guidelines, ensuring participant confidentiality and voluntary participation.

Data Analysis

The data were entered and analyzed using Statistical Package for the Social Sciences (SPSS) version 23. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to summarize the socio-demographic characteristics and KAP variables. The results were presented in tabular form. To explore associations between demographic variable such as education and KAP levels, Chi-square tests were employed. A p-value of <0.05 was considered statistically significant.

Ethical Consideration

Ethical approval for the study was obtained from the Institutional Review Committee (IRC) of GP Koirala National Centre for

Respiratory Diseases and Hospital, Tanahun, Gandaki, Nepal on 2023/04/21 (reference number 175). All participants provided written informed consent before participation. Confidentiality was maintained by assigning anonymous identification codes to each participant, and the data were used exclusively for research purposes.

RESULTS

The socio-demographic table 1 highlights that the majority of participants were mothers (55.5%), with most parents falling within the 25-34 age group (52.9%). A significant portion

of the respondents resided in rural areas (54.2%), indicating a higher representation from these communities. In terms of educational background, secondary education was the most common (37%), followed by higher education (21.1%), while 15.4% had no formal education. Regarding occupation, agriculture (30%) and service (29.5%) were the dominant professions. These findings suggest that rural, middle-aged parents with varied education levels and occupational backgrounds are a key demographic for childhood immunization efforts.

Table 1: Socio-Demographic Variables of Parents in term of vaccination status (Mother and Father Distribution)

Socio-Demographic Variables	No. of Participants (n=227)	Percentage (%) of Parents of Parents
Relationship		
Father	101	44.5
Mother	126	55.5
Age		
<25	43	18.9
25-34	120	52.9
35-44	54	23.8
≥45	10	4.4
Area of Living		
Rural	123	54.2
Urban	104	45.8
Educational Qualification		
No formal education	35	15.4
Primary	60	26.4
+Secondary	84	37.0
Higher education	48	21.1
Occupation		
Agriculture	68	30.0
Business	52	22.9
Service	67	29.5
Others	40	17.6

The table 2 shows that 73.6% of parents had good overall knowledge about childhood immunization. A majority (77.1%) understood the importance of vaccines, and 87.2% knew where to access immunization services. However, only 63.9% were familiar with the timing of vaccines, and less than half (47.6%)

were aware of potential side effects. These results suggest that while most parents are knowledgeable about the benefits and access to vaccines, there is a need for improved education regarding vaccine timing and side effects.

Table 2: Parental Knowledge Regarding Childhood Immunization (n = 227)

Knowledge Variables	Correct Response (n)	Percentage (%)
Aware of vaccines required for children	167	73.6
Knows the timing of vaccines	145	63.9
Understands the importance of immunization	175	77.1
Aware of side effects of vaccines	108	47.6
Knows where to access immunization services	198	87.2
Overall good knowledge	167	73.6

The table 3 shows that 75.3% of parents believe vaccines are essential for child health, and 70.5% think vaccines can prevent serious diseases. However, only 53.7% expressed concerns about vaccine safety, reflecting mixed perceptions on this issue. Additionally, 64.3% of parents felt confident in taking their

child for immunization, aligning with the overall favorable attitude score of 64.3%. While most parents recognize the importance of vaccines, concerns about safety and a lower confidence level suggest a need for targeted interventions to improve attitudes toward vaccination.

Table 3: Parental Attitudes Toward Childhood Immunization (n = 227)

Attitude Variables	Positive Response (n)	Percentage (%)
Believes vaccines are essential for child health	171	75.3
Concerned about vaccine safety	122	53.7
Thinks vaccines can prevent serious diseases	160	70.5
Feels confident in taking child to immunization services	146	64.3
Overall favorable attitude	146	64.3

The table 4 highlights that 69.6% of parents ensure their child receives timely vaccinations, and 63.9% complete the full immunization schedule. Additionally, 71.4% maintain an immunization card for their child, indicating a good level of record-keeping. However, only 48.5% follow up on missed vaccinations,

pointing to gaps in maintaining comprehensive immunization coverage. Overall, 60.3% of parents demonstrated good immunization practices, suggesting that while most parents are proactive about vaccination, efforts are needed to improve follow-up on missed doses for better vaccine adherence.

Table 4: Parental Practices Related to Childhood Immunization (n = 227)

Practice Variables	Good Practice (n)	Percentage (%)
Ensures child receives timely vaccinations	158	69.6
Completes the full immunization schedule	145	63.9
Keeps an immunization card	162	71.4
Follows up on missed immunizations	110	48.5
Overall good practice	137	60.3

The table 5 demonstrates a strong positive correlation between parental education and KAP (Knowledge, Attitude, and Practice) regarding childhood immunization. Parents with higher education had significantly better knowledge (85.4%), more favorable attitudes (79.2%), and better practices (75%) compared

to those with no formal education, where knowledge, attitude, and practice were notably lower (48.6%, 37.1%, and 40%, respectively). The p-values (<0.001) suggest these differences are statistically significant, indicating education plays a crucial role in improving KAP in immunization.

Table 5: Association Between Parental Knowledge, Attitude, and Practice and Educational Level

Educational Level	Good Knowledge (%)	Favorable Attitude (%)	Good Practice (%)
No formal education	48.6	37.1	40.0
Primary education	63.3	55.0	53.3
Secondary education	79.8	67.9	67.9
Higher education	85.4	79.2	75.0
p-value	<0.001	<0.001	<0.001

DISCUSSION

This observational cross-sectional study assessed the knowledge, attitude, and practices (KAP) of parents regarding childhood immunization in the Gandaki Province of Nepal. The results revealed that while a majority of parents exhibited good knowledge of vaccines, there were noticeable gaps in their attitudes and practices. These findings align with previous research highlighting that while parents are aware of the benefits of immunization, misconceptions and concerns about vaccine safety, coupled with inconsistent follow-up practices, continue to impede full immunization coverage.

Parental Knowledge on Childhood Immunization: The study found that 73.6% of parents demonstrated good knowledge of childhood immunization, recognizing the importance of vaccines and understanding where to access immunization services. This aligns with global studies that have consistently shown that increasing parental knowledge correlates positively with higher vaccination rates⁷. However, despite the relatively high level of knowledge, only 63.9% of parents knew the correct timing for vaccines, and just 47.6% were aware of potential side effects. These findings are consistent with other studies, where parents' knowledge about vaccine timing and side effects remains limited, particularly in rural areas^{8, 9}. This highlights a crucial area for intervention, as the timing of vaccines is critical for ensuring their effectiveness in preventing disease¹⁰.

Parental Attitudes Toward Childhood Immunization: While 64.3% of parents

exhibited a favorable attitude toward childhood immunization, a significant portion still expressed concerns about vaccine safety, with only 53.7% showing full confidence in the safety of vaccines. This mirrors findings from studies in other low-resource settings where concerns about vaccine safety remain a substantial barrier to vaccine uptake^{11, 12}. Research suggests that these fears often stem from misinformation and rumors about adverse effects¹³. In contrast, parents who received more formal education demonstrated better attitudes, as seen in this study and corroborated by previous research¹⁴. Thus, addressing vaccine safety concerns through targeted educational campaigns could play a pivotal role in improving vaccination attitudes in similar populations¹⁵.

Parental Practices Regarding Childhood Immunization: In terms of practices, 60.3% of parents ensured their children adhered to the full immunization schedule, while 69.6% ensured timely vaccinations. This is slightly lower compared to the national average, where Nepal's Annual Health Report 2079/80 indicates 84% of children received complete immunization¹⁶. The difference could be attributed to various barriers, such as limited access to healthcare services, lack of awareness, or logistical challenges in rural areas, as indicated by other studies conducted in similar regions^{17, 18}. The gap in follow-up practices, where only 48.5% of parents followed up on missed vaccinations, is particularly concerning and has been observed in various other contexts. Poor follow-up can result in incomplete immunization, leaving children vulnerable to preventable diseases¹⁹.

Education and KAP: A key finding of this study is the significant correlation between parental education and KAP. Parents with higher levels of education consistently demonstrated better knowledge, attitudes, and practices concerning childhood immunization, with a p-value of <0.001 . This is consistent with several studies that underscore the role of education in influencing health behaviors²⁰. Educated parents are more likely to understand the importance of completing vaccination schedules and are less likely to harbor vaccine-related misconceptions^{21,22}. This underscores the need for tailored interventions that focus on improving vaccine literacy among less-educated populations²³.

Barriers to Immunization: The study highlights multiple barriers to childhood immunization, which align with findings from other low- and middle-income countries (LMICs). These include lack of access to healthcare facilities, misconceptions about vaccines, and logistical challenges in rural settings²⁴. Moreover, the study found that rural parents were less likely to demonstrate good practices, as also observed in research from other developing regions where geographic barriers hinder healthcare access^{25,26}. To bridge these gaps, outreach programs, mobile immunization units, and community health workers could be instrumental in delivering vaccines and educating parents in hard-to-reach areas²⁷.

Policy Implications and Recommendations: To improve immunization coverage, targeted interventions addressing the identified gaps in knowledge, attitudes, and practices are essential. The study's findings suggest that comprehensive education campaigns emphasizing the safety and timing of vaccines could be particularly effective in addressing parental concerns and misconceptions. Additionally, improving healthcare access in rural areas, perhaps through mobile health services, could enhance vaccine uptake in underserved populations²⁸. Given the association between education and KAP,

providing health education to parents, particularly in rural and undereducated communities, should be prioritized. Moreover, ongoing monitoring and evaluation of immunization programs are necessary to ensure that these interventions have a long-lasting impact.

CONCLUSION

While the majority of parents in Gandaki Province exhibit good knowledge about childhood immunization, gaps remain in their attitudes and practices, which must be addressed to improve overall vaccine coverage. Education plays a crucial role in shaping parental knowledge and attitudes, which in turn influences their practices. Thus, efforts to improve immunization rates in Nepal should focus on increasing parental awareness, addressing vaccine safety concerns, and ensuring healthcare access, particularly in rural areas. Strengthening these areas will help bridge the current gaps in childhood immunization coverage, contributing to better child health outcomes.

Declaration by Authors

Ethical Approval: Approved

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