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Original Research Article

Knowledge and Practices of Mothers Regarding Childhood Immunization

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Abstract:

Background: Childhood immunization is a cost-effective strategy to prevent vaccine-preventable diseases. Maternal knowledge and practices significantly influence immunization uptake and completion.

Aim: To assess the knowledge and practices of mothers regarding childhood immunization and to determine the association between socio-demographic factors and immunization knowledge.

Methods: This prospective hospital-based study was conducted at GSL Medical College, Rajahmundry, from June to December 2025 among 120 mothers of children aged 0–5 years. Data were collected using a pre-tested structured questionnaire assessing socio-demographic variables, knowledge, and immunization practices. Knowledge was categorized as adequate, moderate, or inadequate based on scoring criteria. Statistical analysis was performed using SPSS, and $p < 0.05$ was considered significant.

Results: Adequate knowledge was observed in 53.3% of mothers, while 71.7% of children were fully immunized for age. Immunization card retention was high (86.7%). However, 28.3% reported missed doses, primarily due to lack of awareness and fear of side effects. Maternal education was significantly associated with adequate knowledge ($p = 0.002$).

Conclusion: Despite satisfactory coverage, knowledge gaps persist. Targeted educational interventions are required to improve complete immunization coverage.

Keywords: Childhood Immunization, Mothers, Knowledge, Practices, Vaccine Coverage.

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Introduction

Childhood immunization remains one of the most cost-effective public health interventions, preventing vaccine-preventable morbidity and mortality when children receive vaccines on schedule. However, gaps persist due to "demand-side" factors such as low awareness, myths about adverse effects, and reduced confidence in vaccines, which together contribute to delayed or missed doses and ongoing outbreaks of preventable diseases [1, 2]. Recent evidence shows that routine vaccine hesitancy among parents is a measurable and widespread problem, affecting timely uptake across settings [2].

Mothers are usually the primary decision-makers for child healthcare; therefore, their knowledge and day-to-day practices strongly influence completion of the recommended immunization schedule [3]. Recent KAP (knowledge, attitude, and practice) studies among mothers/caregivers have demonstrated that even when knowledge and attitudes are satisfactory, practical barriers (access, cost, availability, competing priorities) can prevent translation into complete vaccination practices [1,3].

This study planned to assess the knowledge and practices of mothers regarding childhood immunization and identify factors associated with suboptimal immunization practices among their children.

Methods

This prospective, hospital-based observational study was conducted at GSL Medical College, Rajahmundry, Andhra Pradesh, from June 2025 to December 2025. The study population comprised mothers of children aged 0–5 years attending the department of Paediatrics outpatient clinic and immunization clinic during the study period. After obtaining approval from the Institutional Ethics Committee, eligible mothers were approached consecutively. Mothers who were permanent residents of the catchment area and willing to provide informed written consent were included in the study. Mothers who were critically ill, unable to communicate effectively, or who declined consent were excluded. The sample size was calculated using the formula for estimating a single population

proportion, assuming 50% adequate knowledge prevalence (for maximum variability), 95% confidence level, and 10% relative precision; the calculated minimum sample size was 96, which was rounded to 120 to compensate for non-response.

Data were collected using a pre-tested, semi-structured questionnaire developed after review of standard immunization guidelines and previously validated KAP studies. The tool consisted of three sections: socio-demographic characteristics (age, education, occupation, socioeconomic status, parity), knowledge regarding childhood immunization (schedule, vaccine-preventable diseases, importance, side effects, contraindications), and practices related to immunization (possession of immunization card, adherence to schedule, missed doses, reasons for delay, management of minor adverse events). The questionnaire was translated into Telugu and back-translated to ensure linguistic validity. A pilot study was conducted on 10% of the sample to assess clarity and feasibility; necessary modifications were incorporated, and pilot data were excluded from final analysis. Knowledge scores were calculated by assigning one point for each correct response; scores ≥75% were categorized as adequate knowledge, 50–74% as moderate knowledge, and <50% as inadequate knowledge. Practice was classified as appropriate or inappropriate based on adherence to the national immunization schedule and documentation in the child's immunization card.

Data were entered into Microsoft Excel and analyzed using SPSS version 22. Descriptive statistics such as mean, standard deviation, frequency, and percentage were used to summarize demographic variables, knowledge levels, and immunization practices. The association between socio-demographic factors and knowledge/practice levels was assessed using the Chi-square test or Fisher's exact test where appropriate. Independent t-test or ANOVA was used to compare mean knowledge scores across different groups. Multivariate logistic regression analysis was performed to identify independent predictors of adequate knowledge and appropriate immunization practices. A p value <0.05 was considered statistically significant. Confidentiality of participants was strictly maintained, and no personal identifiers were disclosed in the study reports.

Results

A total of 120 mothers participated in the study. The majority (51.7%) were aged 26–35 years, and 45% had completed secondary education. Homemakers constituted 65% of the study population, and nearly half belonged to the middle socioeconomic class (Table 1). Regarding knowledge, 53.3% of mothers demonstrated adequate knowledge about childhood immunization, while 30% had moderate and 16.7% had inadequate knowledge (Table 2). More than half correctly identified the national immunization schedule (58.3%) and common vaccine-preventable diseases (51.7%). Awareness of minor post-vaccination side effects was reported by 73.3% of mothers.

In terms of practice, 71.7% of children were fully immunized for their age, and 86.7% of mothers-maintained immunization cards (Table 3). However, 28.3% reported missing at least one scheduled dose. The primary reasons for delay included lack of awareness (15%), fear of side effects (8.3%), and access-related issues (5%). A statistically significant association was observed between maternal education and adequate knowledge ($p = 0.002$), with graduates demonstrating higher knowledge levels compared to mothers with primary education (Table 4). These findings indicate that although immunization coverage was relatively high, knowledge gaps and socio-demographic factors continued to influence immunization practices.

Table 1: Socio-demographic characteristics of mothers

Variable	Category	Number	%
Age	18–25	38	31.7
	26–35	62	51.7
	>35	20	16.6
Education	Primary	28	23.3
	Secondary	54	45
	Graduate & above	38	31.7
Occupation	Homemaker	78	65
	Employed	42	35
Socioeconomic Status	Lower	46	38.3
	Middle	58	48.3
	Upper	16	13.4

Table 2: Knowledge regarding childhood immunization			
Knowledge Variable	**Adequate (≥75%)**	**Moderate (50–74%)**	**Inadequate (<50%)**
Overall, Knowledge Level	64 (53.3%)	36 (30.0%)	20 (16.7%)
Knew correct schedule	70 (58.3%)	–	–
Identified ≥5 VPDs	62 (51.7%)	–	–
Aware of side effects	88 (73.3%)	–	–

Table 3: Immunization practices among the mothers		
Practice Variable	**Number**	**%**
Child fully immunized for age	86	71.7
Possessed immunization card	104	86.7
Missed at least one dose	34	28.3
Reason for delay – Lack of awareness	18	15
Reason for delay – Fear of side effects	10	8.3
Reason for delay – Access issues	6	5

Table 4: Association between education and adequate knowledge			
Education Level	**Adequate Knowledge**	**Inadequate/Moderate**	**p value**
Primary	8	20	0.002
Secondary	28	26	
Graduate & above	28	10	

Discussion

Table 1 presents the socio-demographic profile of the 120 mothers enrolled in the study, highlighting age, education, occupation, and socioeconomic status. Most mothers (51.7%) were aged 26–35 years, a group often considered to have greater exposure to health information and services due to reproductive experience and increased health system contact, compared with younger or older cohorts. Education levels varied considerably: 45% had secondary education, and 31.7% held graduate degrees, whereas 23.3% had only primary education. This pattern mirrors findings from other settings where maternal educational attainment influences immunization knowledge and behaviors; for example, studies have shown that maternal literacy is closely linked to understanding vaccine benefits and schedules, although its exact effect on coverage may differ by context [4]. Nearly two-thirds (65%) of the participants were homemakers, reflecting social norms in many regions where women primarily shoulder caregiving responsibilities. Maternal occupation can affect access to information and health services, potentially influencing immunization practices. A substantial proportion of mothers were from the middle socioeconomic class (48.3%), with fewer in the upper (13.4%) or lower tiers (38.3%). Socioeconomic status has been documented as a key determinant of healthcare utilization, including immunization, as families with higher economic resources may afford better access and continuity of services [5]. Overall, the distribution in Table 1 suggests that while a considerable fraction of mothers was educated and from middle socioeconomic strata, there remained groups with limited formal education and lower socioeconomic status, conditions that other research attests may be associated with gaps in knowledge and suboptimal immunization outcomes [5]. Recognizing how these socio-demographic factors intersect with immunization practices helps clarify underlying barriers and target public health interventions effectively.

Table 2 summarizes mothers' knowledge regarding childhood immunization, showing that 53.3% had adequate knowledge, while 30.0% were moderate and 16.7% were inadequate, indicating that nearly one in two mothers still had room for improvement in key vaccine information. Similar knowledge gaps have been reported in recent maternal KAP research by Ndaki et al. documented comparatively low proportions of "good knowledge" among mothers despite generally favorable attitudes, emphasizing that awareness and correct understanding of vaccines do not automatically reach optimal levels in routine settings [6]. In our study, 58.3% of mothers knew the correct schedule and 51.7% could identify ≥5 vaccine-preventable diseases, which is important because knowing the schedule and diseases directly supports timely decision-making and reduces missed opportunities for vaccination. In India, Chaudhuri et al. also found substantial lacunae in mothers' knowledge (e.g., limited familiarity with vaccine-preventable diseases and misconceptions around minor illnesses/side effects), which can translate into delayed or missed doses even when mothers are generally "in favor" of vaccination [7]. The relatively high awareness of side effects in our sample (73.3%) may reflect frequent counseling at immunization clinics; however, if counseling is not framed well, it can also amplify anxiety and contribute to hesitancy. This matters because a global meta-analysis shows that

routine childhood vaccine hesitancy among parents is a measurable and persistent challenge, underscoring the need for targeted communication that improves correct knowledge and confidence together [2]. Overall, Table 2 suggests strengthening mother-focused counseling on schedule, vaccine-preventable diseases, and normal AEFI guidance to convert moderate knowledge into consistent, timely immunization practices [2, 6].

Table 3 depicts immunization practices among participating mothers and provides a practical snapshot of program utilization and adherence. In this study, 71.7% of children were fully immunized for age**,** and 86.7% of mothers possessed an immunization card, suggesting reasonably good service uptake and record retention; however, the finding that 28.3% missed at least one dose indicates a meaningful "drop-out" segment that requires targeted follow-up. Missed doses were mainly attributed to lack of awareness (15.0%)**,** fear of side effects (8.3%), and access issues (5.0%), which aligns with evidence that incomplete immunization is frequently driven by a mix of informational and system barriers rather than outright refusal. Chaudhuri et al. reported that missed vaccination was common in certain maternal subgroups and highlighted that mothers may be supportive of vaccination yet still miss scheduled doses due to misconceptions and inadequate guidance; importantly, they also documented very high card retention, reflecting that vaccination cards can be leveraged as reminders and tracking tools [7]. From a systems perspective, Prakash et al. demonstrated that areas with higher drop-outs had lower possession of parent-held vaccination records and emphasized that robust record-keeping and community-level support are pivotal to reduce drop-outs and improve full coverage [8]. Similarly, Masebo et al. identified poor maternal knowledge and postponing the vaccination schedule as key predictors of default from completion, reinforcing that counseling and reminder systems should focus on schedule adherence and addressing concerns early [9]. Overall, Table 3 suggests strengthening mother-centered counseling on schedule/AEFI, improving reminder–recall mechanisms, and ensuring easy access and tracking through immunization cards to reduce missed doses and sustain age-appropriate full immunization [7, 9].

Table 4 demonstrates a clear and statistically significant association between maternal education and adequate immunization knowledge ($p = 0.002$), with adequate knowledge rising steadily from primary education (8/28) to secondary education (28/54) and graduate & above (28/38). This "education gradient" is epidemiologically important because immunization decisions require mothers to understand the schedule, recognize vaccine-preventable diseases, and interpret common post-vaccination reactions correctly, all of which are strongly influenced by literacy and comprehension skills [10]. A recent systematic review and meta-analysis from Ethiopia showed that higher maternal education markedly increased the likelihood of completing childhood vaccination, supporting the pathway that education improves health-related knowledge, confidence, and navigation of services [10]. In our setting, the same pathway is reflected at the level of knowledge itself: as educational attainment increased, a larger proportion of mothers achieved adequate knowledge scores, indicating that counseling messages are likely better understood and retained among educated mothers [7, 11]. Evidence from a recent maternal KAP study in India (Jharkhand) similarly highlighted significant knowledge gaps among mothers and emphasized the need for structured health education to address misconceptions and improve informed decision-making [7]. Furthermore, a 2024 study from Rwanda examining mothers' knowledge and trust in childhood vaccination found that socio-demographic variables, including education, were associated with vaccination knowledge and confidence, implying that education not only improves factual knowledge but may also strengthen trust and reduce susceptibility to misinformation [11]. Taken together, Table 4 suggests that health education interventions should be tailored for mothers with lower schooling, using simple language, visual aids, and repeated counseling at each immunization contact, while simultaneously leveraging immunization cards and community reminders to reinforce correct information and sustain knowledge gains across all education strata [7, 10].

Conclusion

The present study demonstrated that although a majority of mothers attending GSL Medical College, Rajahmundry had adequate knowledge and relatively good immunization practices, significant gaps persisted, particularly among mothers with lower educational status. Nearly one-third of children had missed at least one vaccine dose, mainly due to lack of awareness, fear of side effects, and access-related issues. Maternal education showed a strong association with adequate knowledge. Strengthening focused health education, improving reminder–recall systems, and reinforcing counseling during each immunization visit are essential to enhance complete, age-appropriate immunization coverage and reduce preventable morbidity in children.

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