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Assessment of Parental Knowledge and Attitude regarding Routine Childhood Immunization in a Selected Rural Area of Jharkhand

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Abstract
Background: *Immunization is one of the most effective public health interventions for preventing childhood morbidity and mortality. Parents play a crucial role in ensuring timely and complete immunization of their children, particularly in rural areas where access to health information may be limited.*
Aim: *The study aimed to assess the level of knowledge and attitude regarding routine childhood immunization among parents of under-five children in a selected rural area of Jharkhand.*
Methodology: *A quantitative research approach with a descriptive research design was adopted. The study was conducted in a selected rural area of Jharkhand among 100 parents of under-five children, selected using a non-probability purposive sampling technique. Data were collected using a self-developed tool consisting of a demographic profile, a structured knowledge questionnaire, and a five-point Likert attitude scale. Descriptive and inferential statistics were used for data analysis.*
Results: *The analysis revealed that the majority of parents possessed an average level of knowledge regarding routine childhood immunization, while a predominantly positive attitude was observed among the participants. Chi-square analysis demonstrated a statistically significant association between knowledge levels and selected demographic variables, indicating that parental age, education, and source of information played an important role in influencing knowledge regarding immunization. Pearson's correlation coefficient showed no statistically significant relationship between knowledge and attitude, suggesting that favourable attitudes toward immunization may be influenced by factors beyond factual knowledge alone.*
Conclusion: *Although parents exhibited a positive attitude toward childhood immunization, gaps in knowledge were evident. Strengthening health education initiatives by paediatric nurses and healthcare workers is essential to improve parental knowledge and ensure complete immunization coverage in rural areas.*
Keywords: *Childhood immunization, parental knowledge, attitude, rural area, paediatrics nursing*

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I. Introduction:

The human body is equipped with intricate host defence mechanisms that protect against microorganisms and other internal and external harmful agents. The successful functioning of these defence mechanisms results in immunity, which is the body's ability to resist specific diseases. In children, whose immune systems are still developing, protection against infectious diseases is particularly crucial. Prevention of disease is therefore one of the most important goals of child healthcare, and immunization plays a central role in achieving this goal. [1]

Immunization is the process of inducing immunity against specific infectious diseases through the administration of vaccines. It is widely recognized as one of the most effective, economical, and sustainable public health interventions. Vaccines work by introducing antigens or antibodies into the body, thereby stimulating the immune system to develop protection against future infections. Timely immunization during

infancy and early childhood provides protection against several life-threatening diseases and contributes significantly to the reduction of childhood morbidity and mortality.[1,2]

A large number of infectious diseases that once caused widespread disability and death among children can now be prevented through the use of safe and effective vaccines. Vaccines are considered one of the greatest achievements of modern medicine and have made an unparalleled contribution to public health worldwide. Despite these advancements, vaccine-preventable diseases (VPDs) continue to be responsible for a substantial proportion of deaths among children under five years of age, particularly in low- and middle-income countries.[2,3]

Globally, an estimated 70 million children are at risk of dying before reaching their fifth birthday (UNICEF, State of the World's Children, 2016). The World Health Organization (WHO) has emphasized that increasing vaccine coverage in low- and middle-income countries could prevent millions of deaths and reduce catastrophic health expenditures. WHO research indicates that improved immunization coverage could prevent approximately 24 million people from falling into poverty due to health-related expenses, highlighting the dual health and economic benefits of immunization. [3,4]

Immunization is universally acknowledged as one of the safest and most effective measures for preventing and eradicating communicable diseases. It involves the artificial induction of immunity, thereby protecting individuals and communities from infectious diseases. Over the years, immunization has significantly reduced disease burden, disability, and mortality, particularly among children under five years of age. [2]

In India, immunization services are provided through the Universal Immunization Programme (UIP), one of the largest public health initiatives in the world. The Expanded Programme on Immunization was launched in 1978 and was renamed the Universal Immunization Programme in 1985 when its coverage expanded beyond urban areas. Subsequently, UIP became part of the Child Survival and Safe Motherhood Programme in 1992 and was included under the National Reproductive and Child Health Programme in 1997. Since the launch of the National Rural Health Mission in 2005, UIP has remained an integral component of national health strategies.[5]

At present, the Universal Immunization Programme targets approximately 2.67 crore newborns and 2.9 crore pregnant women annually. Immunization services under UIP are provided free of cost and protect children against 12 vaccine-preventable diseases. Nationally, vaccines are administered against nine diseases, including diphtheria, pertussis, tetanus, poliomyelitis, measles, rubella, severe forms of childhood tuberculosis, hepatitis B, and meningitis and pneumonia caused by *Haemophilus influenzae* type B. Additionally, vaccines against rotavirus diarrhoea, pneumococcal pneumonia, and Japanese encephalitis are provided in selected states or districts, with ongoing expansion of rotavirus and pneumococcal vaccines.[6,7]

A child is considered fully immunized when all vaccines recommended under the national immunization schedule are received within the first year of life. Globally, immunization prevents more than 2.5 million child deaths each year, and an additional two million deaths could be prevented annually through optimal use of currently available vaccines. Despite this, immunization coverage remains uneven. Each year, approximately 8 lakh children remain unvaccinated, and more than 3.2 million children live in districts where immunization coverage is below 80%. [2]

Several studies have identified barriers to complete immunization, including poor parental knowledge, fear of adverse effects, lack of family support, perceived poor quality of health services, and limited trust in healthcare systems. Studies conducted in countries such as Mozambique and Ethiopia have demonstrated high rates of partial immunization and dropout, emphasizing the role of social norms, caregiver perceptions, and health system challenges in influencing immunization uptake.[8]

In India, studies have also highlighted gaps in vaccination timeliness and completeness. Although overall coverage may appear high, delays in vaccination remain common, reducing the effectiveness of immunization programs. Misconceptions and inadequate knowledge among parents continue to influence immunization behavior, even in semi-urban and rural settings. [10,11]

In Jharkhand, immunization coverage has shown substantial improvement over the years, increasing from 8% in 1998–99 to 61.9% in 2015–16. However, significant disparities persist, particularly in rural and hard-to-reach areas. UNICEF estimates that nearly 300,000 infants in Jharkhand continue to miss basic vaccines under routine immunization. Data from the National Family Health Survey (NFHS-5, 2020–21) indicate that although vaccination coverage has improved, rural areas still experience higher infant and under-five mortality rates compared to urban areas. (International Institute for Population Sciences. [12,13]

Evidence suggests that unimmunized and partially immunized children are three to six times more likely to die from preventable diseases compared to fully immunized children. According to UNICEF Jharkhand, an estimated 30 lakh children in the state are still excluded from the full benefits of vaccination. [3]

Parents play a decisive role in ensuring timely and complete immunization of their children. Their knowledge and attitude toward immunization significantly influence acceptance, compliance, and continuation

of vaccination schedules. Improving parental knowledge and fostering positive attitudes are therefore critical for enhancing immunization coverage and preventing vaccine-preventable diseases.[10]

Although immunization coverage is relatively better in tertiary care settings, rural areas continue to face challenges related to awareness, accessibility, and utilization of services. The present study was conducted in rural areas to assess parental knowledge and attitudes toward immunization, with the aim of identifying gaps and informing the development of targeted strategies to improve immunization uptake among parents of under-five children.[11]

II. Materials and Methods

The present study was conducted as part of the curricular requirements of the Bachelor of Science in Nursing program and adopted a quantitative approach with a descriptive survey design to assess parental knowledge and attitude regarding immunization. The study was carried out in selected rural areas of Ormanjhi Block, Ranchi District, Jharkhand, over a period of four days from 21 June to 24 June 2023. The variables under investigation included demographic variables such as the number of under-five children, age of parents and child, educational status, occupation, religion, preferred immunization center, and source of previous information on immunization as well as the research variables, namely knowledge and attitude regarding immunization. The study population comprised parents of under-five children residing in rural areas of Ranchi District, with the target population being parents from selected rural areas and the accessible population consisting of parents living in Ormanjhi Block. A total of 100 parents of under-five children were selected as the study sample using a non-probability purposive sampling technique. Eligible participants were identified with the help of the under-five children register maintained at the Anganwadi Center of Anandi Village, Ormanjhi Block. Parents of under-five children residing in Ormanjhi Block who could read and write Hindi and were willing to participate were included in the study, while parents from urban areas of Ranchi District and those with children above five years of age were excluded from participation.

Data Collection Tools and technique

1. *Demographic Proforma:* Included eight items related to background characteristics such as number of under-five children, age of parents and child, education, occupation, religion, preferred immunization centre, and source of information regarding immunization.
2. *Knowledge Questionnaire on Routine Childhood Immunization:* A 20-item self-structured questionnaire was designed to assess parents' knowledge regarding immunization. The items covered concepts of immunity, benefits of immunization, Universal Immunization Programme, vaccination schedule, specific vaccines, booster doses, side effects, and post-vaccination care.
3. *Attitude Scale on Routine Childhood Immunization:* A five-point Likert scale comprising 20 statements to assess parents' attitudes toward immunization. The statements addressed perceptions regarding benefits, safety, necessity of vaccination, misconceptions, and long-term effects of immunization.

Content validity of the tool was established by eleven experts from the fields of medicine and Nursing. The tool was evaluated for relevance, accuracy, and appropriateness. All items achieved at least 75% agreement, and no modifications were required. Reliability of the tool was assessed using Cronbach's alpha, which yielded a reliability coefficient of 1.0, indicating excellent internal consistency. The validated English version of the tool was translated into Hindi by a language expert prior to data collection to ensure clarity and comprehension.

A pilot study was conducted on 20 May 2023 in Kutiyatu, Namkum, Ranchi, Jharkhand, among 10 parents of under-five children who met the inclusion criteria, to assess the feasibility and clarity of the study tools and procedures. The findings confirmed the appropriateness of the methodology, and the pilot data were excluded from the final analysis

Data Collection Process

After obtaining the necessary administrative permissions and written informed consent from the participants, data collection was carried out in a systematic manner. Initially, the demographic proforma was administered to obtain background information of the participants, followed by the knowledge questionnaire to assess their understanding of immunization, and subsequently the attitude scale to evaluate their perceptions and beliefs regarding immunization. All questionnaires were completed by the participants under the direct supervision of the investigators to ensure clarity and completeness of responses. Ethical approval and administrative permissions for the study were obtained from the Departmental Research Committee, the Principal of the College of Nursing, RIMS, Ranchi, and the Mukhiya of the respective Gram Panchayats of Kutiyatu (for the pilot study) and Ormanjhi (for the main study). Strict ethical principles were adhered to throughout the study, with assurance of voluntary participation, confidentiality, and anonymity of all respondents. The collected data were analysed using SPSS version 16.0, employing descriptive statistics such as frequency and percentage to summarize demographic characteristics and levels of knowledge and attitude, and

inferential statistics including the Chi-square test and Pearson's correlation coefficient to examine associations and relationships between variables, with statistical significance set at $p < 0.05$.

III. Results and Discussion

Demographic Characteristics of the Participants

The demographic profile of the participants showed that most parents (65%) had one under-five child, while 27% had two children and only 8% had more than two, reflecting a trend toward smaller family sizes that may support better attention to child health and immunization. A majority of parents were young adults, with 38% aged 19–25 years and 34% aged 26–30 years, an age group generally more receptive to health education and preventive practices. Most children were within the critical immunization age range, with the highest proportion being two years old (27%), followed by three years (23%). Regarding education, 42% of parents had completed intermediate education, while 16% had no formal education, indicating the need for simplified and targeted health education strategies. Nearly all participants (99%) belonged to the Hindu religion. Occupationally, 37% of parents were engaged in other occupations and 28% were daily wage laborers, suggesting potential socioeconomic influences on healthcare access. Anganwadi centers were the preferred immunization site for the majority of parents (89%), and healthcare workers were the primary source of immunization-related information (60%), highlighting the central role of community-based health services in rural immunization delivery.

Knowledge Regarding Immunization

The assessment of parental knowledge regarding immunization revealed that the majority of parents (58%) had an average level of knowledge, while 23% demonstrated poor knowledge and only 19% exhibited good knowledge. Although awareness about immunization existed among most parents, the predominance of average and poor knowledge indicates gaps in understanding of immunization schedules, vaccine-specific information, booster doses, and long-term benefits of vaccination.

This finding suggests that while immunization services are accessible, comprehensive knowledge among parents remains inadequate. Similar observations have been reported in other studies conducted in rural and semi-urban areas, where limited health literacy and dependence on informal sources of information contributed to insufficient knowledge levels. (Singh, 2018) These findings underscore the need for continuous and structured educational interventions focusing on immunization.

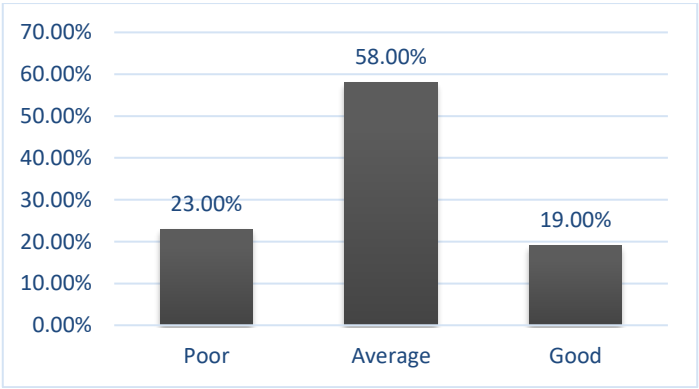

Figure 1- Level of Knowledge of Parents Regarding Routine Childhood Immunization

Attitude Regarding Immunization

In contrast to knowledge levels, parental attitude toward immunization was overwhelmingly positive. The results showed that 97% of parents had a good attitude toward immunization, while only 3% demonstrated an average attitude. Notably, none of the participants exhibited a poor attitude toward immunization. This positive attitude may be attributed to sustained government immunization campaigns, increased trust in public health services, and regular interaction with healthcare workers at Anganwadi centres. A favourable attitude toward immunization reflects acceptance of vaccines as beneficial and necessary for child health. However, the discrepancy between positive attitude and average knowledge suggests that parents may comply with immunization practices based on trust in health systems rather than informed understanding.

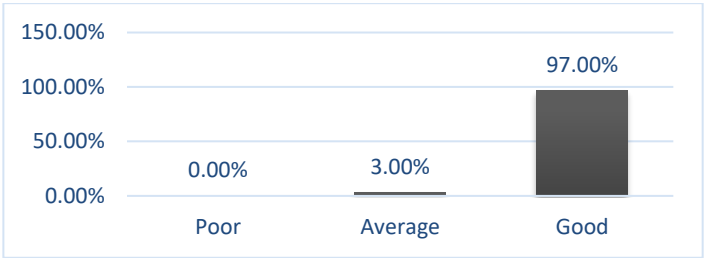

Figure 2- Level of Attitude of Parents Regarding Routine Childhood Immunization

Relationship Between Knowledge and Attitude

The relationship between knowledge and attitude regarding immunization was examined using Pearson's correlation coefficient. The analysis revealed no statistically significant correlation between knowledge and attitude ($r = 0.102$, $p = 0.312$). Therefore, the null hypothesis stating that there is no significant relationship between knowledge and attitude was accepted. This finding indicates that a positive attitude toward immunization does not necessarily depend on adequate knowledge. Parents may hold favourable perceptions due to social norms, community influence, or trust in healthcare providers, even in the absence of detailed knowledge. Similar findings have been reported in previous studies, where attitude was influenced more by external reinforcement than by factual understanding.[8]

Domain	Knowledge	Attitude
Knowledge	r=0.102 p=0.312	r=0.102 p=0.312
Attitude	r=0.102 p=0.312	r= 0.102 p=0.312

Table 1. Correlation between Knowledge and Attitude of Parents Regarding Routine Childhood Immunization (Pearson's correlation coefficient)

Association Between Knowledge and Selected Demographic Variables

The association between knowledge regarding immunization and selected demographic variables was analysed using the Chi-square test. The results demonstrated a statistically significant association between knowledge and several demographic variables, including parental education ($\chi^2 = 40.100$; $p = 0.001$), occupation ($\chi^2 = 29.300$; $p = 0.001$), preferred immunization centre ($\chi^2 = 140.660$; $p = 0.001$), and source of previous information ($\chi^2 = 84.080$; $p = 0.001$). Consequently, the null hypothesis related to association was rejected.

These findings suggest that parents with higher educational attainment and stable occupations were more likely to possess better knowledge regarding immunization. Additionally, parents who relied on healthcare workers and formal health facilities as sources of information demonstrated higher knowledge levels. This highlights the crucial role of education and reliable information sources in shaping parental understanding of immunization.

IV. Discussion

The findings of the present study reveal a clear disparity between knowledge and attitude among parents of under-five children in rural Ranchi. While attitudes toward immunization were predominantly positive, knowledge levels were largely average, indicating a need to strengthen informational components of immunization programs. The reliance on Anganwadi centres and healthcare workers underscores the importance of strengthening community-based health services and empowering frontline workers with effective communication skills. [7,14]

The absence of a significant relationship between knowledge and attitude suggests that improving knowledge alone may not automatically translate into attitude change; however, enhancing knowledge is essential for informed decision-making and sustained compliance with immunization schedules. The significant association between knowledge and demographic variables emphasizes the need for targeted interventions focusing on parents with lower educational and socioeconomic status.

V. Implications and recommendations of the Study

Nursing Practice: The findings highlight the crucial role of nurses in improving parents' knowledge and attitude toward immunization of under-five children. Nurses can utilize these results to plan and implement

effective health education strategies such as counselling, group discussions, and community-based awareness programs to enhance vaccination coverage and reduce vaccine-preventable diseases.

Nursing Education: The study emphasizes the importance of strengthening immunization-related content in nursing education. Student nurses can be encouraged to actively participate in health education activities using appropriate audiovisual aids to promote positive attitudes toward immunization among parents. Continuous nursing education programs can further reinforce updated immunization practices.

Nursing Administration: Nurse administrators can use the study findings to plan, supervise, and monitor immunization-related activities at both peripheral and tertiary care levels. Organizing in-service training and continuous education programs for nursing staff can help improve service delivery and vaccination coverage among under-five children.

Nursing Research: The study provides baseline data for future research on parental knowledge and attitude toward immunization. It underscores the need for further large-scale and multi-centre studies to generate evidence that can strengthen immunization programs and contribute to the advancement of nursing knowledge.

Recommendations

1. Similar studies may be conducted on a larger sample to enhance generalizability of the findings.
2. Future research may assess the immunization practices of parents of under-five children.
3. Replication of the study in different districts or regions, including various parts of Jharkhand, is recommended to compare findings across settings.

Summary

In summary, the study findings indicates that although parents of under-five children in rural areas of Ranchi generally exhibit a positive attitude toward immunization, their knowledge remains suboptimal. Knowledge was significantly associated with selected demographic variables but showed no significant correlation with attitude. These findings highlight the importance of focused health education, strengthened nursing interventions, and community-based awareness programs to bridge the gap between knowledge and practice and to ensure complete and timely immunization of children.

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