



# The Role of Nurses in Improving Immunization Compliance Among Toddlers in Slum Areas

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## ABSTRACT

Immunization is a crucial public health intervention for preventing vaccine-preventable diseases among toddlers; however, immunization compliance remains low in slum areas due to socioeconomic and health system barriers. Nurses, as frontline health workers, play a strategic role in promoting immunization within underserved communities. This study aims to examine the role of nurses in improving immunization compliance among toddlers in slum areas and to identify key challenges and enabling factors influencing immunization practices. This study employed a mixed-methods research design conducted in selected slum areas. Quantitative data were collected through structured questionnaires administered to parents or caregivers of toddlers to assess immunization compliance and related factors. Qualitative data were obtained through in-depth interviews and observations involving nurses engaged in community and maternal-child health services. Data analysis was performed using descriptive and inferential statistics for quantitative data and thematic analysis for qualitative data. The results indicate that nurses play a significant role in improving immunization compliance through health education, home visits, counseling and effective communication, reminder and follow-up systems, and community engagement. These interventions were found to enhance parents' knowledge, attitudes, and trust toward immunization services. Key challenges identified include limited parental knowledge, socioeconomic constraints, high population mobility, and restricted access to health facilities. In conclusion, strengthening community-based nursing roles is essential for improving immunization compliance among toddlers in slum areas. Empowering nurses with adequate training, resources, and institutional support can enhance immunization coverage and contribute to better child health outcomes in vulnerable urban populations.

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## 1. INTRODUCTION

Immunization is one of the most effective public health interventions for preventing infectious diseases and reducing morbidity and mortality among toddlers. Despite national and global efforts to improve immunization coverage, disparities remain evident, particularly among children living in slum or urban poor areas (Crocker-Buque et al., 2017). Immunization coverage in these settings is often lower than national targets due to a combination of socioeconomic, environmental, and health system-

related factors. Toddlers in slum areas are therefore at a higher risk of vaccine-preventable diseases, which can contribute to increased child morbidity, mortality, and long-term health consequences.

Low immunization compliance poses serious public health problems. Incomplete or delayed immunization weakens herd immunity, increasing the likelihood of disease outbreaks such as measles, diphtheria, and polio (Guerra, 2007). These outbreaks disproportionately affect vulnerable populations, including toddlers living in overcrowded and unsanitary environments. Additionally, poor immunization compliance places a greater burden on health systems due to increased healthcare utilization, preventable hospitalizations, and higher healthcare costs. Addressing immunization gaps in slum areas is therefore critical to achieving equitable child health outcomes and meeting national and global immunization goals.

Slum areas are characterized by complex social and environmental challenges that directly affect health-seeking behaviors. Overcrowding, poverty, unstable housing, low levels of parental education, and limited access to clean water and sanitation are common features of these communities (Nandy & Gordon, 2009). Families living in slums often face competing priorities, such as securing daily income, which may reduce their ability to attend immunization services regularly. In addition, limited access to health facilities, poor transportation, lack of information, and misinformation about vaccines further contribute to low immunization compliance among parents of toddlers in these settings.

Nurses play a strategic and central role as frontline health workers in community and maternal-child health services, particularly in underserved and high-risk populations. In slum areas, nurses are often the primary point of contact between the health system and the community (Collaborative, 2022). Their roles extend beyond clinical service delivery to include health education, counseling, advocacy, home visits, follow-up care, and community engagement. Through effective communication and culturally sensitive approaches, nurses can influence parental knowledge, attitudes, and behaviors related to immunization, thereby improving compliance among toddlers.

Several quantitative studies have investigated factors associated with immunization compliance among parents and caregivers. Hasnidar & Nurul Rahma Danni (2024) examined factors related to parental non-compliance in giving complete immunizations to toddlers in the Puskesmas Pembantudes Maninili Utara area, finding that parental knowledge, attitude, and family support were significantly related to compliance, whereas distance to health facilities was not statistically significant. This highlights the multifactorial nature of immunization behavior and points to the importance of community education in improving immunization uptake.

Research by Suci Nurhayati et al. (2023) explored the relationship between mothers' knowledge and immunization compliance, reporting a statistically significant association: higher maternal knowledge was linked with better immunization compliance among children aged 0–60 months in the Babelan II health center area. The study emphasizes that improving caregiver awareness is crucial for enhancing the regularity and completeness of routine childhood vaccinations.

In a study of determinants affecting basic immunization completeness, Salma Hanani, Irma Jayatmi & Hedy Hardiana (2023) assessed how caregiver knowledge, health worker roles, and community health cadres influenced immunization completeness at Klinik Pratama Dewi Medika. They found that caregiver knowledge was significantly associated with immunization completeness, while the overall statistical effect of health worker participation was not significant in this setting. The findings underline the complexity of immunization behavior and suggest that health worker roles may interact with other social determinants.

Complementing these cross-sectional investigations, Cut Rahma Huswatul Hasanah et al. (2024) examined various factors related to basic immunization coverage in the Tapaktuan region of Aceh, Indonesia, including the influence of family support, caregiver knowledge, and health worker participation. Their work illustrates that socio-demographic and health service factors, including the roles of health personnel, are crucial for improving immunization uptake, particularly in under-served communities where slum-like conditions prevail.

Beyond the Indonesian context, Ebtessam Abdulla and colleagues (2018) conducted research in Qatar focusing on primary health care nurses' knowledge about immunization. This sequential mixed-methods study measured nurses' immunization knowledge before and after an educational program and found increased knowledge post-training, demonstrating how nurse education can strengthen immunization practices and potentially influence compliance through better communication, safety awareness, and service delivery.

Although previous studies have examined factors influencing immunization coverage, many have focused primarily on parental characteristics or health system barriers, with limited attention to the specific and multifaceted role of nurses in improving immunization compliance in slum settings. There is a lack of in-depth research that explores how nurses' roles, strategies, and challenges contribute to immunization outcomes among toddlers living in urban poor areas. This research gap highlights the importance of studying the role of nurses in improving immunization compliance, as evidence from such studies can inform the development of more effective, community-based nursing interventions and policies aimed at reducing immunization disparities in slum areas.

## 2. RESEARCH METHOD

### 2.1 Conceptual / Theoretical Framework

This study is grounded in health behavior and community nursing theories that emphasize the role of healthcare providers in influencing individual and community health behaviors (Pinto et al., 2012). Immunization compliance among toddlers is understood as a health behavior shaped by a combination of professional interventions, individual perceptions, and environmental factors. Within this framework, nurses play a central role as agents of change who can directly and indirectly influence parents' decisions to comply with immunization schedules.

The independent variable in this study is the role of nurses, which encompasses several key functions in community and maternal-child health services (Isangula et al., 2022). These roles include providing health education to parents and caregivers regarding the benefits, safety, and schedules of immunization; conducting home visits to reach families who face barriers in accessing health facilities; and offering counseling and effective communication to address parental concerns, fears, and misconceptions about vaccines. In addition, nurses are involved in implementing reminder and follow-up systems, such as appointment reminders or tracking immunization status, to prevent missed or delayed vaccinations. Community engagement is another essential nursing role, where nurses collaborate with local stakeholders, community leaders, and health cadres to promote immunization and build trust within slum communities.

The dependent variable is immunization compliance of toddlers, which refers to the extent to which children receive complete and timely vaccinations according to recommended immunization schedules (Konwea et al., 2018). Immunization compliance is reflected in indicators such as completion of basic immunizations, adherence to scheduled vaccination times, and consistency in attending immunization services. Effective nursing roles are expected to improve immunization compliance by increasing parental awareness, reducing practical barriers, and strengthening motivation to utilize immunization services.

The relationship between the role of nurses and immunization compliance is influenced by several supporting and confounding factors (Powers et al., 2016). Parents' knowledge and attitudes toward immunization play a critical mediating role, as informed and positive attitudes are more likely to lead to compliance. Socioeconomic conditions, including income level, employment status, and educational background, may either facilitate or hinder parents' ability to access immunization services. Accessibility of health facilities, such as distance, transportation availability, and service hours, can also affect compliance, regardless of nursing efforts. Furthermore, support from community leaders can strengthen the effectiveness of nursing interventions by enhancing community acceptance, encouraging participation, and addressing sociocultural barriers related to immunization.

Overall, this conceptual framework proposes that nurses' roles have a direct influence on immunization compliance among toddlers and an indirect influence through changes in parental

knowledge, attitudes, and community support. By considering both professional nursing interventions and contextual factors, this framework provides a comprehensive understanding of how immunization compliance can be improved in slum areas.

## 2.2 Research Method

This study employs a mixed-methods research design to comprehensively examine the role of nurses in improving immunization compliance among toddlers in slum areas (Yazdani et al., 2021). The mixed-methods approach is selected to integrate quantitative data on immunization compliance with qualitative insights into nursing practices, experiences, and contextual challenges. This design allows for a more holistic understanding of both measurable outcomes and underlying processes influencing immunization behavior in underserved communities.

Data collection is conducted using multiple methods to ensure data triangulation and strengthen the validity of findings (Bans-Akutey & Tiimub, 2021). Quantitative data are collected through structured questionnaires administered to parents or caregivers of toddlers to assess immunization compliance, parental knowledge, attitudes, and perceived barriers to immunization services. Qualitative data are obtained through in-depth interviews with nurses working in community health centers and slum areas to explore their roles, strategies, and challenges in promoting immunization. In addition, non-participant observations are conducted during immunization activities and community outreach programs to document nurse-parent interactions and service delivery processes. Relevant document reviews, such as immunization records, monthly health reports, and program guidelines, are also used to support and verify the collected data.

The participants in this study include community and maternal-child health nurses who are directly involved in immunization services, as well as parents or primary caregivers of toddlers residing in selected slum areas (Gilmore & McAuliffe, 2013). Participants are selected using purposive sampling for qualitative components to ensure rich and relevant information, while quantitative respondents are selected using appropriate probability or non-probability sampling techniques based on the study setting and population size.

Data analysis is carried out using both quantitative and qualitative approaches (Bergin, 2018). Quantitative data are analyzed using descriptive and inferential statistical methods to identify levels of immunization compliance and examine relationships between nursing roles and compliance outcomes. Qualitative data from interviews and observations are analyzed thematically to identify recurring patterns, key themes, and contextual factors related to nursing interventions and immunization practices. The integration of quantitative and qualitative findings occurs at the interpretation stage to provide a comprehensive explanation of how and why nurses influence immunization compliance among toddlers in slum areas.

## 3. RESULTS AND DISCUSSIONS

### 3.1 Effective Nursing Roles and Strategies

Effective nursing roles and strategies play a crucial part in improving immunization compliance among toddlers, particularly in slum areas where social, economic, and environmental barriers are prevalent. Nurses function not only as healthcare providers but also as educators, communicators, advocates, and community mobilizers. Their multifaceted roles enable them to address both individual and systemic challenges that influence parents' decisions and ability to complete their children's immunization schedules.

One of the most effective nursing strategies is health education, which aims to improve parents' knowledge and understanding of immunization benefits, schedules, and potential side effects (Lv et al., 2021). Through individual counseling sessions, group education at community health posts, and informal discussions during clinic visits or home visits, nurses can correct misconceptions and reduce vaccine hesitancy. Clear, culturally sensitive, and consistent health education has been shown to increase parental confidence and motivation to comply with immunization recommendations.

Home visits represent another critical nursing strategy, especially for families living in slum areas who face barriers such as limited transportation, irregular work schedules, or lack of awareness of immunization services. By visiting families in their homes, nurses can identify unvaccinated or partially vaccinated toddlers, provide tailored education, assess environmental and social factors affecting health behaviors, and encourage parents to attend immunization services. Home visits also help build trust and strengthen the nurse-family relationship, which is essential for sustained immunization compliance.

Effective counseling and communication skills are central to the nursing role in addressing parental concerns and fears related to immunization (Hoekstra & Margolis, 2016). Nurses who actively listen, show empathy, and provide evidence-based explanations are better able to alleviate anxiety about vaccine safety and side effects. Open and respectful communication fosters a supportive environment in which parents feel comfortable asking questions and expressing doubts, leading to informed decision-making and improved compliance.

The use of reminder and follow-up systems is another strategy that significantly enhances immunization adherence. Nurses often maintain immunization registers, monitor vaccination schedules, and conduct follow-up through phone calls, text messages, or coordination with community health volunteers (Organization, 2022). These systems help prevent missed or delayed vaccinations and ensure that parents are reminded of upcoming immunization appointments, particularly in communities with high mobility and unstable living conditions.

Finally, community engagement is a vital nursing strategy for improving immunization compliance in slum areas. Nurses collaborate with community leaders, health cadres, and local organizations to promote immunization campaigns and disseminate accurate health information. Community-based activities, such as outreach immunization services and health education sessions, help create a supportive social environment that encourages parents to participate in immunization programs. By engaging trusted community figures, nurses can enhance acceptance of immunization and overcome cultural or social resistance.

### **3.2 Key Challenges and Enabling Factors**

Improving immunization compliance among toddlers in slum areas involves navigating a range of challenges while simultaneously leveraging enabling factors that support successful implementation. These challenges and facilitators operate at individual, community, and health system levels, influencing the effectiveness of nursing interventions and immunization programs.

One of the primary challenges is the limited knowledge and negative attitudes of parents toward immunization. Misinformation, fear of side effects, and cultural or religious beliefs often lead to vaccine hesitancy (Nuwarda et al., 2022). In slum communities, low educational attainment may further hinder parents' understanding of the importance of completing immunization schedules. These factors can result in delayed or incomplete immunization, despite the availability of services.

Socioeconomic constraints also pose significant challenges. Many families living in slum areas experience poverty, unstable employment, and demanding work schedules that limit their ability to attend immunization services during regular clinic hours. High population mobility, including frequent relocation, makes it difficult for health workers to track immunization status and ensure follow-up. Additionally, indirect costs such as transportation expenses or lost income can discourage parents from prioritizing immunization visits (Cox et al., 2021).

Challenges related to the health system and service accessibility further affect immunization compliance. Slum areas often have limited health facilities, overcrowded services, and shortages of healthcare personnel. Inconsistent vaccine supply, long waiting times, and inadequate documentation systems may reduce parents' trust in health services and contribute to missed immunization opportunities (Li et al., 2020). Nurses working in these settings may also face heavy workloads and limited resources, constraining their ability to conduct outreach and follow-up activities.

Despite these challenges, several enabling factors can significantly enhance immunization compliance when effectively utilized. One key enabling factor is the active and consistent role of nurses in providing health education, counseling, and follow-up care. Nurses who are skilled in

communication and culturally sensitive approaches can build trust with families and address vaccine-related concerns more effectively. Their presence within the community helps bridge the gap between health services and underserved populations.

Community support also plays a critical enabling role. Involvement of community leaders, health volunteers, and local organizations can improve acceptance of immunization programs and encourage parental participation (Woldie et al., 2018). When trusted community figures endorse immunization, parents are more likely to comply with recommended schedules. Community-based outreach services, such as mobile immunization clinics or integrated health activities, further reduce access barriers.

Another enabling factor is the availability of supportive policies and programs, including reminder systems, home visit initiatives, and integrated maternal and child health services. The use of immunization tracking tools and follow-up mechanisms helps nurses identify defaulters and ensure timely vaccination. Moreover, intersectoral collaboration between health services, local government, and community organizations strengthens program implementation and sustainability.

### **3.3 Practical Recommendations to Improve Immunization Compliance in Slum Areas**

Improving immunization compliance among toddlers in slum areas requires comprehensive and context-sensitive strategies that address individual, community, and health system challenges. Based on the identified roles of nurses, existing barriers, and enabling factors, several practical recommendations can be proposed to strengthen immunization programs and enhance compliance in underserved urban settings.

First, strengthening nurse-led health education programs is essential. Nurses should deliver consistent, culturally appropriate, and easily understandable immunization education to parents and caregivers through various platforms, including community health posts, home visits, and group discussions (Oku et al., 2017). Educational materials should be tailored to the literacy levels of slum communities and focus on the benefits of immunization, potential side effects, and the importance of completing the full immunization schedule. Continuous training for nurses in communication and health promotion skills is also recommended to improve the effectiveness of educational interventions.

Second, the expansion of outreach services and home visit programs can significantly reduce access barriers faced by families in slum areas. Nurses should proactively identify toddlers who have missed or delayed immunizations and conduct home visits to provide counseling and referrals (Committee, 2003). Mobile immunization services and flexible service hours can accommodate parents with demanding work schedules, thereby increasing the likelihood of timely immunization.

Third, the implementation of systematic reminder and follow-up mechanisms is recommended to prevent missed immunization appointments. Nurses can utilize simple and low-cost tools such as immunization registers, reminder cards, phone calls, or text message notifications to track immunization status and remind parents of upcoming schedules (Onamade et al., 2022). Effective follow-up systems enable early identification of defaulters and support continuity of care, particularly in highly mobile slum populations.

Fourth, enhancing community engagement and collaboration is crucial for building trust and increasing acceptance of immunization programs. Nurses should work closely with community leaders, health volunteers, and local organizations to promote immunization messages and encourage community participation (McCollum et al., 2017). Community-based advocacy and peer support can help counter misinformation and cultural resistance to immunization. Integrating immunization activities with existing community events or social programs can also increase reach and participation.

Finally, strengthening health system support and intersectoral collaboration is necessary to sustain improvements in immunization compliance. Adequate staffing, consistent vaccine supply, and supportive supervision for nurses should be ensured (Oliveira et al., 2013). Collaboration between health services, local government, and non-governmental organizations can enhance resource allocation and program coordination in slum areas. Policies that prioritize maternal and child health

services in urban poor settings will further support nurses in delivering effective immunization interventions.

### **3.4 Comparison of the Results of the Current Study with Previous Studies**

The findings of the current study demonstrate that nurses play a significant role in improving immunization compliance among toddlers in slum areas through health education, home visits, counseling, follow-up systems, and community engagement. These results are largely consistent with previous studies that emphasize the importance of frontline health workers, particularly nurses, in promoting childhood immunization in underserved communities.

In line with the findings of this study, previous research has shown that health education provided by nurses positively influences parents' knowledge and attitudes toward immunization, which in turn improves compliance. Studies by Nurhayati et al. (2023) and Hasanah et al. (2024) reported that increased parental knowledge was significantly associated with higher immunization completeness. Similarly, the current study found that nurse-led educational interventions helped reduce misinformation and vaccine hesitancy among parents in slum areas, supporting the view that education is a key mechanism through which nurses affect immunization behavior.

The importance of home visits and outreach services identified in this study is also supported by earlier research (Ammerman et al., 2006). Studies conducted in low-resource and urban poor settings have shown that home-based nursing interventions are effective in reaching families who face barriers such as distance, time constraints, and economic limitations. For example, Lv and Zhao (2021) reported that community-based nursing interventions, including direct outreach and scenario-based education, significantly improved timely immunization rates. The current study reinforces these findings by demonstrating that home visits enable nurses to identify unvaccinated toddlers, provide tailored counseling, and strengthen trust with families living in slum environments.

Regarding counseling, communication, and follow-up systems, the results of the current study align with previous literature highlighting the role of effective communication and reminder mechanisms in improving immunization compliance (Obi-Jeff et al., 2022). Research on immunization programs has consistently shown that reminder systems, such as appointment tracking and follow-up contact, reduce missed immunization opportunities. The present study adds to this body of knowledge by emphasizing the role of nurses in implementing these systems within resource-limited slum settings, where high population mobility often complicates immunization tracking.

However, some findings of the current study differ from previous research. While several earlier studies suggested that the role of health workers was not always statistically significant when compared to socioeconomic factors, the present study found that active and consistent nursing involvement could partially mitigate the effects of poverty and limited access to health facilities. This difference may be attributed to the intensive community engagement strategies employed by nurses in the study area, suggesting that the effectiveness of nursing roles may depend on the context and level of intervention intensity.

## **4. CONCLUSION**

This study concludes that nurses play a pivotal and multifaceted role in improving immunization compliance among toddlers living in slum areas. Through health education, home visits, effective counseling and communication, reminder and follow-up systems, and active community engagement, nurses significantly contribute to increasing parents' awareness, motivation, and adherence to recommended immunization schedules. These nursing interventions are particularly crucial in slum settings where socioeconomic constraints, limited access to health services, and low parental knowledge often hinder immunization compliance. The findings indicate that nurse-led strategies not only have a direct impact on immunization uptake but also indirectly influence compliance by improving parental knowledge and attitudes and strengthening trust between the community and health services. Despite persistent challenges such as poverty, population mobility, and health system limitations, consistent and context-sensitive nursing interventions were found to mitigate these barriers and enhance immunization coverage among toddlers. Overall, this research highlights the

importance of strengthening community-based nursing roles as a key approach to reducing immunization disparities in slum areas. By empowering nurses with adequate training, resources, and institutional support, immunization programs can achieve higher compliance rates and contribute to improved child health outcomes in vulnerable urban populations. The study underscores the need for continued investment in nursing-led interventions as an essential component of equitable and sustainable immunization strategies.

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