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## The Role of Immunization Programs in Measles Control: A Public Health Literature Review

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### KEYWORDS

Immunization; Measles; Measles-Rubella; Public Health; Literature Review

### ABSTRACT

Measles is an infectious disease that remains a public health problem, despite the availability of an effective and safe vaccine. Successful measles control depends heavily on the optimal and sustainable implementation of immunization programs. However, measles and measles-rubella (MR) immunization coverage in various regions still faces various challenges, both from an individual and family perspective, as well as from the health care system. This study aims to examine the role of immunization programs in measles control through a public health literature review approach. Using the Systematic Literature Review (SLR) method with the PRISMA approach, secondary data were obtained from primary research articles published between 2021 and 2026 from Google Scholar, PubMed, and ScienceDirect. Of the screened articles, 15 journals met the inclusion criteria. Research findings indicate that the success of immunization programs in controlling measles is influenced by the active role of health cadres, the support and participation of mothers and families, the involvement of health workers, and the quality of management and access to immunization services. Furthermore, several studies have highlighted challenges in immunization implementation, such as limited infrastructure and the impact of the COVID-19 pandemic, which have contributed to declining immunization coverage. The conclusion of this study indicates that measles control requires a comprehensive and integrated approach through strengthening the role of cadres, increasing community literacy, and optimizing the immunization service system. These efforts are expected to increase measles and MR immunization coverage and prevent measles outbreaks in the community.

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### INTRODUCTION

Measles is still one of the infectious diseases that contributes greatly to the global public health burden, particularly on groups of children, even though safe and effective vaccines have become widely available. Global epidemiological reports show that in recent years there has been a resurgence of measles cases in various countries, which is closely related to the decline in routine immunization coverage after the COVID-19 pandemic. The World Health Organization (2023) together (Patel et al., 2022) emphasized that disruptions to immunization services have increased the number of children who do not receive complete immunization, thereby increasing the risk of measles outbreaks in the community.

Measles is caused by the measles virus which has a very high rate of transmission through respiratory droplets and direct contact (Misin et al., 2020). This disease not only causes mild symptoms such as fever and rash, but can also cause severe complications in the form of pneumonia, severe diarrhea, encephalitis, blindness, and death, especially in children with poor

nutritional status. (Moss, 2021) states that the majority of measles deaths occur in populations that are not immunized or have limited access to basic health services.

Effective measles prevention efforts have long relied on the administration of measles vaccines through immunization programs. Scientific evidence shows that one dose of measles vaccine can provide about 93% protection, while two doses of the vaccine increase effectiveness by about 97%. (Gastañaduy, 2021) in its systematic review explained that two-dose immunization coverage is a key factor in reducing the incidence of measles and preventing continuous transmission at the community level.

Immunization programs as a public health intervention not only aim to protect individuals who receive vaccines, but also to form herd immunity. (Ozawa et al., 2022) emphasized that herd immunity is crucial in controlling measles because this virus has a high baseline reproduction rate, so it requires a minimum of 95% immunization coverage to effectively break the chain of transmission. However, the achievement of measles immunization coverage globally still faces various challenges. A global analysis conducted by (Abbas et al., 2022) shows that the COVID-19 pandemic has caused significant disruption to routine immunization services in more than half of the world's countries, which has an impact on the increasing number of children who do not or have not received measles immunizations as scheduled.

In developing countries, the challenges of implementing measles immunization programs are increasingly complex due to geographical, socio-economic, and health system inequality. Studies conducted by (Sari et al., 2023) in several regions of Southeast Asia show that areas with limited access to health services and high poverty rates tend to have lower measles immunization coverage as well as a higher risk of measles extraordinary events.

In addition to structural factors, behavioral and socio-cultural factors also play an important role in the success of the immunization program. (Larson et al., 2022) identified that vaccine hesitancy, low parental knowledge, and rampant misinformation related to vaccine safety are the main obstacles to achieving optimal measles immunization coverage in various countries.

Additional strategies have been developed to strengthen measles immunization programs, including the implementation of mass immunization campaigns and catch-up immunizations. (Minetti et al., 2023) reported that the implementation of integrated immunization strategies adapted to local epidemic conditions was able to significantly reduce measles incidence, especially in regions with large immunization coverage gaps.

Attention to the administration of the second dose of the measles vaccine is also a focus in the current literature. (Cutss et al., 2021) assert that low coverage of second doses is often the main cause of measles elimination failure, although first-dose coverage has reached relatively high levels in some countries. From a health system perspective, the success of measles immunization programs relies heavily on strong policy support, sustainable funding, and effective disease surveillance systems. (Donald et al., 2024) stated that the integration of immunization programs with primary health services and data-driven monitoring systems is a key element in maintaining the sustainability of measles control.

Based on various scientific findings published between 2021 and 2026, it can be concluded that immunization programs have a very crucial role in controlling measles at the global and national levels. Therefore, this literature review aims to comprehensively examine the role of immunization programs in reducing the incidence of measles, identify factors that

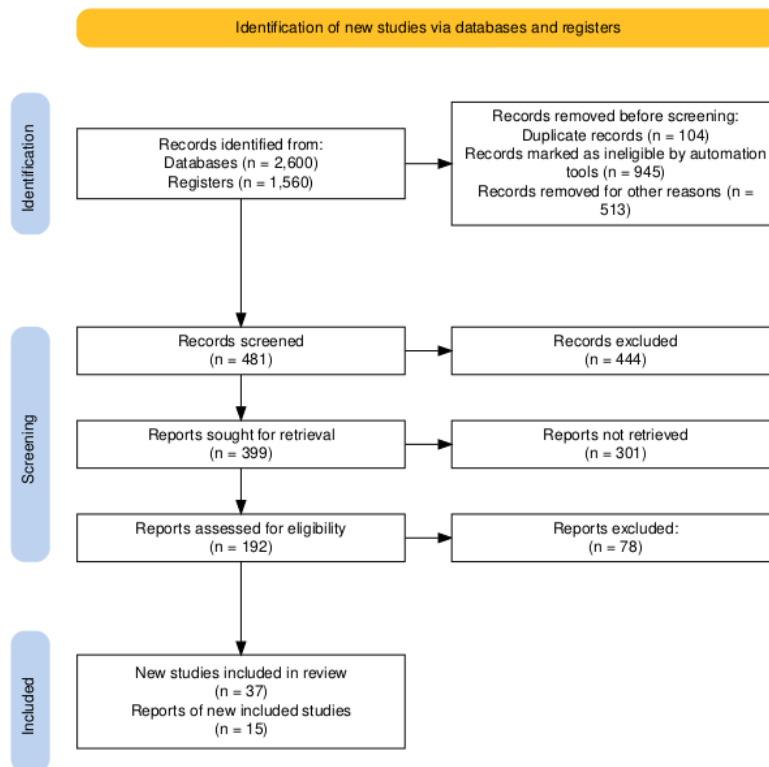
influence its success, and provide a scientific basis for strengthening immunization policies and strategies in the context of public health. The benefits of this study are twofold. Theoretically, this research enriches the public health literature by synthesizing recent evidence on the multifaceted determinants of immunization program success, including the roles of cadres, families, health workers, and service systems, thereby offering a comprehensive framework for understanding measles control in the post-pandemic era. Practically, the findings provide actionable insights for policymakers, health program managers, and field health workers to design targeted interventions, strengthen cadre capacity, improve community literacy, and optimize immunization service delivery. Furthermore, this study serves as a reference for future research on immunization strategies and measles elimination efforts in similar low-resource settings.

## **METHOD**

This research used secondary data through the Systematic Literature Review (SLR) method with the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) approach to examine the role of immunization programs in measles control from a public health perspective. The literature search process is carried out systematically through several scientific databases, namely Google Scholar, PubMed, and ScienceDirect. The article search uses a combination of relevant keywords, including "measles immunization", "measles vaccination program", "measles control", "immunization coverage", and "measles elimination", with the help of Boolean AND and OR operators to obtain search results that match the research objectives.

The inclusion criteria in this study include primary research articles with quantitative, qualitative, and mixed methods approaches published in the 2021–2026 range, available in full text form, and directly discussing the measles immunization program or measles-rubella immunization and its contribution to the prevention, control, or elimination of measles in the community. Articles that are not relevant to the research topic, duplicate articles, non-systematic review articles, and publications that do not present empirical data are excluded from the selection process in accordance with the PRISMA flow.

Articles that met the inclusion criteria were then analyzed using descriptive synthesis techniques to identify patterns of findings related to the effectiveness of measles immunization programs, factors that affect the success of its implementation, and their impact on reducing measles incidence and extraordinary events in the community. In addition, the analysis also considered variations in the study design, characteristics of the target population, and the context of the research area to obtain a comprehensive picture of the role of the immunization program in measles control.



**Figure 1 Prism Flow Diagram**

Source: Author's own adaptation based on PRISMA 2020 flow diagram (Page et al., 2021)

## RESULT AND DISCUSSION

The results of the literature search and selection process based on inclusion criteria show that as many as 15 journals are eligible to be analyzed in this literature review research. Thethematically, most of the research highlights the role of health cadres or posyandu cadres in the implementation of immunization programs, namely 5 journals, which show that the active role of cadres is significantly related to increasing the coverage and completeness of measles immunization, basic immunization, and MR immunization. In addition, there are 4 journals that discuss the role of mothers and families, including knowledge, attitudes, beliefs, and family support for compliance with the implementation of immunization in toddlers, which consistently affects the completeness of immunization status. A total of 3 journals examine the role of health workers and the health service system, including aspects of program management, availability of facilities, and integration of services in health centers and posyandu, which contribute to the success and equitable distribution of immunization coverage. Meanwhile, 3 other journals highlighted contextual factors and challenges in immunization implementation, such as the impact of the COVID-19 pandemic, public anxiety, limited infrastructure, and obstacles faced by cadres in the field, which can reduce immunization visits and potentially increase the risk of decreasing measles and MR immunization coverage. Overall, the synthesis of the 15 journals shows that the success of the immunization program in controlling measles is greatly influenced by the involvement of cadres, family support, the role of health workers, and the strengthening of the integrated public health service system.

**Table 1. Summary of Literature on Measles and MR Immunization Programmes**

<b>No</b>	<b>Researcher &amp; Year</b>	<b>Research Title</b>	<b>Research Methods</b>	<b>Results</b>
1	Siregar & Lubis (2021)	The Role of Posyandu Cadres with Measles Immunization Status In the Working Area of the Batu Horpak Health Center	Kuantitatif (cross-sectional)	There is a significant relationship between the active role of posyandu cadres and the completeness of measles immunization status.
2	Hayati & Irianty (2021)	Increasing Maternal Participation in the Implementation of Immunization in Sungai Besar Village, Banjarbaru City in 2021	Quantitative	Increased participation and knowledge of mothers affects compliance with the implementation of immunization in toddlers.
3	Sukmana & Permatasari (2021)	Evaluation of Program Implementation and Scope at Environmental Posyandu Rancapetir Ciamis	Evaluative Desk	The implementation of the immunization program has not been optimal due to limited management and support of posyandu cadres.
4	Rizkullah et al. (2022)	Overview of the Achievements of the Immunization Program in the Bandar Dua Pidie Jaya Health Center Working Area in 2022	Descriptive	The coverage of the immunization program varies and is not even across the health center's work area.
5	Wirasmi et al. (2022)	Implementation of Management in Immunization Programs Complete Policies at Jagasatru Health Center	Qualitative	Planning, implementation, and management supervision affect the success of immunization programs.
6	Rahayu et al. (2021)	Analysis of the Role of Cadres in Complete Basic Immunization Coverage at the Posyandu Working Area of the Kereng Bangkirai Health Center, Palangka Raya	Quantitative	The role of good cadres significantly increases the coverage of complete basic immunization.
7	Modjo & Piola (2021)	The Relationship Between the Role of Health Cadres and Teachers with Implementation of Mr (Measles Rubella) Immunization In the Working Area of the Talaga Jaya Health Center Gorontalo Regency	Quantitative	The role of cadres and teachers is significantly related to the success of the implementation of MR immunization.
8	Putri & Listiyanawati (2023)	Family Assistance Team Role Relationship With the Completeness of Immunization Status Coverage Basics in Toddlers	Quantitative	Family assistance affects the completeness of basic immunization status in children under five.
9	Nasution et al. (2022)	The Relationship of Facilities, the Role of Cadres, Anxiety	Quantitative	Anxiety during the pandemic and the role of

		About Immunization Visits During the Covid 19 Pandemic		cadres affect immunization visits for toddlers.
10	Silpia & Mardiyah (2024)	The Relationship between Family Roles, Maternal Trusts and the Role of Health Workers with the Status of Immunization Completeness of Toddlers 10-23 Months	Quantitative	Maternal trust and support from health workers are significantly related to the immunization status of toddlers.
11	Sundariningsih & Novitasari (2025)	The Relationship between the Attitude of Mothers of Toddlers Aged 12–24 Months and the Role of Cadres With Complete Basic Immunization at the Salam Health Center Bandung City in 2025	Quantitative	The positive attitude of mothers and the active role of cadres increase the coverage of complete basic immunization.
12	Shah (2025)	The Relationship of Birthing Places, Childbirth Assistants and the Role of Health Workers to the Completeness of Basic Immunization During the Covid-19 Pandemic	Quantitative	Childbirth facilities and the role of health workers affect the completeness of basic immunization.
13	Basyuni (2021)	The Role and Challenges of Health Cadres in Efforts Implementation of Basic Immunization in Satriajaya Village, Bekasi	Qualitative	Cadres play an important role but face obstacles of knowledge, motivation, and system support.
14	Handayani et al. (2025)	The Relationship of Knowledge, Family Support and the Role of Health Workers with the Provision of Basic Immunization for Toddlers Aged 1-3 Years in Undrus Binangun Village Sukabumi Regency in 2025	Quantitative	Maternal knowledge, family support, and the role of health workers are related to the administration of basic immunizations.
15	Rahayu et al. (2026)	Factors Affecting Measles Immunization Coverage (rubella) in the working area of the Pekanbaru City Health Center	Quantitative	Knowledge, access to services, and the role of health workers affect MR immunization coverage.

Source: Author's own synthesis based on 15 selected articles (2021–2026)

Based on the results of the synthesis of 15 journals, it can be seen that the success of immunization programs, including measles and measles rubella (MR) immunization, is greatly influenced by the involvement of various parties at the community and health service levels. Research by (Siregar and Lubis, 2021); (Rahayu et al., 2021) showed that the role of posyandu cadres has a significant relationship with the completeness of immunization status, because cadres function as a liaison between health services and the community through counseling activities, target data collection, and immunization schedule reminders. Similar findings are also strengthened by (Modjo and Piola, 2021); (Basyuni, 2021) which emphasized that cadres

who are active and have a good understanding are able to increase public acceptance of measles and MR immunization, even though they still face various challenges in the field.

In addition to the role of cadres, mother and family factors are important determinants in the successful implementation of immunization. Research conducted by (Hayati and Irianty, 2021); (Putri and Listiyanawati, 2023); (Silpia and Mardiyah, 2024) show that mother's knowledge, attitudes, and trust in immunization have a great influence on compliance in completing children's immunization status. Family support has also been shown to strengthen the mother's decision to take the child to immunization services. This is in line with findings (Handayani et al., 2025) which state that the combination of maternal knowledge, family support, and the role of health workers contributes significantly to the success of basic immunization.

From the aspect of the health service system, several journals highlight the importance of the role of health workers and the management of immunization programs. (Sukmana and Permatasari, 2021); (Wirasmi et al., 2022) emphasized that good planning, implementation, and supervision of immunization programs have a direct effect on the achievement of immunization coverage in the health center's work area. Research (Rizkullah et al., 2022) also shows that the achievement of immunization programs is not evenly distributed, which indicates the need to strengthen service systems and equitable access to immunization at the local level.

Challenges in the implementation of immunization are also a concern in several studies, especially during the COVID-19 pandemic. (Nasution et al., 2022); (Syah, 2025) revealed that public anxiety, limited facilities, and changes in health service patterns during the pandemic had an impact on the decline in immunization visits. This condition has the potential to reduce measles immunization coverage and increase the risk of extraordinary events if not immediately addressed through catch-up immunization strategies and service recovery.

Research (Sundariningsih and Novitasari, 2025) confirms that the combination of a positive maternal attitude and the active role of cadres is a key factor in increasing complete basic immunization coverage. Meanwhile, (Rahayu et al., 2026) highlighted that the factors of access to services, health education, and the role of health workers are the main determinants in achieving MR immunization coverage, which directly contributes to measles control efforts.

Overall, the discussion of the fifteen journals shows that measles control through immunization programs requires a comprehensive and sustainable approach. Strengthening the role of health cadres as stated by (Siregar and Lubis, 2021); (Basyuni, 2021) increasing literacy and family support as explained by (Hayati and Irianty, 2021); (Silpia and Mardiyah, 2024) as well as optimizing the role of health workers and the service system as conveyed by (Wirasmi et al., 2022); (Rahayu et al., 2026) is a complementary strategy. By strengthening all of these components simultaneously, the immunization program is expected to be able to increase the coverage of measles and MR immunization and support efforts to control measles effectively in the community.

## CONCLUSION

Based on the results of a literature review of 15 journals, it can be concluded that the success of the immunization program in controlling measles is greatly influenced by the active role of health cadres, the support of mothers and families, as well as the involvement of health workers and the quality of the immunization service system. Strengthening cadre capacity, increasing public knowledge and trust, and improving the management and access to immunization services are key factors in increasing measles and MR immunization coverage, so that measles control and prevention efforts in the community can run optimally. It is recommended that future research conduct empirical studies on the effectiveness of cadre training models and family-based interventions in improving immunization coverage. For policymakers, strengthening post-pandemic immunization catch-up strategies and integrating immunization services with primary health care are essential to prevent future measles outbreaks.

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