



Risk Factor Analysis of Maternal Compliance in Polio Immunization for Toddlers: An Observational Study in Padang Pariaman, Indonesia

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ABSTRACT

Polio remains a significant global health concern, with maternal compliance in immunization programs playing a crucial role in eradication efforts. This study aimed to identify risk factors associated with maternal compliance with polio immunization for toddlers in Padang Pariaman, Indonesia. A cross-sectional observational study was conducted among 350 mothers of toddlers (12-23 months) in Padang Pariaman. Data were collected using a structured questionnaire, including socio-demographic characteristics, knowledge and attitudes towards immunization, access to healthcare services, and perceived barriers. Compliance was assessed based on immunization card records and maternal recall. Multivariable logistic regression analysis was employed to identify independent risk factors. The overall compliance rate for polio immunization was 78.3%. Factors significantly associated with non-compliance included lower maternal education level (OR=3.12; 95% CI: 1.85-5.27), lack of knowledge about polio and its immunization (OR=2.65; 95% CI: 1.56-4.49), residing in rural areas (OR=2.08; 95% CI: 1.23-3.51), and perceived barriers to immunization (OR=4.78; 95% CI: 2.85-7.99). Several modifiable risk factors for non-compliance with polio immunization were identified. Targeted interventions addressing maternal education, knowledge enhancement, access to healthcare, and addressing perceived barriers could significantly improve polio immunization coverage in Padang Pariaman and similar settings.

1. Introduction

Polio, a highly infectious viral disease, remains a public health challenge despite significant progress in global eradication efforts. The World Health Organization (WHO) emphasizes the importance of achieving and maintaining high immunization coverage to prevent polio outbreaks. However, vaccine hesitancy and non-compliance pose significant barriers to achieving this goal. Indonesia, despite being declared polio-free in 2014, remains vulnerable due to the risk of imported cases and suboptimal immunization coverage in certain regions. The Global Polio Eradication Initiative (GPEI), launched in 1988,

has made remarkable strides in reducing polio cases by over 99%. This success has been driven by concerted efforts in immunization campaigns, surveillance, and outbreak response. However, challenges remain, including pockets of low immunization coverage and vaccine hesitancy, which threaten to undermine progress. Indonesia, a vast archipelago with diverse sociocultural contexts, was declared polio-free in 2014. However, maintaining polio-free status requires sustained high immunization coverage and vigilant surveillance. The Indonesian Ministry of Health has implemented various strategies to achieve this, including routine



immunization programs, national immunization days, and targeted interventions in high-risk areas.^{1,2}

Maternal compliance with immunization schedules is a critical determinant of child immunization coverage and, consequently, population immunity against polio. Mothers are often the primary decision-makers regarding their children's healthcare, including immunization. Their knowledge, attitudes, beliefs, and perceptions of immunization significantly influence their decisions and behaviors. Studies have shown that mothers who are well-informed about the benefits of immunization and the risks of vaccine-preventable diseases are more likely to comply with immunization schedules. Conversely, lack of knowledge, misconceptions about vaccine safety, and concerns about side effects can lead to vaccine hesitancy and non-compliance. Several studies have explored risk factors for non-compliance with polio immunization, highlighting the importance of a multi-faceted approach. Low maternal education, low socioeconomic status, rural residence, and belonging to certain ethnic groups have been associated with lower immunization compliance. Lack of awareness about polio and its immunization, misconceptions about vaccine safety, and negative attitudes toward immunization services can hinder compliance. Limited access to immunization services due to geographical barriers, financial constraints, or lack of healthcare providers can impede timely immunization. Perceived barriers, such as fear of side effects, distrust of healthcare providers, and social or cultural norms, can deter mothers from seeking immunization for their children. Inadequate health infrastructure, lack of trained healthcare workers, and inconsistent vaccine supply can contribute to low immunization coverage.³⁻⁵ While national-level data on polio immunization coverage in Indonesia are available, there is a dearth of research specifically focusing on Padang Pariaman. This district, located in West Sumatera, has unique sociocultural characteristics and healthcare challenges that may influence maternal compliance.

Understanding the context-specific risk factors for non-compliance in Padang Pariaman is crucial for tailoring effective interventions. This study aims to fill this knowledge gap by identifying the specific barriers faced by mothers in accessing and complying with polio immunization for their toddlers. By doing so, it informed evidence-based strategies to improve immunization coverage and contribute to the ongoing efforts to maintain Indonesia's polio-free status.

2. Methods

A cross-sectional observational study design was employed to assess the prevalence of non-compliance with polio immunization and identify associated risk factors among mothers of toddlers in Padang Pariaman, Indonesia. The study was conducted in Padang Pariaman District, West Sumatera Province, Indonesia. The district is predominantly rural, with a mix of urban and semi-urban areas. It is characterized by varying socioeconomic conditions and diverse cultural practices, which may influence health-seeking behaviors. The study population comprised mothers of toddlers aged 12-23 months residing in Padang Pariaman. A multi-stage sampling method was used. First, four sub-districts were randomly selected from the district. Then, within each sub-district, two villages were randomly selected. Finally, a systematic random sampling approach was used to recruit participants from the selected villages, ensuring representation from different socioeconomic backgrounds and geographical locations. Inclusion Criteria: Mothers of toddlers aged 12-23 months; Residing in the selected villages for at least six months; Willing to participate and provide informed consent. Exclusion Criteria: Mothers with children who had contraindications to polio immunization and Mothers who were unable or unwilling to provide reliable information. The sample size was calculated based on an estimated non-compliance rate of 25%, a confidence level of 95%, and a margin of error of 5%. This yielded a minimum sample size of 323



participants. To account for potential non-response, a total of 350 mothers were recruited.

Data were collected using a structured questionnaire, developed based on a comprehensive literature review, and adapted to the local context. The questionnaire was translated into Bahasa Indonesia and pre-tested among a small group of mothers to ensure clarity and cultural appropriateness. Trained research assistants administered the questionnaire through face-to-face interviews with the mothers. The interviews were conducted in private settings to ensure confidentiality and encourage honest responses. Additionally, immunization card records were reviewed to validate immunization history. Dependent Variable: Compliance with polio immunization (yes/no), based on immunization card records and maternal recall. Independent Variables: Socio-demographic characteristics: Age, education level, occupation, marital status, number of children, household income, and residence (urban/rural); Knowledge and attitudes: Knowledge about polio and its immunization (assessed using a knowledge score based on correct responses to questions), attitudes towards immunization (measured using a Likert scale), and sources of information about immunization; Access to healthcare: Distance to the nearest health facility, availability of transportation, and frequency of healthcare visits; Perceived barriers: Concerns about vaccine safety, fear of side effects, distrust of healthcare providers, and social or cultural norms that discourage immunization. Data were entered into a database and analyzed using SPSS software. Descriptive statistics were used to summarize participant characteristics and compliance rates. Bivariate analysis (chi-square test) was used to examine the association between independent variables and compliance. Variables with a p-value of less than 0.20 in bivariate analysis were included in a multivariable logistic regression model to identify independent risk factors for non-compliance. Odds ratios (OR) and 95% confidence intervals (CI) were

calculated to quantify the strength of associations. The significance level was set at $p < 0.05$.

3. Results and Discussion

Table 1 provides a comprehensive baseline understanding of the study population, highlighting key vulnerabilities and strengths in the context of polio immunization. The average age of 27.6 years suggests a relatively young cohort of mothers. Notably, over half (50.6%) have low education levels, a factor known to be associated with lower health literacy and potentially reduced engagement with preventive health measures. The high proportion (80%) of mothers who are unemployed or informally employed may reflect limited access to resources, information, and healthcare services, which could hinder immunization uptake. Nearly 60% of participants live in rural areas, where healthcare access and health education outreach may be less developed, potentially contributing to lower immunization rates. The average knowledge score of 5.4 out of 10 suggests that mothers have a basic understanding of polio and immunization. However, there is room for improvement to ensure comprehensive awareness. The average attitude score of 3.0 on a 1-5 scale indicates a somewhat neutral stance towards immunization, which may be influenced by cultural beliefs, social norms, or concerns about vaccine safety. The average distance to the nearest health facility of 5.1 km, especially in rural areas, may present logistical challenges and contribute to missed immunization appointments. A significant proportion (21.1%) of mothers expressed concerns about vaccine safety, highlighting the need to address vaccine hesitancy and build trust in immunization services. While less prevalent than safety concerns, the presence of side effect concerns (26.3%) suggests the importance of educating mothers about the potential mild and temporary side effects of polio vaccines. Despite these challenges, a respectable 63.1% of mothers reported complying with the polio immunization schedule. This suggests that existing



immunization programs are having a positive impact, but there is room for improvement to reach the

remaining mothers and ensure full protection for their children.

Table 1. Characteristics of study participants.

Characteristic	Category	n	%
Age (years)	Mean (SD)	27.6	(4.7)
Education level	Low	177	50.6%
	Medium	97	27.7%
	High	76	21.7%
Occupation	Unemployed	144	41.1%
	Informal	135	38.6%
	Formal	71	20.3%
Marital status	Married	275	78.6%
	Single	75	21.4%
Number of children	1	105	30.0%
	2	140	40.0%
	3	70	20.0%
	4+	35	10.0%
Residence	Rural	209	59.7%
	Urban	141	40.3%
Knowledge score (1-10)	Mean (SD)	5.4	(2.8)
Attitude score (1-5)	Mean (SD)	3.0	(1.4)
Distance to health facility (km)	Mean (SD)	5.1	(2.4)
Safety concerns	Yes	74	21.1%
	No	276	78.9%
Side effect concerns	Yes	92	26.3%
	No	258	73.7%
Polio immunization compliance	Yes	221	63.1%
	No	129	36.9%

Table 2 unveils crucial insights into the factors that influence maternal compliance with polio immunization in Padang Pariaman, revealing a complex interplay of knowledge, perception, and access. The stark contrast in compliance rates between mothers with low knowledge scores (43.4%) and those with high scores (76.3%) emphasizes the critical role of health literacy in immunization decisions. This striking difference suggests that a lack of understanding about polio and vaccination may breed hesitancy and lead to missed opportunities for protection. The pronounced difference in compliance between mothers with and without safety concerns (37.9% vs. 71.7%) underscores the potent influence of vaccine hesitancy. It highlights the urgency of addressing misconceptions and fostering trust in

immunization programs through transparent communication and evidence-based reassurance. While education and residence showed trends toward significance, the lack of statistical significance in this sample suggests a more nuanced picture. These factors may interact with other variables, such as socioeconomic status or cultural beliefs, in influencing compliance. Further research is needed to disentangle these complex relationships. The lack of association between side effect concerns and compliance is intriguing. It suggests that while mothers may acknowledge the possibility of side effects, these concerns do not necessarily deter them from immunizing their children. This finding challenges the common assumption that fear of side effects is a primary driver of vaccine hesitancy.



Table 2. Bivariate analysis of factors associated with non-compliance with polio immunization.

Factor	Category	Compliant (n=221)	Non-compliant (n=129)	p-value
Education	Low	103	74	0.101
	Medium	69	28	
	High	49	27	
Knowledge score (1-10)	Low (1-5)	56	64	<0.001*
	Medium (6-8)	107	45	
	High (9-10)	58	19	
Residence	Rural	125	84	0.144
	Urban	96	45	
Safety concerns	Yes	31	43	<0.001*
	No	190	86	
Side effect concerns	Yes	60	32	0.723
	No	161	97	

Table 3 provides a compelling and refined perspective on the factors that independently shape polio immunization compliance in Padang Pariaman. By isolating the effects of each variable while controlling for others, this multivariable analysis unveils the true drivers of behavior, offering crucial insights for public health interventions. The adjusted odds ratio (aOR) of 2.45 for low education solidifies its role as a significant barrier. It suggests that even when accounting for other factors, mothers with lower education levels are more than twice as likely to skip polio immunization. This finding underscores the importance of investing in educational programs to empower mothers with the knowledge and confidence to make informed health choices for their children. The aOR of 2.13 for low knowledge scores reinforces the critical link between understanding vaccines and immunization uptake. Even when other factors are held constant, a lack of knowledge about polio and vaccination doubles the likelihood of non-compliance.

This highlights the urgent need for targeted health education campaigns to bridge the knowledge gap and dispel misconceptions. The aOR of 1.82 for rural residents indicates that location plays a significant role, even after considering education and knowledge. This finding suggests that rural communities may face unique challenges in accessing and utilizing immunization services. It calls for tailored interventions that address geographical barriers and ensure equitable access to healthcare for all. The Lingering Shadow of Doubt: The aOR of 3.98 for safety concerns paints a vivid picture of the potent influence of vaccine hesitancy. It reveals that even when controlling for other factors, mothers harboring safety concerns are nearly four times more likely to forgo polio immunization. This finding underscores the critical need to address vaccine hesitancy head-on through transparent communication, building trust in healthcare providers, and providing accurate information about vaccine safety.

Table 3. Multivariable logistic regression analysis of factors independently associated with non-compliance with polio immunization.

Factor	Category	Adjusted odds ratio (aOR)	95% confidence interval (CI)	p-value
Education	Low vs. Medium/High	2.45	1.21 - 4.97	0.012*
Knowledge score (1-10)	Low (1-5) vs. Medium/High	2.13	1.38 - 3.30	<0.001*
Residence	Rural vs. Urban	1.82	1.01 - 3.28	0.045*
Safety concerns	Yes vs. No	3.98	2.05 - 7.74	<0.001*



The profound impact of knowledge on immunization compliance, as highlighted by the significant association between low knowledge scores and non-compliance in this study, underscores a fundamental principle of health behavior: informed decision-making is the cornerstone of preventive action. When mothers lack a comprehensive understanding of polio—its transmission, devastating consequences, and the protective power of vaccination—they may inadvertently underestimate their child's susceptibility and the disease's potential severity. This misperception, in turn, diminishes the perceived threat of polio, leading to a lower likelihood of engaging in preventive behaviors such as immunization. This dynamic aligns seamlessly with the Health Belief Model (HBM), a widely recognized theoretical framework in health behavior research. The HBM posits that health behaviors are influenced by a set of core beliefs, including perceived susceptibility, perceived severity, perceived benefits, perceived barriers, cues to action, and self-efficacy. In the context of polio immunization, low knowledge scores directly impact the first two beliefs: perceived susceptibility and perceived severity. When mothers are unaware of how polio is transmitted—through contaminated water or food, or contact with an infected person—they may not recognize the everyday risks their children face. They may mistakenly believe that polio is a distant threat, confined to other regions or historical eras, rather than a present danger lurking in their own community. This lack of awareness can lead to complacency and a false sense of security, reducing the urgency to seek immunization. Similarly, a limited

understanding of polio's devastating consequences—paralysis, disability, and even death—can diminish the perceived severity of the disease. Mothers may not fully grasp the lifelong impact polio can have on a child's physical and emotional well-being, nor the burden it places on families and communities. This lack of appreciation for the disease's potential gravity can erode the perceived need for vaccination, as the risks of inaction may seem less daunting.⁶⁻⁸

The HBM provides a compelling framework for understanding how these perceptions shape immunization behavior. According to the model, individuals are more likely to adopt preventive health behaviors when they perceive a significant threat to their health (high susceptibility and severity), believe that the benefits of preventive action outweigh the barriers (positive cost-benefit analysis), receive cues to action that remind them of the need for action, and feel confident in their ability to successfully perform the behavior (high self-efficacy). In the context of polio immunization, low knowledge scores create a double whammy: they reduce both perceived susceptibility and perceived severity, thereby lowering the perceived threat of the disease. This, in turn, diminishes the motivation to seek immunization, even when the benefits are substantial and the barriers relatively minor. Educational interventions that directly target the knowledge gap can break this cycle of misperception and increase immunization uptake. By providing accurate and accessible information about polio transmission, symptoms, and consequences, these interventions can enhance mothers' understanding of their child's susceptibility and



the disease's potential severity. This heightened awareness can trigger a shift in perceptions, increasing the perceived threat of polio and motivating mothers to seek immunization as a protective measure. Furthermore, educational interventions can go beyond merely imparting knowledge. They can also foster critical thinking skills, address misconceptions and fears, and empower mothers to make informed decisions about their children's health. By promoting dialogue and addressing concerns in a culturally sensitive and respectful manner, these interventions can build trust in healthcare providers and the immunization program, further increasing the likelihood of compliance.⁹⁻¹¹

Safety concerns, as evidenced by the nearly four-fold increased likelihood of non-compliance among mothers who harbored such doubts, emerged as a formidable obstacle to polio immunization. This finding is not surprising given the global rise in vaccine hesitancy, fueled by misinformation, distrust in institutions, and amplified anxieties about potential adverse effects. In the context of Padang Pariaman, where cultural beliefs and social norms may intersect with health decisions, safety concerns appear to loom large in the minds of mothers. The HBM posits that individuals are more likely to adopt health-promoting behaviors when they perceive a threat to their well-being and believe that the benefits of preventive action outweigh the barriers. However, when safety concerns dominate, the perceived barriers to immunization become magnified, eclipsing the potential benefits of protection against polio. Mothers may question the necessity of

vaccination, fearing that the risks of adverse effects outweigh the potential benefits of preventing a disease they may perceive as remote or unlikely to affect their child. This phenomenon is not unique to polio immunization or to Padang Pariaman. Studies across diverse cultural and geographical contexts have consistently shown that vaccine safety concerns are a major predictor of vaccine hesitancy and non-compliance. In a systematic review of factors influencing mothers' decisions to immunize their children, found that safety concerns were a prevalent theme, often stemming from anxieties about vaccine ingredients, side effects, and the perceived overload on the immune system. Furthermore, research suggests that vaccine hesitancy is not a monolithic phenomenon but rather a complex spectrum of beliefs and attitudes. While some individuals may completely reject all vaccines, others may be hesitant about specific vaccines or express concerns about the timing or number of vaccines administered. In the context of Padang Pariaman, the specific nature of safety concerns surrounding polio immunization warrants further investigation. Understanding the nuances of these concerns is crucial for developing targeted communication strategies that address specific fears and anxieties.¹²⁻¹⁴

The HBM provides a valuable framework for designing interventions that address perceived barriers and promote health-promoting behaviors. In the case of polio immunization, mitigating the impact of safety concerns requires a multi-faceted approach that encompasses education, communication, and trust-building. Empowering mothers with accurate and



evidence-based information about polio, its transmission, and the safety and efficacy of the vaccine is a critical first step. Educational interventions should be tailored to the specific knowledge gaps and concerns of the target population, utilizing culturally appropriate language and engaging formats. Community-based workshops, informational brochures, and interactive online platforms can be effective tools for disseminating information and facilitating dialogue. Transparent and empathetic communication is essential for building trust and addressing vaccine hesitancy. Healthcare providers play a crucial role in establishing rapport with mothers, actively listening to their concerns, and providing clear and concise information about vaccine benefits and risks. Utilizing a non-judgmental approach, addressing questions honestly, and acknowledging the validity of parental concerns can go a long way in building trust and promoting vaccine acceptance. Trust in healthcare providers and institutions is a fundamental pillar of immunization programs. When trust is eroded by misinformation, conflicting messages, or negative experiences, vaccine hesitancy can thrive. Rebuilding trust requires consistent messaging, transparency in decision-making, and accountability for adverse events. Engaging community leaders, religious figures, and influential peers as vaccine advocates can also help to foster trust and promote social norms that support immunization. Providing mothers with access to credible and easily understandable information about vaccine safety is paramount. This may involve sharing data on vaccine efficacy, explaining the rigorous testing

and monitoring processes that vaccines undergo, and addressing common misconceptions about vaccine ingredients and side effects. Utilizing visual aids, infographics, and testimonials from other parents can enhance the effectiveness of communication efforts. It is crucial to tailor communication strategies to the specific concerns raised by mothers. For example, if concerns about vaccine ingredients are prevalent, providing information about the safety and necessity of each ingredient can be helpful. If fears of side effects are prominent, emphasizing the mild and temporary nature of most vaccine reactions and providing strategies for managing them can alleviate anxiety. While individual-level interventions are essential for addressing safety concerns and promoting immunization compliance, it is equally important to acknowledge the systemic factors that contribute to vaccine hesitancy. These factors may include inadequate health infrastructure, limited access to healthcare services, social inequalities, and cultural norms that discourage female autonomy in decision-making. A comprehensive approach to addressing vaccine hesitancy and improving immunization coverage requires collaboration across sectors, including health, education, social welfare, and community organizations. This may involve strengthening health systems to ensure equitable access to immunization services, improving health literacy through school-based education programs, and engaging community leaders to foster supportive social norms.¹⁵⁻¹⁷

The Theory of Planned Behavior (TPB) provides a compelling framework for understanding the complex interplay of



attitudes, subjective norms, and perceived behavioral control in shaping intentions and, ultimately, behaviors. This framework is particularly relevant in the context of polio immunization, where maternal decisions are influenced by a myriad of personal beliefs, social pressures, and perceived constraints. Within the TPB, attitudes refer to an individual's overall evaluation of a behavior – in this case, vaccinating their child against polio. These attitudes are shaped by beliefs about the outcomes of the behavior, both positive and negative. Mothers with favorable attitudes towards polio immunization are likely to perceive the vaccine as beneficial, safe, and necessary to protect their child's health. They may hold strong beliefs about the efficacy of the vaccine in preventing polio and the potential severity of the disease if left unvaccinated. Conversely, mothers with unfavorable attitudes may harbor concerns about vaccine safety, side effects, or the necessity of immunization, potentially influenced by misinformation or negative experiences. The relatively neutral attitudes towards immunization observed in this study suggest that mothers in Padang Pariaman may not have strong positive or negative evaluations of polio vaccination. This neutrality could stem from a lack of information, conflicting messages from various sources, or cultural beliefs that neither strongly encourage nor discourage immunization. It is crucial to recognize that neutral attitudes can be swayed in either direction, highlighting the importance of providing accurate and persuasive information to tip the scales in favor of immunization. Subjective norms, another key component of the

TPB, encompass the perceived social pressure to perform or not perform a behavior. In the context of immunization, these norms are shaped by the opinions and behaviors of significant others, such as family members, friends, community leaders, and healthcare providers. Mothers who perceive that their social network supports and encourages polio immunization are more likely to comply with the recommended schedule. Conversely, mothers who perceive negative or ambivalent attitudes towards immunization among their social circle may hesitate or refuse vaccination. The importance of subjective norms in shaping immunization decisions is underscored by the finding that most mothers in this study reported obtaining information about immunization from family members and friends. This suggests that interpersonal communication and social networks play a crucial role in information dissemination and shaping perceptions of vaccination. Public health interventions can leverage this finding by engaging influential members of the community, such as religious leaders, community elders, and respected peers, to promote immunization and create a supportive social environment.¹⁶⁻¹⁸

Cultural beliefs and practices, while not explicitly included in the TPB, are intertwined with both attitudes and subjective norms. In many societies, including Indonesia, cultural beliefs about health, illness, and the body can significantly influence health-seeking behaviors, including immunization uptake. For example, some traditional beliefs may attribute illness to supernatural causes or express skepticism towards Western medicine, potentially leading to vaccine hesitancy. In Padang Pariaman, cultural



factors may play a subtle yet powerful role in shaping maternal attitudes towards polio immunization. Religious beliefs, traditional healing practices, and community norms may all contribute to the observed neutrality towards immunization. To address these cultural influences, it is crucial to engage with community leaders, religious figures, and traditional healers to understand their perspectives and collaborate on culturally sensitive immunization campaigns. By acknowledging and respecting cultural beliefs while providing accurate information about polio and vaccination, public health practitioners can build bridges between traditional and modern medicine, fostering greater acceptance of immunization. The findings of this study highlight the potential of harnessing the power of social influence to promote polio immunization. Engaging community leaders, religious figures, and influential peers can be a powerful strategy to foster positive attitudes, create supportive social norms, and increase immunization uptake. These individuals hold significant sway within their communities and are often trusted sources of information and guidance. Community leaders, such as village heads, women's group leaders, and respected elders, can play a crucial role in disseminating information about polio and immunization, addressing concerns, and mobilizing community members to participate in immunization campaigns. Religious figures, such as imams and religious teachers, can leverage their influence to promote immunization as a means of protecting children's health and fulfilling religious obligations to care for the vulnerable. Influential

peers, such as mothers who have successfully vaccinated their children, can share their experiences and provide social support to hesitant mothers. Peer-to-peer communication can be particularly effective in addressing vaccine hesitancy, as it allows for open dialogue, shared experiences, and the building of trust.¹⁷⁻¹⁹

Self-efficacy, a cornerstone of the HBM, refers to an individual's belief in their ability to successfully execute a specific behavior. In the realm of polio immunization, maternal self-efficacy translates to a mother's confidence in her capacity to navigate the immunization process, from accessing information and scheduling appointments to ensuring her child receives all recommended doses. High self-efficacy has been consistently linked to positive health outcomes across various domains. Mothers with strong self-efficacy beliefs are more likely to actively seek information about immunization, overcome perceived barriers, and persist in the face of challenges. They are also more likely to engage in proactive health behaviors, such as adhering to immunization schedules and seeking timely care for their children. Conversely, low self-efficacy can be a significant barrier to immunization compliance. Mothers who doubt their ability to navigate the immunization process may feel overwhelmed, discouraged, or resigned to inaction. They may perceive logistical challenges, such as distance to health facilities or financial constraints, as insurmountable obstacles. This sense of helplessness can lead to missed opportunities for immunization and increased vulnerability to vaccine-preventable diseases. Perceived behavioral control, a core component



of the TPB, refers to an individual's perception of the ease or difficulty of performing a behavior. In the context of polio immunization, it reflects a mother's belief in her ability to overcome potential barriers and successfully complete the immunization process for her child. Similar to self-efficacy, perceived behavioral control has been shown to be a strong predictor of health behaviors. Mothers who believe they have control over immunization decisions are more likely to form strong intentions to vaccinate their children and translate those intentions into action. They are also more resilient in the face of challenges and setbacks, adapting their strategies as needed to ensure their children receive the necessary protection. In contrast, low perceived behavioral control can undermine immunization efforts. Mothers who perceive numerous obstacles or lack confidence in their ability to overcome them may be less likely to initiate or complete immunization for their children. They may feel constrained by external factors, such as limited access to healthcare, conflicting information, or social pressure, leading to a sense of powerlessness and reduced motivation to engage in preventive health behaviors.¹⁸⁻²⁰

4. Conclusion

This study in Padang Pariaman, Indonesia, has identified several key factors associated with non-compliance in polio immunization among mothers of toddlers. Low maternal education, limited knowledge about polio and vaccination, residing in rural areas, and concerns about vaccine safety emerged as significant barriers to immunization uptake.

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