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Sustaining polio-free Indonesia through enhanced capacity of primary and secondary target groups: a case study in primary health care services

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Abstract

Purpose: Indonesia strives to remain polio-free and eradicate polio globally by 2026, adding two inactivated polio vaccine (IPV) vaccine doses to the 2023 child immunization schedule. IPV2 immunization has been introduced in DKI Jakarta, West Java, and Banten provinces. This initiative aims to enhance public health by protecting against vaccine-preventable diseases. **Methods:** A mixed-method study was conducted in December 2022 - January 2023 at South Jakarta, Mampang Prapatan district health center, focusing on IPV2's second dose introduction evaluation. **Results:** Effective health promotion and seamless integration of primary health services are pivotal in implementing vaccination services. Despite ongoing understanding gaps, health cadres and parents showed significant knowledge gains ($p<0.05$) post-intervention. The health cadres' role in education is crucial. **Conclusion:** Aligned with the tiered health transformation, which has evolved into a collaborative movement grounded in the life cycle, health cadres' effective deployment and support play a pivotal role in sustaining Indonesia's polio-free achievement.

Keywords: community development; IPV2 Immunization; knowledge communication; primary health care

INTRODUCTION

Polio, short for Poliomyelitis, is a viral disease caused by the Poliovirus of the *Picornaviridae* family and *Enterovirus C* species. It manifest itself as acute flaccid paralysis, which is its most severe form. Polio can harm motor neurons, leading to lifelong muscle dysfunction or even death, especially if it affects respiratory function. The vaccine must be administered as a primary preventive measure. Polio immunity is achieved through the administration of inactivated polio vaccine (IPV) or oral polio vaccine (OPV, Sabin strain) [1].

In recent years, several countries in Southeast Asia, including Indonesia, Myanmar, the Philippines, and Malaysia, have been alarmed by the discovery of Polio cases. This is a concerning issue because the region has been polio-free for over a decade. From 2018 to 2020, 12 cases of Polio VDPV type 1 and 14 cases of Polio VDPV type 2 were reported in the region. Moreover, 19 environmental polio samples were positive for VDPV 1 and 23 for VDPV type 2. According to the World Health Organization (WHO), Indonesia has been free of polio since 2014. However, to maintain this status, Indonesia must increase its routine Polio immunization coverage and improve its surveillance sensitivity. In 2018, the WHO conducted a risk assessment of Polio transmission in Indonesia at both national and provincial levels. The assessment used three main indicators to determine risk: population immunity, surveillance, and delivery programs. The results of the assessment revealed that

Indonesia is at high risk for polio transmission, with 23 provinces (76.5%) categorized as high risk, nine (23.5%) as moderate risk, and only two at low risk [2,3].

Immunization programs are mandatory in Indonesia to protect individuals from preventable diseases by actively increasing their immunity against a disease so that they will not get sick or only experience mild symptoms if exposed. The immunization program includes routine, additional, and special vaccines. According to the Minister of Health Regulation No. 12/2017, 4 doses of Oral Polio Vaccine (OPV) and one dose of IPV have been included in the routine immunization schedule for babies. Despite an average coverage of OPV4 of more than 90% in the last three years, it has not yet met the national target of a minimum 95% coverage that is evenly distributed. Meanwhile, coverage of IPV has increased every year since its introduction in 2016 but is still less than 80% nationally [3–5].

The COVID-19 pandemic has caused significant disruptions in the immunization program, leading to an increased burden. According to a survey, 84% of the participating health centers reported significant disruptions in immunization services out of 5,329 centers. More than 56% of these centers experienced disruptions at the *puskesmas* and integrated health post (*posyandu*) levels. A study conducted in Indonesia showed that vaccine delivery was disrupted due to mobility restrictions during the pandemic [6,7]. In 2020, polio immunization coverage was 7% lower than the previous year (94.2%) [8]. If these interruptions to immunization services continue, there is a chance of outbreaks brought on by diseases that are preventable by administering vaccines. In response to the polio outbreak in three provinces—Aceh, North Sumatra, and West Java—related to the circulation of polio virus type 2 (cVDPV2), the Ministry of Health and WHO have taken various measures to mitigate its impact and prevent further transmission. Additionally, IPV2 immunization has commenced in DKI Jakarta, West Java, and Banten provinces since 2022. A second dose of the IPV vaccine provides increased protection against all polioviruses, including paralysis caused by VDPV2. The IPV2 vaccine will be included in routine immunization programs per WHO recommendations. For routine immunization, the first dose of IPV is given at four months of age along with the DPT-HBHib3 and OPV4 vaccines, whereas the IPV2 vaccine is given along with the Measles-Rubella immunization at nine months of age. To uphold Indonesia's polio-free status and contribute to global polio eradication by 2026, the Ministry of Health has declared that infants will receive two doses of the IPV starting in 2023 [2,7,9].

Starting from December 01, 2022, DKI Jakarta, along with Banten and West Java, has become the first three provinces authorized by the Indonesian Ministry of Health to administer two doses of the IPV to infants. South Jakarta, as one of the areas in DKI Jakarta province, has pointed out and implemented the IPV2 immunization program. Mampang Prapatan District Health Center has been chosen for evaluation within a month of the implementation program [2,10]. Based on MP's health center report, IPV immunization is included in the annual target program of 100%, with a monthly target of 8.3%. However, the immunization target had not been achieved during the initiation of IPV2 immunization. Ensuring all children receive routine immunizations is crucial for a healthy next generation. Assessment and pinpointing of challenges impacting both primary and secondary targets are essential. Healthcare professionals and cadres at integrated health posts must be equipped to expand the reach of compulsory IPV2 vaccinations.

METHODS

First, we used the Strength, Weakness, Opportunity, and Threat (SWOT) approach to identify alternative problem solutions by eliminating and intervening in key risk factors. The study employed qualitative methods and purposive sampling and conducted in-depth interviews with six health workers from three sub-district health centers involved in the immunization program. The study also recruited 39 health cadres and 63 parents with babies aged 0-11 months as inclusion criteria. A cross-sectional approach and convenience sampling were used to assess their approach as external targets. The parents were selected from those who had attended integrated health post activities that matched the inclusion criteria. The study was conducted from December 2022 to January 2023. However, activities outside the health center building were still conducted online via Zoom meetings because the government officially lifted all Community Activity Restrictions (*PPKM*) related to the COVID-19 pandemic on December 31, 2022 [11].

As part of our efforts to improve immunization services, we conducted in-depth interviews with health workers. We covered topics such as immunization flow, achieving IPV2 immunization, and challenges faced during program implementation. We provided internal training for 6 health workers, refreshing their knowledge of the technical aspects of immunization and methods for achieving IPV2 vaccine immunization. Before the training, we conducted a pretest and post-test to evaluate their comprehension of the material before and after the session.

The second aim was to increase awareness and knowledge about the importance of polio immunization. The primary targets, besides health cadres, were parents of under-one-year-old children, couples of childbearing age, and pregnant women. They need to comprehend the disease, understand the benefits, and be aware of the IPV2 immunization schedule for babies aged between 0 and 11 months. Pre- and post-tests were conducted to evaluate the comprehension of the provided material.

SPSS for Windows software was used to conduct pre-and post-test analysis with a significance level of $p<0.05$. Qualitative analysis was performed by triangulating and grouping topics. The research was approved by the Faculty of Medicine Ethical Board, Universitas Trisakti, with approval number 242/KER-FK/XI/2022.

RESULTS

Table 1 provides a SWOT inventory of risk factors related to the problem present in the working area of the Mampang Prapatan District Health Center. The analysis aims to reduce or eliminate the identified risk factors, with the key factor being the suboptimal capacity of health workers (physicians, midwives, and nurses) and integrated health post cadres regarding IPV2 immunization, both internally and externally.

Table 1. Inventory of key factors of SWOT analysis

Parameters	Strategies	Result analysis
Strength Opportunity	Development	Expansion of health services for immunization coverage
Strength Threat	Extensification	Empowering the communities, both primary and secondary target
Weakness Opportunity	Partnership	Strengthening and coordination with social networking, such as neighborhood and resident associations and village heads.
Weakness Threat	Intensification	Strengthening internal services by enhancing the capacity of health workers to administer IPV2 immunization

Discovering issues that hinder the SWOT method can be crucial to achieving desired outcomes. With this SWOT inventory, we can identify and tackle key factors that may impede the success of problem analysis. During that period, we identified obstacles to maintaining polio immunization coverage while the IPV2 implementation began in DKI Jakarta. After assessing the risk factors identified in the SWOT analysis of the work area at the Mampang Prapatan District Health Center, the most suitable long-term strategies, internally and externally, are extension, intensification, and partnership strategies.

Table 2 shows the respondents' profiles during the study; the survey and socialization were conducted using the Zoom method for cadres and parents. At that time, not all integrated health posts and health cadres were actively conducting activities in the field due to ongoing restrictions. Many community-based efforts, including integrated health posts, were not fully operational. Additionally, most people were hesitant to participate in large-scale gatherings or attend integrated health post activities, hindering the effective implementation of community-strengthening initiatives [12-13].

Table 2. Demographic profiles

Demographic profile	Health workers (%) (n=6)	Health cadres (%) (n=39)	Parents (%) (n=63)
Age (years)			
21-30	-	-	45 (71)
31-40	4 (63)	11 (28)	18 (29)
41-50	2 (33)	19 (49)	-
>51	-	9 (23)	-
Education level (years)			
<9	-	15 (38)	19 (30)
≥9	6	24 (68)	44 (70)
Served as cadres (years)			
<5	-	17(44)	-
≥5	-	22(62)	-
Child rank			
First	-	-	48 (76)
Second	-	-	13 (21)
Third	-	-	2 (3)

In 2022, the Mampang Prapatan district health center had 1985 boys and 1844 girls under the age of two. During the same period, 113 integrated health posts and 724 health cadres worked in the district. Despite aiming for 100% immunization coverage, when IPV2 immunization began in December of that year, only 64% of the targets had been reached. Consequently, the IPV2 immunization target remains unmet. In-depth interviews with the health workers (general practitioners and nurses) mentioned:

"*minimal information regarding IPV2 immunization",*

"have not yet received sufficient training on IPV2 immunization techniques",

"The impact of limited dissemination information about IPV2 to health cadres and parents due to the unavailability of informational media"

"*dissemination and information regarding IPV2 immunization as a basic immunization was not evenly distributed to all cadres and parents*"

In addition, internally, the district and sub-district health centers have not yet undergone re-training related to the implementation of IPV2 immunization. The information regarding IPV2 immunization as a basic immunization has not been widely disseminated to all health workers. The introduction of IPV2 immunization started in DKI Jakarta province before other provinces; there were also challenges related to the recording process. An additional obstacle was the absence of IPV2 immunization records in the outdated KIA book. The available solution was to manually write and note it in the empty checklist column provided. Concurrently, a registration system was utilized for reporting purposes.

Based on an evaluation with a list of 10 questions posed to health workers, most of the officers demonstrated an understanding of techniques for carrying out IPV2 immunization and the guidelines for providing the immunization. However, some field health officers still misunderstand the correct method of administering IPV2 immunization, dosages, and post-immunization complications (*KIPI*). According to them, there are two main obstacles to the success of this Polio endgame program. Firstly, because the program began in December 2022, many mothers were still unaware of the new additional basic immunization program for babies at nine months, known as IPV2 immunization. Secondly, this important information was not being distributed widely enough, unlike the PCV immunization program, which has been better socialized.

Strengthening community action is essential for the success of immunization programs. Therefore, enhancing health cadres' knowledge and roles is a vital strategy for developing personal skills. After receiving refreshing knowledge and practical information, 39 integrated health post cadres underwent pre and post-tests to evaluate their knowledge about IPV2 immunization.

Table 3 presents the evaluation results of health cadres. Out of the 20-item questions, six items, namely about disease symptoms, treatment, vulnerable groups, places to seek help, and reporting as falsely selected answers before knowledge intervention, had an average high point score of 70. After the intervention, the false answers were reduced by 50%. However, the cadres were still given false answers about the impact of exposure to the polio virus on humans, the susceptible age of exposure to the polio virus, and the IPV2 immunization report column in the children's pink book. However, there was an increasing average point of 21% from the prior. The intervention activity to enhance the health cadre's capacity through knowledge was significant changes ($p<0.05$) in the cadres' understanding of IPV2 immunization, although it was not optimal.

Table 3. Evaluation result of health cadres (n=20)

Evaluation	Number of questions		Value		*p-value*
	Right	False	Average	Range	
Pretest	14	6	70.9	50-90	.000
Postest	17	3	86.3	70-95	

Table 4 provides the knowledge evaluation and post-intervention results obtained from the mothers participating in the registered integrated health posts program with infants aged 0-11 months.

Table 4. Mothers of infants U-1 years old (n=20)

Evaluation	Number of questions		Value		*p-value*
	Right	False	Average	Range	
Pretest	10	10	47	20-70	.000
Postest	16	4	70.8	55-95	

Mothers' comprehension of polio and its prevention measures is only at a 50% level compared to before and after the intervention. Despite a 51% improvement in scores, the level of misunderstanding was not significantly different from that of the health cadres. Intervention efficacy to enhance parents' infants' knowledge about additional mandatory immunization for infants was proven to provide significant changes ($p<0.05$) in the level of meaning of IPV2 immunization practice. However, it was not optimal on the score.

DISCUSSION

To maintain a Polio-Free Indonesia and realize Global Polio Eradication by 2026, the Ministry of Health announced that infants will be vaccinated twice with the IPV starting in 2023. However, three provinces, namely DKI Jakarta, West Java, and Banten, administered the second dose of IPV immunization in 2022 and expanded it nationally in 2023. Providing immunization is a public health effort that has proven to be the most cost-effective and positively impacts maternal and child health status in Indonesia. Immunization protects a person or individual and society by providing community protection, known as herd immunity. ITAGI approved the introduction of IPV2 immunization in routine immunization based on WHO SAGE recommendations. The recommended IPV schedule for routine immunization is four months of age for the first dose of IPV given together with the DPT-HBHib3 and OPV4 vaccines. In comparison, IPV2 and Measles-Rubella immunizations are given at nine months of age [14].

Overall, the health officers demonstrated consistent internal knowledge and competence. Their responses were clear and articulate, with only minor errors. The health workers grasped the objectives and techniques for implementing immunization activities. They identified the primary target for launching IPV2 immunization health promotion in their work areas. Planning is a very important part of managing an immunization program. With good planning, immunization service activities are expected to run well [15-17].

The issue of not reaching the immunization target at the Mampang Prapatan health center at that time was similar to the challenges experienced at other sub-district health centers in the South Jakarta municipality during the post-pandemic period. Improving vaccine coverage and success in immunization campaigns depends on effective community mobilization. Ensuring the continuation of routine immunization requires involvement from all sectors. One strategy is improving understanding, especially about health-related topics like polio and its prevention, which can be achieved through various strategies. The goal is to ensure mothers are aware and understand the importance and benefits of getting their child vaccinated with IPV2. To achieve this, community empowerment is carried out through the family welfare and empowerment organization *(Perberdayaan dan Kesejahteraan Keluarga, PKK*) and *PKK* cadres. *The Dasawisma* means a group of mothers from 10 neighboring families has come together to streamline a program, health cadres, and other community components as a secondary target [18-20]. Community development facilitates collective empowerment by engaging with communities in diverse manners, allowing individuals to unite and pinpoint common goals and desires, enhance their lives through collaborative efforts, rectify power disparities, foster changes based on social justice, equality, and inclusivity, and impact the decisions of organizations that affect their existence [15-16].

Several issues related to understanding polio and adherence to recommended immunization schedules are still identified. Regular knowledge improvement remains necessary, considering the tasks and responsibilities of a cadre. One of the key responsibilities of health cadres is to educate and remind their communities about the importance of polio immunization for children under 5 years old. By raising awareness, they contribute significantly to disease prevention and community health. According to the study, it is stated that support systems for health cadres in *Posyandu* are crucial. These systems not only fulfill logistical needs but also provide guidance and continuous knowledge enhancement for the health cadres [21]. Caders are frontline public health profes- sionals who serve as trusted members of their commu- nities. They possess a deep understanding of local contexts, culture, and social dynamics. Their roles include health education, outreach, and connecting community members to essential health services. Health cadres play a crucial role in promoting polio immuni- zation within their communities.

Increased knowledge and skills can be achieved in six strategies: (1) regular educational sessions or workshops conducted in community centers, healthcare facilities, or virtually, using interactive and simple language to explain complex concepts; (2) distributtion of easy-to-understand and visually appealing pamphlets, brochures, or booklets about polio and its prevention; (3) consultation with healthcare providers who provide personalized information and answer any questions; (4) helping educate their mother peers in the environment where people feel more comfortable learning from their peers; (5) dissemination of information via digital platforms like websites, mobile apps, or social media, reaching a large audience and providing interactive learning experiences; and (6) regular follow-ups and reinforcement of the information can help improve and sustain the understanding of the mothers. It is important to make these strategies culturally appropriate and accessible to ensure they are effective [19-20]. It might also be beneficial to get feedback from the mothers about what methods work best for them. This can help tailor the strategies to suit their needs better and improve their understanding. These groups inform families as a primary target as part of health promotion.

Health cadres scored better than parents, which indicates their potential to extend health communication, education, and information (*Komunikasi, Informasi dan Edukasi*, KIE) and assist communities. To encourage IPV2 immunization, communication strategies can utilize diverse channels, including printed materials, electronic, outdoor, and social media. Installing posters and banners strategically can enhance information dissemination within the community. For example, a brief rationale for administering the IPV2 vaccine concurrently with the MR vaccine at nine months is: "*This approach streamlines the immunization process, providing quicker protection for children, improving service efficiency, and minimizing multiple visits for parents*." It is important to reassure parents that simultaneous vaccinations are safe and effective and do not increase adverse event risks in children. Despite being informed that "*the polio virus can infect and damage the nervous system, leading to paralysis, many parents still have the misconception that the virus causes paralysis by attacking the bones."*

Improving parental understanding of polio transmission and its effects can be approached through several educational strategies through clear communication.

- ☐ **Use simple language** to explain how polio is transmitted and its effects on the body. Avoid medical jargon that may confuse parents.
- ☐ **Visual aids**: Employ diagrams, illustrations, or videos that show the virus's impact on the nervous system and the resulting paralysis.
- ☐ **Storytelling**: Share stories of individuals affected by polio, which can be more impactful than facts and figures.
- ☐ **Question & answer sessions**: Hold Q&A sessions where parents can ask questions and get immediate answers from healthcare professionals.
- ☐ **Myth-busting campaigns**: Create campaigns specifically aimed at dispelling common myths about polio, such as the misconception that it attacks the bones.
- ☐ **Healthcare professional training**: Train healthcare professionals to communicate about polio to ensure effective, consistent messaging.
- ☐ **Community leaders involvement**: Involve community leaders who can influence public opinion and help spread accurate information.
- ☐ **Feedback mechanism**: Implement a feedback mechanism to understand parents' misconcepti- ons and address them directly in future communications [20,22].

By employing these strategies, we can help ensure parents correctly understand polio transmission and its effects, which is crucial for effective prevention and vaccination efforts.

Results showed that after receiving educational material, there was an improvement in knowledge and understanding about the importance of polio immunization for infants. Boosting engagement implies that families with infants can enhance their ability to autonomously manage, decide, and be accountable for their children's health prevention. By moving the emphasis from illness to health, society can become the driving force behind improved wellness. Community empowerment is essential in motivating and equipping the target community with the necessary skills and desire to preserve and improve their health. It entails leveraging internal assets and harnessing external support to accomplish objectives. Effective coordination among coordinator officers at the community health center (puskesmas) and sub-health center (pustu) levels, responsible for village-level health services and robust planning, and community cadre development, is essential. A network-focused, multisectoral approach is pivotal in sustaining polio-free status through the IPV2 vaccination program.

The Ottawa Charter highlights the significance of community involvement as the primary component of community empowerment in the healthcare sector [20,23]. Health cadres can support staff at public health centers by disseminating information about IPV2 immunization to parents within their integrated health post area. Ensuring the health of our communities is vital, and every individual must play a role in supporting health initiatives. It is our responsibility to actively contribute towards achieving better health outcomes. Through collaborative efforts and proactive measures, we can create substantial positive change and secure a healthier tomorrow for everyone. For this vision to materialize, it is crucial that the community, particularly parents and health cadres, engage more dynamically and gain empowerment.

CONCLUSION

Societies must advocate for vaccinations to prevent vaccine-preventable diseases and ensure children's healthy development. It is critical to increase community awareness and trust in the health benefits of vaccinations for families. Furthermore, it is imperative to empower parents, cadres, and healthcare providers to achieve full routine immunization coverage, not only for IPV2. The broader setting of community involvement and information sharing has been a noticeable element of the empowerment felt by health cadres and mothers who participate in integrated health post activities. Engaged communities benefit from professional guidance. Community development workers are pivotal in guiding public sector employees to collaborate effectively with these communities.

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