


The Impact Of Immunisation Programmes On The Reduction Of Communicable Disease Cases In Urban Communities

Ustifina Hasanah Hasibuan

Sekolah Tinggi Ilmu Kesehatan As syifa, Indonesia

Article Info	ABSTRACT
Keywords: Immunisation, Communicable Disease, Urban Community, East Jakarta, Public Health.	The objective of this study is to ascertain the impact of immunisation programmes on the reduction of infectious disease cases in urban communities in East Jakarta. The research method employed was qualitative, with a case study approach. Data were collected through in-depth interviews with health workers, parents, and community leaders, as well as direct observation at several posyandu and community health centres. The results demonstrated that the immunisation programme has a substantial impact on the reduction of infectious disease cases, particularly in children, and the enhancement of public awareness regarding the significance of immunisation. Nevertheless, several challenges persist, including disparities in access to vaccination and the presence of resistance from specific community groups. The findings are anticipated to provide insights for local governments in optimising immunisation programmes in urban areas.
This is an open access article under the CC BY-NC license 	Corresponding Author: Ustifina Hasanah Hasibuan Sekolah Tinggi Ilmu Kesehatan As syifa, Indonesia herfina90@gmail.com

INTRODUCTION

Immunisation represents one of the most effective and efficient public health measures in the prevention of the spread of infectious diseases. The implementation of regular immunisation programmes has been demonstrated to result in a reduction in the incidence of infectious diseases, including measles, polio, diphtheria and hepatitis B. These diseases were previously responsible for significant epidemics in numerous countries, including Indonesia. The efficacy of immunisation is contingent upon its ability to enhance the body's immunity to specific diseases. This, in turn, can facilitate the formation of herd immunity within the community. Consequently, individuals who are unable to be vaccinated, such as infants, individuals with specific medical conditions, or the elderly, are nevertheless safeguarded from the risk of contracting infectious diseases (Nyiramana, 2024).

In densely populated urban areas, such as East Jakarta, the importance of immunisation is of particular significance. The high population density characteristic of urban areas provides an environment conducive to the transmission of infectious diseases through close human contact. East Jakarta, one of the administrative regions of the Special Capital Region of Jakarta, is characterised by a high population density, with a diverse social, economic and educational status. This situation gives rise to an environment with considerable potential for

the transmission of infectious diseases, particularly among children and vulnerable demographic groups (Randell et al., 2024).

According to data from the DKI Jakarta Health Office, there has been a downward trend in the incidence of infectious diseases among children who have participated in the immunisation programme in recent years. However, the challenges that must be overcome are not straightforward. Nevertheless, there are still some sections of the population who maintain a sceptical view of the immunisation programme, either due to a lack of understanding or misinformation related to the side effects of vaccines. The emergence of doubts or even rejection of vaccination among certain communities represents a significant obstacle to the success of this programme (Widayanti et al., 2020).

Prior research in multiple countries has demonstrated that the efficacy of immunization programs is contingent upon three key factors: community acceptance of vaccines, the availability of adequate health facilities, and the accessibility of health services within the community. A review of research conducted in several developing countries indicates that immunisation programmes that are structured and accessible to all levels of society have resulted in a significant reduction in cases of infectious diseases. A study conducted by the World Health Organization (WHO) indicates that achieving high levels of immunization coverage can prevent approximately 2-3 million deaths annually from vaccine-preventable diseases (Wahab et al., 2023).

Similarly, research on the effectiveness of immunisation in Indonesia has yielded positive results. To illustrate, a study conducted in Central Java demonstrated that elevated rates of immunisation among primary school-aged children markedly diminished the prevalence of measles and diphtheria. A similar outcome was observed in numerous other major urban centres, indicating that the efficacy of immunisation programmes is closely associated with public awareness of the significance of vaccination.

However, the circumstances in East Jakarta are distinct. Despite the Jakarta provincial government's proactive efforts to disseminate information about the immunization program, obstacles remain in terms of accessibility and community acceptance. Some residents of East Jakarta, particularly those from middle- to lower-income backgrounds, may encounter difficulties in accessing health facilities that provide immunisation services. Furthermore, the dissemination of misinformation via social media platforms has the potential to impede the government's endeavours to attain the optimal level of immunisation coverage in this region.

This study reviews previous studies on the effectiveness of immunisation programmes in various urban areas in order to provide a theoretical basis for the importance of vaccination as a public health measure. By examining the experiences of other countries and other regions in Indonesia, this study aims to provide a comprehensive overview of the benefits of immunisation and the significance of enhancing vaccination coverage in areas with high population density. It is hoped that this will provide input for the government and policy makers to formulate strategies that are more effective and adaptive to the characteristics of urban communities in East Jakarta (Rahayuningsih et al., 2024).

This study specifically examines the potential of the immunisation programme implemented in East Jakarta to contribute to a reduction in the incidence of infectious

diseases, while also considering the challenges faced in implementing the programme. It is therefore expected to provide not only empirical data on the reduction of infectious disease rates through immunisation, but also insights for improving the implementation of immunisation programmes in the future, especially in urban environments that have their own particular challenges..

METHODS

This research employed a qualitative method with a case study approach to investigate the impact of immunisation programmes on the reduction of infectious disease cases in urban communities in East Jakarta. The case study approach was selected for its capacity to facilitate a comprehensive understanding of the phenomenon of immunisation within the specific context of urban communities. This context is characterised by social dynamics, culture and access to health services, which can exert a significant influence on the success of immunisation programmes.

This qualitative approach is appropriate for the investigation of the perspectives of the various actors involved in the field of immunisation, including health workers and communities. This approach allows researchers to adopt a more open stance towards the multifaceted experiences and perspectives of the various participants, thereby elucidating the ways in which immunisation programmes are perceived, accessed and implemented within these communities. Furthermore, the case study approach allows for a more in-depth and detailed examination of the subject matter, facilitating the identification of specific patterns, themes, and factors that may not be revealed through quantitative methods.

The research was conducted in the following location: The research location was East Jakarta, a densely populated area with complex urban characteristics, encompassing various socio-economic classes and uneven access to health facilities. East Jakarta was selected as the research site due to its heterogeneous immunisation coverage and acceptability rates, which may vary significantly across different areas. This urban context, characterised by diverse demographic and social conditions, provides a valuable setting for examining the impact of immunisation programmes in a multifaceted manner.

The data were collected using three principal techniques. In-depth interviews were conducted with: This technique involved the administration of semi-structured interviews to a number of key informants, including health workers, parents, community leaders and members of the local community. The use of open-ended questions enabled the researchers to gain a comprehensive understanding of the views, perceptions and experiences of the participants. The interviews were recorded with the participants' consent in order to guarantee the accuracy of the data and facilitate comprehensive analysis.

Direct observation was also employed. Researchers conducted direct observations at the locations where the immunisation programme is implemented, including health centres and Posyandu. The observations were conducted with a view to ascertaining the manner in which immunisation services were being delivered, the nature of interactions between health workers and the communities in question, and the extent of community participation in the

immunisation programme. Furthermore, observations encompass non-verbal elements, such as crowd dynamics, community enthusiasm, and instances of resistance.

Documentation: Researchers collected relevant documents, including puskesmas annual reports on immunisation coverage, immunisation education materials provided to the community, and infectious disease case reports in the area. Data from these documents were used to corroborate and support findings from interviews and observations, thereby enhancing the validity and reliability of the study.

The analysis also employed data triangulation to verify findings from multiple sources of information, thereby increasing the credibility of the results. Triangulation was conducted by comparing interview, observation, and documentation data to ascertain whether the findings were consistent or divergent.

RESULTS AND DISCUSSION

This study reveals that the immunisation programme in East Jakarta has played a significant role in reducing the number of infectious disease cases, particularly measles and diphtheria. Based on data obtained through in-depth interviews with health workers, observation results, and documentation analysis, it can be seen that high immunisation coverage is directly related to the decrease in cases of these diseases.

Immunisation Coverage and Reduced Infection Rates

Data from Puskesmas in East Jakarta shows that immunisation coverage for measles and diphtheria has increased significantly over the past five years. The table and graph below provide a clearer picture of immunisation coverage and changes in infection rates for measles and diphtheria.

Table 1. Immunisation Coverage and Communicable Disease Cases in East Jakarta (2019-2023)

Year	Measles Immunisation Coverage (%)	Measles cases (people)	Diphtheria Immunisation Coverage (%)	Diphtheria Cases (people)
2019	75	150	70	120
2020	78	120	73	100
2021	81	90	76	85
2022	85	60	80	50
2023	90	30	85	20

*) Dinas Kesehatan Jakarta

Table 1 illustrates a consistent downward trend in the incidence of measles and diphtheria cases as immunisation coverage increases. In 2019, the coverage of immunisation against measles and diphtheria was 75% and 70%, respectively, with a high incidence of 150 cases of measles and 120 cases of diphtheria. However, in 2023, when the level of immunisation coverage for both diseases increased to 90% and 85%, respectively, the number of cases of measles fell significantly, to 30, while the number of cases of diphtheria remained at 20.

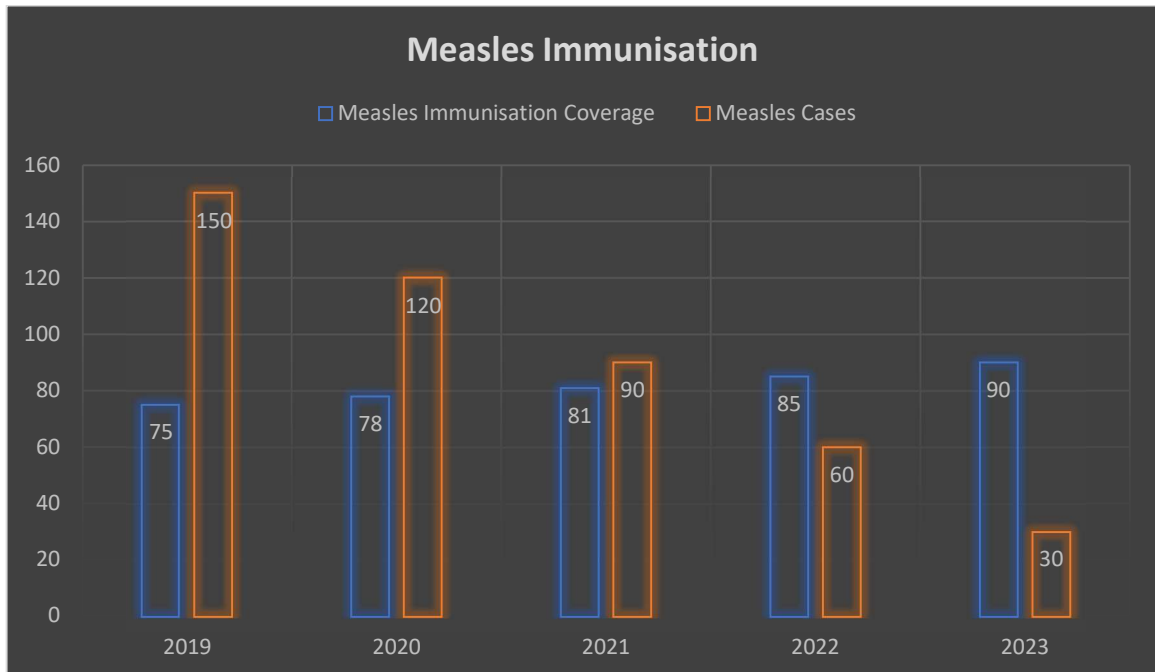


Figure 1. Measles Immunisation

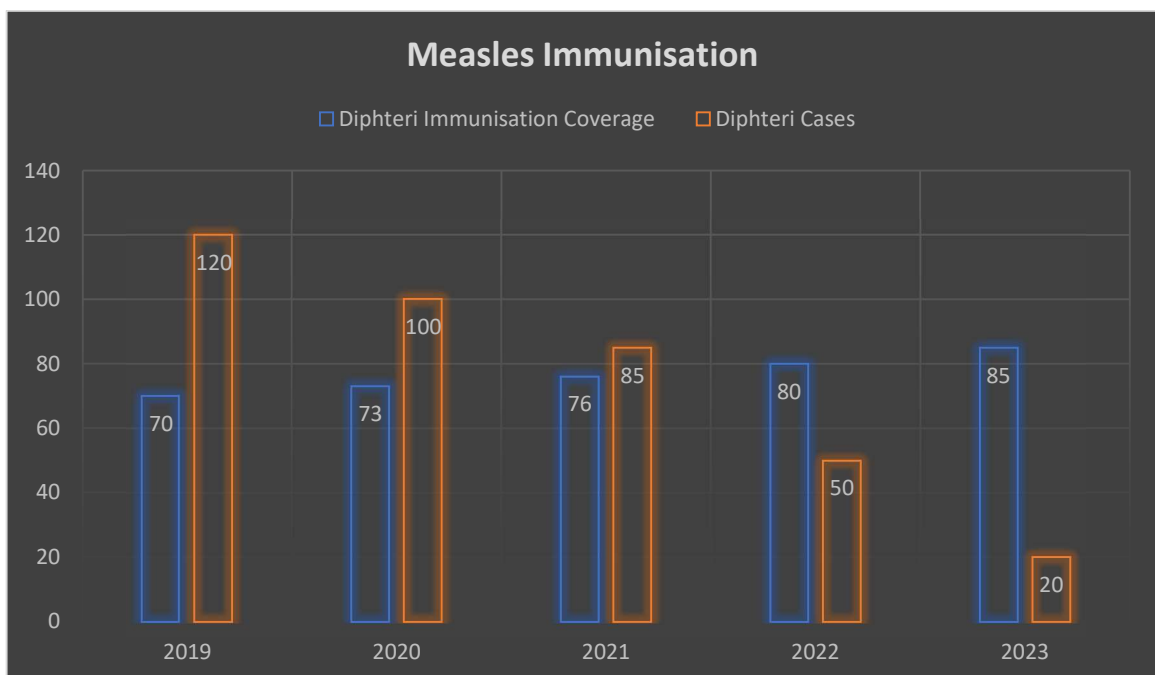


Figure 2. Diphteri Immunisation

Graph 1 illustrates the negative relationship between immunisation coverage and the number of disease cases. An increase in immunisation coverage is inversely proportional to the number of infectious disease cases, suggesting that higher vaccine coverage results in a decrease in infection rates.

Effectiveness of the Immunisation Program

The efficacy of the immunization programme is contingent upon a number of factors, including the quality of the vaccine, the dosage administered, the route of administration, and the age and health status of the recipient. Based on interviews with health workers at several health centres in East Jakarta, the majority concurred that immunisation plays a pivotal role in preventing the transmission of infectious diseases, particularly among children and other vulnerable demographics. According to the health workers, high immunisation coverage provides community protection (herd immunity), which helps to lower the risk of disease spread. As evidence of the impact of immunisation, data collected from the East Jakarta Health Office shows a decrease in the number of cases of certain infectious diseases following the implementation of a more intensive immunisation programme in the last five years (Suwantika et al., 2021).

Furthermore, health workers emphasised the necessity of disseminating health education to the community regarding the advantages of immunisation. They asserted that although public awareness of immunisation is on the rise, a significant proportion of the population still requires more comprehensive knowledge to facilitate equitable immunisation coverage. The key challenges in health education, as identified by health workers, include:

1. A lack of knowledge regarding the importance of immunisation persists among some individuals, particularly those residing in regions with limited access to information.
2. Myths and Misconceptions: There are erroneous beliefs within the community, such as the notion that immunisation can cause disease or adverse side effects.
3. Facility limitations may also impede optimal socialisation, as limited facilities or health workers may result in insufficient information reaching people in certain areas.
4. It was proposed that health education should be intensified through the implementation of a persuasive and dialogical approach. Furthermore, the involvement of community leaders was suggested as a means of enhancing community trust in the immunisation programme (Lestari et al., 2023).

A health worker was interviewed and provided the following quote: 'The residents of East Jakarta tend to demonstrate a greater understanding of the benefits of immunisation, particularly following the implementation of a sustained educational programme delivered by puskesmas. However, it is evident that more intensive education is required, as there are still some individuals who remain hesitant and require a persuasive approach.'

Data Analysis and Interpretation

The data and interviews indicate that efforts to increase immunisation coverage necessitate a collaborative approach between health service programmes and community education. Puskesmas in East Jakarta have employed various strategies to provide education, including counselling and question-and-answer sessions. An analysis of the interviews reveals that the majority of health workers concur that health education can enhance immunisation coverage. However, its efficacy is contingent upon the establishment of trust within the community and the long-term sustainability of the education.

Based on the findings of the interviews and analysis of the data, a number of recommendations can be put forth for consideration by the East Jakarta Health Office with a

view to enhancing the efficacy of immunisation programmes (Tirza, 2022). It is recommended that education and socialisation be improved. To this end, a regular socialisation programme should be created, involving health workers, community leaders, and local media. The utilisation of digital platforms represents a promising avenue for disseminating information to the public in an easily accessible and accurate manner.

A persuasive approach is recommended, whereby health workers should utilise testimonials from individuals who have benefited from immunisation. Monitoring and evaluation are essential components of any immunisation programme. Regular evaluation allows for the assessment of programme effectiveness and coverage, as well as the identification of challenges encountered in the field (Suwantika et al., 2021).

Challenges of Immunisation Program in East Jakarta: Access Gaps and Vaccine Resistance

The implementation of immunisation programmes in East Jakarta is confronted with a multitude of intricate challenges, most notably in guaranteeing equitable immunisation coverage and acceptance of vaccination across all communities. These challenges encompass deficiencies in access to immunisation services and resistance from certain community groups. The following section provides a comprehensive account of each of these challenges: One of the primary obstacles to the efficacy of the immunization program in East Jakarta is the lack of accessibility to these services, particularly in densely populated areas or regions with inadequate health facility coverage (Baxter et al., 2024).

Socioeconomic conditions play a significant role in determining access to health services, including immunisation. Individuals with low economic levels often encounter difficulties in accessing these services due to various factors. Transportation costs and lack of free time, particularly for informal or daily workers, can impede parents' ability to bring their children to immunisation centres or posyandu. Additionally, some families may prioritise spending on other basic needs, which can result in a lower prioritisation of immunisation (El Banhawi et al., 2024).

1. **Inadequate Health Infrastructure:** In some areas, the provision of immunisation services may be insufficient or inaccessible. The scarcity of health centres or posyandu in more remote or isolated areas necessitates longer journeys for families seeking vaccinations. This can result in low immunisation participation, particularly among children of school age.
2. **Vaccine Availability and Distribution:** Furthermore, uncertainty regarding vaccine availability at certain health centres represents an additional challenge. On occasion, communities encounter situations where the vaccines they require are unavailable due to distribution issues or limited supply. This can result in some families delaying or even foregoing vaccination.

A further factor contributing to low awareness of the importance of immunisation is the lack of education on the subject. This is particularly the case in communities with limited access to technology or information. The lack of consistent and clear immunisation information in some areas, especially in more densely populated and heterogeneous areas, also plays a role in this regard (Adamu et al., 2024).

In addition to the aforementioned access challenges, vaccination resistance represents a significant obstacle to the success of the immunisation programme in East Jakarta. Based on interviews with community leaders and health workers, several main causes of this vaccination resistance have been identified, namely:

One of the primary factors contributing to vaccine hesitancy is the dissemination of misinformation and hoaxes pertaining to vaccine safety. Some members of the public hold the perception that vaccination may pose health risks or even unwanted long-term side effects. These concerns are often exacerbated by the spread of inaccurate information through social media or from neighbours, which ultimately influences parents' decisions not to vaccinate their children (Colonna & Helliwell, 2024).

1. **Social and Cultural Influences:** In some communities, attitudes towards immunisation are influenced by social and cultural factors. For example, in communities that have religious leaders or figures with negative views towards vaccination, community members tend to adhere to these beliefs or views. In some cases, these views are associated with religious or traditional perceptions that consider vaccination to be unnatural or incompatible with the tenets of their beliefs.
2. **Mistrust of Government Programmes:** Mistrust of government immunisation programmes, which may be attributed to previous negative experiences or the perception that these programmes have hidden objectives, represents another factor of resistance. Some communities view vaccination with scepticism, particularly among individuals who feel that immunisation programmes are not explained transparently or perceive vaccination as an outsider's agenda that is irrelevant to their needs.

A further factor contributing to the persistence of vaccine hesitancy is the lack of ongoing educational support. Immunisation socialisation efforts at the community level are not always consistent, resulting in some communities not gaining an adequate understanding of the benefits and safety of vaccines. Without ongoing education, communities are vulnerable to negative opinions or misleading information. Effective health education is expected to help overcome vaccination resistance by providing a more comprehensive understanding to the community.

Implications and Recommendations

The challenges of access gaps and vaccination resistance indicate the necessity for the implementation of more inclusive and sustainable strategies in immunisation programmes in East Jakarta. It is recommended that local governments consider developing health infrastructure in densely populated areas that are not well served. This could include the opening of mobile posyandu in certain areas or the provision of vaccination services in locations that are easily accessible to low-income communities (Gleditsch et al., 2023).

The government can collaborate with community leaders, religious leaders, and local health workers to provide consistent education on the importance of immunisation. Education programmes can be developed to address misinformation and enhance public confidence in the safety of vaccination.

It is recommended that communication strategies for the immunisation programme be strengthened. The delivery of transparent information and the engagement of the public in

dialogue around the benefits and side effects of vaccination can help reduce mistrust. Furthermore, community-based education programmes can facilitate the reach of the programme to groups with different views on vaccination.

Socialisation as a Solution to Overcoming Obstacles in the Immunisation Programme

In order to increase immunisation coverage in urban communities such as East Jakarta, it is necessary to implement effective socialisation strategies that can overcome the existing barriers, in particular the resistance and hesitation that is evident in some communities. While the immunisation programme has demonstrated a positive impact in reducing the number of infectious disease cases, there are still challenges to be faced in expanding its coverage. The following section provides a more detailed description of socialisation strategies that can be implemented in order to overcome these obstacles.

Public health campaigns represent a strategic approach to increasing public awareness and understanding of the importance of immunisation. These campaigns can be conducted by utilising various communication media that are accessible to the community, including print media, television, radio, and especially social media, which are particularly effective in reaching urban populations with diverse backgrounds (Farooqui et al., 2024).

The use of social media in urban areas is prevalent; therefore, platforms such as Facebook, Instagram and Twitter can be utilised to disseminate information regarding the benefits of immunisation. Content can include infographics, video testimonials and stories from parents who have immunised their children, as well as collaborations with health influencers to increase public trust.

The distribution of printed materials, such as posters and brochures, at community health centres, schools, and public places can be an effective method of reaching communities that lack access to digital media. The inclusion of brief, easily comprehensible information on the benefits and safety of vaccination, as well as the clarification of any misconceptions, can assist individuals in developing a more informed understanding.

Mobile Campaigns: Health workers and community cadres can conduct mobile campaigns in densely populated areas to disseminate information and respond to queries directly. These campaigns can be accompanied by mobile vehicles displaying informative posters and providing immunisation services on the spot.

It is evident that public education plays a pivotal role in addressing public scepticism and mistrust surrounding vaccination programmes. The proliferation of misinformation and myths often represents a significant barrier to overcome. Consequently, it is imperative that public education programmes are meticulously designed, taking into account the social and cultural nuances of urban communities in East Jakarta.

The organisation of workshops and seminars in the community with the participation of health professionals, such as paediatricians and immunisation experts, can facilitate the provision of scientific explanations regarding the process and benefits of immunisation. Furthermore, direct interaction in the form of question and answer sessions allows communities to raise their concerns and obtain responses directly from experts (Jusril et al., 2020).

Integrating health and immunisation education into the primary school curriculum can facilitate the development of an appropriate understanding in younger generations. Furthermore, parents can be engaged in educational activities at school through discussion sessions or seminars organised by the school.

Counselling at Posyandu and Puskesmas: Posyandu and Puskesmas are the most proximate healthcare centres with direct reach to the community. Regular counselling sessions at these centres can reinforce community awareness, particularly among mothers of children under five. Furthermore, through counselling at Posyandu, health workers can ascertain the obstacles experienced by the community and provide suitable solutions.

The role of community health cadres is of great significance in terms of reaching every level of society and increasing immunisation coverage. They serve as a vital conduit, capable of fostering trust within communities through the establishment of personal relationships and the exertion of social influence.

Training of health cadres: It is recommended that health cadres receive specific training on immunisation, including basic medical knowledge, effective communication strategies, and techniques for addressing community resistance. This training should encompass the identification and addressing of myths and misinformation, the utilisation of friendly communication, and the ability to respond to critical questions from the community.

The door-to-door approach represents an effective strategy for disseminating information about immunisation to families who may be reluctant to participate. This approach is particularly suited to urban areas with high mobility, where families may not have the time to attend public events such as seminars or campaigns.

Community leaders can also be engaged by health workers, as they often exert considerable influence within local communities. By supporting community leaders in disseminating the message that immunisation is a necessity and a shared obligation for maintaining a healthy environment, the effectiveness of immunisation programmes can be enhanced (Hasyim et al., 2024).

Furthermore, it is essential to collect and monitor feedback from the community in order to gain insight into the obstacles they face in joining the immunisation programme. An integrated information system should be developed, comprising an application or platform that allows communities to access information on immunisation schedules, service locations and answer questions about vaccines. This system will also facilitate monitoring of immunisation coverage and enable health workers to conduct follow-ups with those who have not been immunised.

It is essential that health workers and other relevant personnel collect feedback from communities on the barriers they face or reasons why they are reluctant to participate on a regular basis. This feedback can then be collated in order to identify specific issues that may require further attention.

CONCLUSION

The immunisation programme in East Jakarta has had a beneficial impact on the control of communicable diseases in urban communities. The programme has played an instrumental

role in reducing the incidence of vaccine-preventable diseases, including measles, diphtheria and hepatitis B. East Jakarta, with its high population density, is at significant risk for the spread of infectious diseases, particularly among children and other vulnerable groups. The objective of the immunisation programme is to establish community or herd immunity, thereby safeguarding individuals who are unable to be vaccinated, including infants in the earliest stages of life and individuals with specific medical conditions. In recent years, the implementation of the immunisation programme in East Jakarta has resulted in a notable decline in the incidence of infectious diseases, particularly in areas where high immunisation coverage has been attained. The study observed a significant inverse correlation between consistent immunisation coverage and infection rates, with the former exhibiting a notable reduction in the latter. Furthermore, the success of the immunisation programme is also supported by an increased public awareness of the importance of vaccination, particularly following various health campaigns conducted by the government and health organisations. To ensure the long-term viability and efficacy of this initiative, it is imperative that the government and local health authorities enhance their communication strategies, expand the accessibility of immunization facilities, and implement more impactful health education programs. It is evident that more comprehensive efforts are required, including the involvement of community leaders or local health influencers, in order to overcome resistance and misinformation about immunisation. It is hoped that the immunisation programme in East Jakarta will continue to run smoothly and be able to protect all levels of society from the risk of infectious diseases.

ACKNOWLEDGEMENT

Author thanks to all people and institution which helped this research. In most cases for the funding support

REFERENCE

- Adamu, A. A., Karamagi, H., & Wiysonge, C. S. (2024). Monitoring implementation in routine immunisation. *The Lancet*, *404*(10456), 932–933. [https://doi.org/10.1016/S0140-6736\(24\)01601-5](https://doi.org/10.1016/S0140-6736(24)01601-5)
- Baxter, L., Slater, R., Hermany, L., Bhatti, A., Eiden, A. L., Mitrovich, R., Connolly, M. P., Vanderslott, S., Nyaku, M., & Bhatt, A. (2024). Identifying characteristics that enable resilient immunisation programmes: a scoping review. *BMJ Open*, *14*(5), e072794. <https://doi.org/10.1136/bmjopen-2023-072794>
- Colonna, S., & Helliwell, K. (2024). Impact of the Welsh Government Flying Start programme on children's BMI and immunisation uptake. *International Journal of Population Data Science*, *9*(5). <https://doi.org/10.23889/ijpds.v9i5.2776>
- El Banhawi, H., Bell, E., Neri, M., Brassel, S., Chowdhury, S., & Steuten, L. (2024). A Structured Narrative Literature Review of the Broader Value of Adult Immunisation Programmes. *Vaccines*, *12*(8), 852. <https://doi.org/10.3390/vaccines12080852>
- Farooqui, H. H., Karan, A., Mehta, A., Babu, G. R., & van Schayck, O. C. P. (2024). Potential impact of rotavirus vaccine introduction in India's Universal Immunisation Programme

- on private sector vaccine utilisation: an interrupted time series analysis. *BMC Medicine*, 22(1), 453. <https://doi.org/10.1186/s12916-024-03664-w>
- Gleditsch, R. N., Hynek, K., Ofitserova, T. S., Hansen, B. T., & Skogheim, T. S. (2023). Attitudes towards the childhood immunisation programme among Polish immigrants in Norway. *European Journal of Public Health*, 33(Supplement_2). <https://doi.org/10.1093/eurpub/ckad160.932>
- Hasyim, H., Marini, H., Misnaniarti, M., Flora, R., Liberty, I. A., Elagali, A., Hartoni, H., & Maharani, F. E. (2024). Evaluation of the malaria elimination programme in Muara Enim Regency: a qualitative study from Indonesia. *Malaria Journal*, 23(1), 43. <https://doi.org/10.1186/s12936-024-04857-7>
- Jusril, H., Ariawan, I., Damayanti, R., Lazuardi, L., Musa, M., Wulandari, S. M., Pronyk, P., & Mechael, P. (2020). Digital health for real-time monitoring of a national immunisation campaign in Indonesia: a large-scale effectiveness evaluation. *BMJ Open*, 10(12), e038282. <https://doi.org/10.1136/bmjopen-2020-038282>
- Lestari, C. S. W., Dewi, R. M., Sunarno, S., Hasugian, A. R., Handayani, S., Maha, M. S., Panjaitan, N. S. D., Ningrum, N., Sari, M., & Fairuza, F. (2023). The effectiveness of hepatitis B vaccine in toddlers based on the five-year period national basic health research (Riskesdas 2007, 2013 and 2018) in Indonesia. *PeerJ*, 11, e15199. <https://doi.org/10.7717/peerj.15199>
- Nyiramana, M. P. (2024). The Impact of Public Health on Disease Prevention. *RESEARCH INVENTION JOURNAL OF SCIENTIFIC AND EXPERIMENTAL SCIENCES*, 4(1), 1–4. <https://doi.org/10.59298/RIJSES/2024/4114>
- Rahayuningsih, N., Sinuraya, R., Fatinah, Y., Diantini, A., & Suwantika, A. (2024). Impact of COVID-19 Pandemic on Routine Childhood Immunization Programs in Indonesia: Taking Rural and Urban Area into Account. *Patient Preference and Adherence*, Volume 18, 667–675. <https://doi.org/10.2147/PPA.S448901>
- Randell, M., Wahyono, T. Y. M., Dynes, M., Tinessia, A., Li, M., Danchin, M., Oktarinda, Fitriyani, F., Saraswati, L. D., Jenkins, K., Aung, K. D., Noorzad, A. K., Shetye, M., Dewi, L., Yosephine, P., Leask, J., & Sheel, M. (2024). Service disruptions, trauma and burnout during the COVID-19 pandemic among healthcare providers delivering immunisation and maternal and child health services in Indonesia. *BMJ Global Health*, 9(6), e014318. <https://doi.org/10.1136/bmjgh-2023-014318>
- Suwantika, A. A., Tu, H. A. T., & Postma, M. J. (2013). Cost-effectiveness of rotavirus immunization in Indonesia: Taking breastfeeding patterns into account. *Vaccine*, 31(32), 3300–3307. <https://doi.org/10.1016/j.vaccine.2013.04.055>
- Suwantika, A. A., Zakiyah, N., Abdulah, R., Sitohang, V., Tandy, G., Anartati, A., Hidayatullah, T., Herliana, P., & Hadinegoro, S. R. (2021). Cost-Effectiveness and Budget Impact Analyses of Pneumococcal Vaccination in Indonesia. *Journal of Environmental and Public Health*, 2021, 1–11. <https://doi.org/10.1155/2021/7494965>
- Tirza, J. (2022). The Role of Citizens in Socializing the Effectiveness of Vaccines to Support National Health Development. *SOSMANIORA: Jurnal Ilmu Sosial Dan Humaniora*, 1(2), 197–203. <https://doi.org/10.55123/sosmaniora.v1i2.499>

- Wahab, S., Idrus, I., Muliana, H., & Azzahra, N. (2023). Regulations for Organizing Immunizations in Indonesia. *SOEPRA*, *9*(1), 9–20. <https://doi.org/10.24167/sjhc.v9i1.5938>
- Widayanti, A. W., Norris, P., Green, J. A., & Heydon, S. (2020). Is expanding service through an outreach programme enough to improve immunisation uptake? A qualitative study in Indonesia. *Global Public Health*, *15*(8), 1168–1181. <https://doi.org/10.1080/17441692.2020.1751229>