

Determinants of Vaccine Hesitancy in Indonesia: A Scoping Review

Faktor Determinan Keraguan Vaksin di Indonesia: Sebuah Telaah Cakupan

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ABSTRACT

Complete children immunization coverage in Indonesia declined from 59.2% in 2013 to 57.9% in 2016. Therefore, a study on understanding the vaccination barrier is necessary to improve future coverage. This scoping review aims to identify the determinants of vaccine hesitancy using the model of the World Health Organization-Strategic Advisory Group of Expert (WHO-SAGE) working group and to map them on the basis of region, target population, and vaccine. This research used publications from seven databases (*Science Direct, Wiley, Scopus, SAGE, PubMed, Springer, and Taylor & Francis*) from 2015 to 2020. A total of 10,212 publications were identified and filtered by employing the PRISMA method, thereby leaving 24 publications that were featured in this review. The majority of these publications is quantitative research conducted in Aceh and Yogyakarta and investigates children complete immunization, with adults and parents being the target population. The vaccine hesitancy determinants that are mentioned the most are social-economy, religion/culture/ gender, the role of health-care professionals, cost, knowledge, and awareness about vaccine, and attitude toward preventive health behavior. However, additional evidence on the influence of contextual-focus factors in various regions in Indonesia is crucial for a further understanding of the antecedent of the relationship between determinant factors and vaccination behavior.

ABSTRAK

Cakupan imunisasi lengkap anak di Indonesia menurun dari 59,2% di 2013 ke 57,9% di 2016. Oleh sebab itu, penelitian mengenai hambatan-hambatan vaksinasi penting untuk ditelaah sebagai rekomendasi untuk meningkatkan cakupan imunisasi di masa yang akan datang. Telaah cakupan ini bertujuan untuk mengidentifikasi faktor determinan keraguan vaksin menggunakan model dari kelompok kerja WHO-SAGE dan memetakannya berdasarkan daerah, target populasi, dan vaksin. Penelitian ini menggunakan publikasi dari tujuh database (*Science direct, Wiley, Scopus, SAGE, PubMed, Springer, and Taylor & Francis*) dari 2015 sampai 2020. Artikel yang ditemukan sebanyak 10212 dan dieliminasi hingga 24 artikel dengan menggunakan metode PRISMA. Karakteristik dari artikel yang terpilih adalah penelitian kuantitatif dengan setting penelitian di Aceh dan Yogyakarta, memuat informasi tentang imunisasi lengkap anak, dengan target populasi orang dewasa dan orang tua. Hasil telaah literatur menjelaskan tentang faktor determinan keraguan vaksin terkait dengan sosial ekonomi, agama/budaya/gender dari tenaga kesehatan, biaya, pengetahuan dan kesadaramna terhadap vaksin dan sikap terhadap vaksin, dan perilaku preventif. Rekomendasi dari telaah literatur ini adalah perlunya kajian mengenai pengaruh faktor konstekstual pada berbagai daerah di Indonesia untuk memahami antaseden dari hubungan antara faktor determinan dan perilaku vaksinasi.

Review Article

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Received: 12 August 2020
Revised: 28 August 2020
Accepted: 14 September 2020

Keyword: attitude toward vaccine, vaccination behavior, vaccination belief, vaccine hesitancy

Cite this article: Hanifah, N., Herdiana, I. & Ardi, R. (2021). Determinants of vaccine hesitancy in Indonesia: A systematic literature review. *Makara Human Behavior Studies in Asia*, 25(1), 3-11. <https://doi.org/10.7454/hubs.asia.3140920>

1. Introduction

Vaccine is commonly mentioned as the most successful and cost-effective intervention in terms of improving public health (Rémy et al., 2015). Even with its outstanding achievement, Indonesia is still facing

vaccination coverage crisis. Basic Healthcare Research (RISKEDAS) 2018 validated that the complete children immunization coverage declined from 59.2% in 2013 to 57.9% in 2018 (Kementerian Kesehatan Republik Indonesia, 2018a). This report also detected drastic coverage cutbacks in Aceh, Riau, and Gorontalo with a 20% difference between 2013 and 2018 (Kementerian

Kesehatan Republik Indonesia, 2018a). Furthermore, large discrepancies emerged across regions according to the RISKEDAS 2018 report, and the coverage rates ranged from 90% (reported in Bali) to 20% (reported in Aceh) (Kementerian Kesehatan Republik Indonesia, 2018a). Regardless, this number is still far behind the World Health Organization (WHO) target of 90% vaccination coverage in South and South-East Asian countries.

Several investigations have been conducted to understand the heterogeneity and declining coverage rate in Indonesia. From these reports, vaccination barriers can be identified into two main categories, namely, health-care providers and individuals. Barriers to quality health care can be observed in the measles outbreak in Asmat that was caused by poor health care, malnutrition, and low vaccination coverage (Tarigan, 2018). The Indonesian Health Ministry admits that poor health care in regions with extreme geographical conditions in Indonesia like Papua is still a challenge to the success of vaccination campaigns (Kementerian Kesehatan Republik Indonesia, 2018b). On the individual side, the challenge comes from vaccine hesitancy, and this hesitancy is based on misinformation or the lack of knowledge and awareness about vaccination and immunization services (Yufika et al., 2020). Belief has also become a growing concern that influences vaccine hesitancy, and the halal/haram issues that revolve around vaccine contribute to the declining measles vaccine coverage (Pronyk et al., 2019).

Vaccine hesitancy is a global phenomenon and documented as a common barrier to vaccination (Larson et al., 2014), and the WHO even listed it as one of the 10 global threats in 2019 (WHO, 2019). The term itself is defined by the Strategic Advisory Group of Expert (SAGE) working group as “a delay in the acceptance or refusal of vaccination despite the availability of vaccination services” (MacDonald, 2015). Vaccine hesitancy comprises three factors that influence the decision of people to accept, delay, or refuse vaccination: (1) confidence (trust in vaccine and the health-care system that provides it), (2) compliancy (perceived risk of vaccine preventable diseases and the advantages of vaccine), and (3) convenience (availability, affordability, willingness, and accessibility of vaccine) (MacDonald, 2015). Based on these factors, the SAGE working group also built a “model of the determinants of vaccine hesitancy” that organizes vaccine hesitancy determinants around three domains, namely, (1) contextual influence—the influence of historic, socio-cultural, environmental, health system/intuitional, economic, or political factors; (2) individual and group influence—the influence of personal perception or social/peer environment toward vaccine; and 3) vaccine or vaccination-specific issues—the influence of issues that are directly related to the

characteristics of vaccine or the vaccination process (Larson et al., 2014; MacDonald, 2015). The influences of the determinants in this model toward vaccine hesitancy are varied and have no global algorithm, and they are highly complex and context-specific—varying across time, place, and vaccine (Larson et al., 2014).

Therefore, an overview about vaccination barriers in Indonesia using model determinants proposed by the SAGE working group is necessary for at least two main reasons. First, Indonesia has diverse social-economic, cultural, geographical, and political conditions in every region with more than 300 ethnic groups that spread over 17,000 islands in the archipelago. Each region also has its own set of beliefs, values, and customs that are fundamental in the society until this day; therefore, each region might have different and unique responses toward factors that influence vaccination behaviors and attitudes. Second, to the best of our knowledge, a comprehensive scoping review on a vaccination barrier overview in a national or regional scale is still not yet publicized. Additionally, this scoping review can provide information that can be utilized in developing vaccination research and policy making on national vaccination campaigns in the future.

2. Methods

Search strategies and criteria

Scoping review is used to understand vaccine behavior and practice in this study. We conducted this review using the guidelines from *Preferred Reporting Items for Systematic Literature Review and Meta-Analysis* (PRISMA) (Tricco et al., 2018). The literature was obtained from seven databases, namely, *Science Direct*, *Wiley*, *Scopus*, *SAGE*, *Pubmed*, *Springer*, and *Taylor & Francis*. The search strategy included several lists of keywords (Table 1) to capture the literature on vaccine confidence, trust, attitude, and hesitancy that was conducted in Indonesia.

The pieces of literature obtained were filtered on the basis of three inclusion criteria, namely, (1) the peer-reviewed journal or article review was published in 2015 to 2020; (2) the literature focuses on behavior, attitude, belief, hesitancy, concern, and confidence; and (3) the study was conducted in Indonesia or included Indonesia as its geographical scope. The articles were excluded if they were not about human vaccines, editorials, letters, comments/opinions, and protocols (no data). We also included only studies that were written in English.

Article screening and selection

The identified articles were compiled and process in open-source programs, such as Mendeley and Microsoft Excel. The removal of duplicates, two-phase screening, and full-text assessment to choose eligible publications

were performed by one reviewer (NH). Thereafter, the eligible studies were discussed with another researcher (RA) and finally established the list of the publication included in this review.

Data extraction and descriptive analysis

After the identification of the publications, the information needed to fulfil the objectives of this study was extracted. The extracted data included the study location, vaccine studied, target population, methodology, study objectives, and the description of the key findings. The analysis was also conducted by identifying and classifying the specific determinants of vaccine hesitancy using the vaccine hesitancy matrix of the SAGE working group (MacDonald, 2015). The summary of each publication along with the extracted data and vaccine hesitancy determinant analysis was compiled and grouped to make descriptions regarding the current study and to identify the knowledge gap.

3. Results

Identified literature

There were 10,212 records identified from seven database searches. After the duplication of the removal stage, 5,073 records remained to be screened of which 24 were included in the full-text assessment. The rest of the discarded records were either not related with the focus study or not conducted in Indonesia, or the full text was unavailable. Figure 1 shows the overview of the record screening method.

Study characteristics

Of the 24 publications in this review, most were quantitative studies ($n = 20$), only four studies were qualitative, and no mixed-methods study was found. The target population of these publications can be stratified into four main categories: adults >18 years of age (parents excluded), parents (children > 9 years of age and adolescents 9–18 years of age), influential figures, and health-care workers. Most commonly investigated vaccine target populations were parents ($n = 12$) and adults ($n = 10$) followed by influential figures ($n = 1$) and health-care workers ($n = 1$). No publication was found on pregnant women, sex workers, men who had sex with men, and adolescents.

Eight vaccines were explored by these publications. Most of these vaccines were early childhood vaccination—seven publications described barriers to children complete vaccination, three publications focused on rotavirus, two publications tackled Zika virus vaccine and MCV, and one publication dealt with DPT3. Other vaccines that were early childhood vaccination and included in this assessment were dengue vaccine ($n = 4$), HPV vaccine ($n = 3$), and Ebola vaccine ($n = 1$). The majority of the publications were national-scale studies ($n = 8$), but regionally,

most of the publications were conducted in Aceh ($n = 7$) (Fasli et al., 2017; Harapan et al., 2017; Harapan, Anwar, Bustaman, et al., 2016; Harapan et al., 2017; Harapan et al., 2016; Harapan et al., 2019; Yufika et al., 2020), followed by Yogyakarta ($n = 5$) (Endarti et al., 2018; Kristina et al., 2020; Lienaningrum & Kristina, 2020; Padmawati et al., 2019; Seale et al., 2015), West Sumatra ($n = 2$) (Widayanti et al., 2020; Yufika et al., 2020), Central Java ($n = 1$) (Spagnoletti et al., 2019), West Java ($n = 1$) (Wallace et al., 2019), Madura ($n = 1$) (Yunitasari et al., 2018), and East Nusa Tenggara ($n = 1$).

Vaccine hesitancy barriers

The individual and group influence was the most frequently explored and reported vaccination barrier ($n = 23$), followed by the contextual influence ($n = 20$) and vaccine and vaccination-specific issues ($n = 19$). All the barriers categorized under the individual and group influence were found during the assessment, and the most discussed barrier was knowledge and awareness ($n = 22$), followed by beliefs, attitudes, and motivation around health and prevention ($n = 14$); risk/benefit (perceived) ($n = 8$), immunization as a social norm ($n = 4$), experience with past vaccination ($n = 4$), and personal experience with a health-care system/provider ($n = 2$). In the contextual influence, religion/culture/gender was the most commonly discussed topic ($n = 13$), followed by socio-economics ($n = 11$), media and communication environment ($n = 4$), influential leader or figure ($n = 3$), geographic barrier ($n = 2$), politics ($n = 1$), and pharmaceutical industry ($n = 1$). No publication discussed historical barriers. Only five barriers were explored under the vaccine and vaccination-specific issues category; role of health-care professionals ($n = 9$), cost ($n = 9$), risk/benefit (scientific) ($n = 5$), vaccination schedule ($n = 2$), and the reliability of vaccination supply ($n = 1$). Barriers and determinants in the *model of the determinant of vaccine hesitancy* of the SAGE are not mutually exclusive with influence that depends on the context, which is the reason for why this systematic review focuses on finding the dynamics among barriers and unique contextual factors. The evidence in this review is beneficial for decision and policy makers in designing and developing further vaccination campaigns.

Contextual influence

Indonesia is a country with Muslim majority and a society that still upholds its cultural norms. Therefore, *religion/cultural/gender* being the most commonly discussed barrier in the *contextual influence* category is an understatement. Religious barrier revolves around the halal/haram status of vaccine (Harapan et al., 2016; Kristina et al., 2020; Lienaningrum & Kristina, 2020; Padmawati et al., 2019; Seale et al., 2015), and concerns regarding the remains of porcine

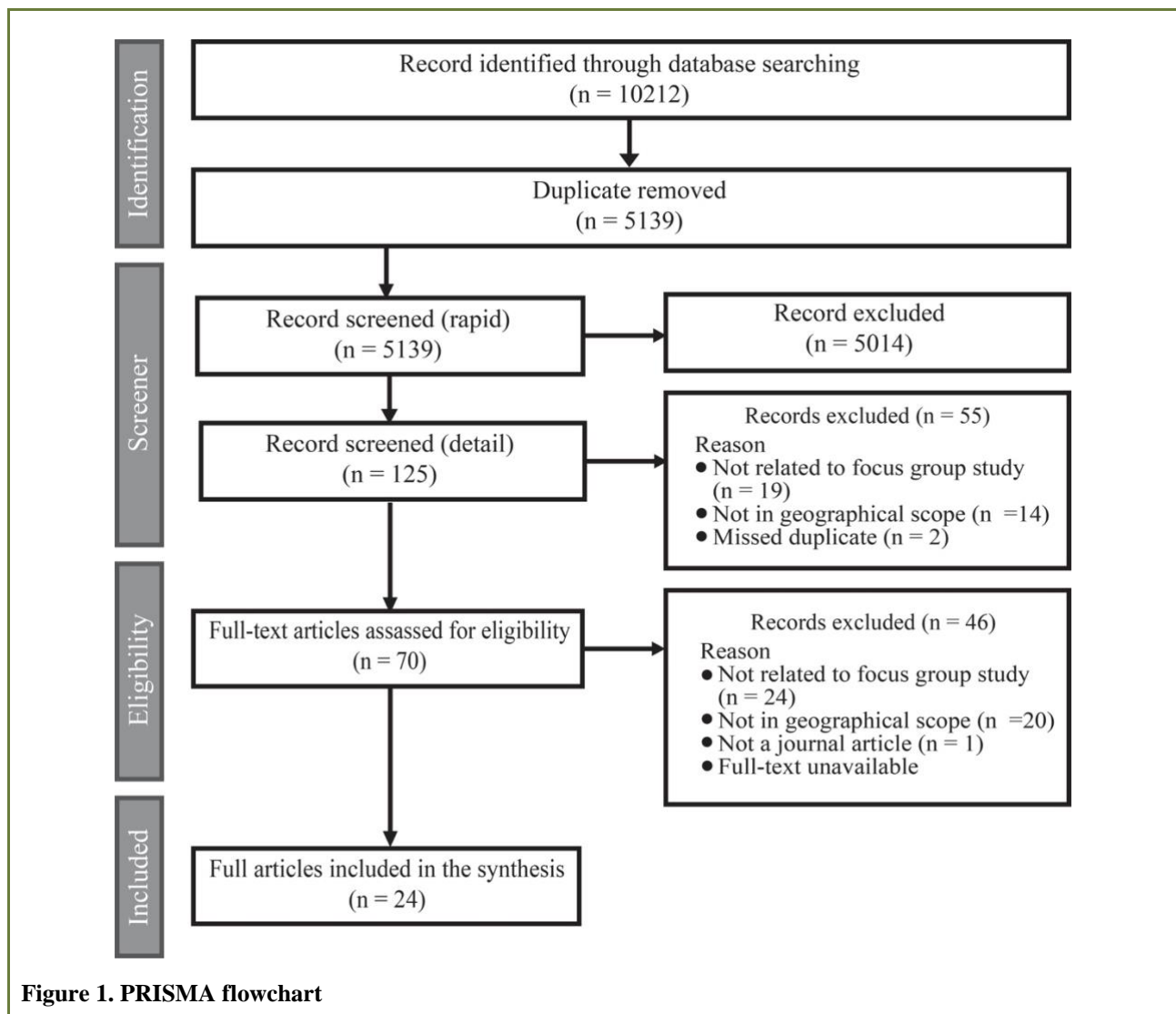
DNA in vaccine finished products emerge (Seale et al., 2015). The explanation of this wariness might be related to individual intrinsic religious motivation, in which individuals who internalized religious value as a part of their self-concept and identity would take the consumption of halal products as an act of carrying their religious order (Nurhayati & Hendar, 2019). The gender role in cultural norms also affects the decisions of people on participating in immunization programs. Women are expected to know how to care for their family (Harapan et al., 2016), but they do not hold the decision-making authority in their household (Arsenault et al., 2017; Herliana & Douiri, 2017; Sohn et al., 2018; Widayanti et al., 2020). It is up to the husband (Arsenault et al., 2017; Herliana & Douiri, 2017; Widayanti et al., 2020) or in-laws (Sohn et al., 2018) to decide whether their family needs vaccination or not.

Socio-economics is the second most commonly discussed barrier in the *contextual influence* category. This review found that individual socio-economic status affects three factors on making vaccination decisions: cost, knowledge and awareness, and motivation. Cost refers not only to the price of vaccine but also to the

time and other expenses that are sacrificed to reach health facility and participate in a vaccination program (Efendi et al., 2020; Harapan et al., 2016; Holipah et al., 2018; Seale et al., 2015). Moreover, social-economy status influences the ability of individuals to attain education that is critical to develop skills on searching and understanding health information, which would lead to awareness about the urgency of vaccination (Harapan et al., 2016; Lienaningrum & Kristina, 2020). The consideration of cost and the sense of urgency will build the motivation to participate in vaccination programs (Fasli et al., 2017; Gao et al., 2020). The influence of social-economy status made some publications stated that employment and job type can be the determinant of vaccine behavior. In Aceh, being a civil servant is related to positive attitudes and participation in vaccination programs due to high socio-economy status and supports from the working environment (Harapan, Anwar, Bustamam, et al., 2017; Harapan et al., 2016). Instead, lower working class individuals, such as farmers, use most of their time working that they do not have time to participate in health prevention programs (Fasli et al., 2017).

Table 1. Search terms and strategies for each database

Database	Filter	Search Terms	Result	Total
PubMed	Article type: research article, systematic review	Vaccine AND Indonesia	380	848
		Vaccination AND Indonesia	204	
		Immunization AND Indonesia	264	
		Immunization AND Indonesia	Same with immunization	
Science Direct	Article type: research article, review article	Vaccine AND Indonesia	1262	3,030
		Vaccination AND Indonesia	980	
		Immunization AND Indonesia	618	
		Immunization AND Indonesia	170	
Taylor & Francis	Document type: article	Vaccine AND Indonesia	435	1,171
		Vaccination AND Indonesia	383	
		Immunization AND Indonesia	267	
		Immunization AND Indonesia	86	
SAGE	Article type: research article, review article	Vaccine AND Indonesia	113	377
		Vaccination AND Indonesia	89	
		Immunization AND Indonesia	94	
		Immunization AND Indonesia	81	
Wiley	Article type: research article, review article	Vaccine AND Indonesia	708	2,128
		Vaccination AND Indonesia	626	
		Immunization AND Indonesia	419	
		Immunization AND Indonesia	375	
Scopus	Document type: article, review	Vaccine AND Indonesia	257	605
		Vaccination AND Indonesia	208	
		Immunization AND Indonesia	140	
		Immunization AND Indonesia	Same with immunization	
Springer Link	Content type: article	Vaccine AND Indonesia	1005	2,053
		Vaccination AND Indonesia	591	
		Immunization AND Indonesia	457	
		Immunization AND Indonesia	Same with immunization	
Total				10212



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Influential leaders and individual and communication and media environment are positively influenced by vaccine confidence and behavior. Public figures (Holipah et al., 2018), religious leaders (Padmawati et al., 2019; Seale et al., 2015), and teachers (Kristina et al., 2020) play a crucial role in promoting the importance and sense of urgency and transforming vaccination behavior into social norms. Supportive

media environments that provide easy access to vaccination information and communication with health-care professionals would improve positive perceptions and motivation to participate in vaccination programs (Benninghoff et al., 2020; Seale et al., 2015; Spagnoletti et al., 2019). Moreover, *geographic barriers* and *politics* have been reported as challenges toward vaccination program participation. Herliana and Douiri (2017) also affirmed that low vaccination coverage in Maluku and Papua is caused by the low socio-economic status of citizens, geographical difficulties in reaching health-care facility, and political conflicts that result in the lack of motivation to obtain vaccination.

Vaccine and vaccination-specific issues

This review found that there are different barriers between the two main groups: mandatory immunization (a set of immunization programs regulated by the government and is free for citizens, for example, children complete immunization) and supplementary immunization (immunization that is not regulated and encouraged by the government and is subsidized but not completely free, for example, HPV vaccine and rotavirus vaccine). However, both of these two groups show the importance of the *role of health-care professionals*. Several publications had consistently showed that mothers who delivered their baby in health facilities had higher chances of completing basic immunization for their children compared to those who delivered at home (Efendi et al., 2020; Holipah et al., 2018, 2018; Larson et al., 2016; Widayanti et al., 2020). Interaction between parents and health-care workers during antenatal and postnatal care will build a positive perception regarding health-care capabilities and encourage them to participate in recommended health programs (Benninghoff et al., 2020; Wallace et al., 2019; Widayanti et al., 2020; Yufika et al., 2020; Yunitasari et al., 2018).

The constant barrier found in mandatory immunization programs is *vaccination schedule*. Missed opportunities happen for three reasons: the child vaccination schedule is not align with the program schedule, the child is sick during the program, and the concern of the short gap in-between vaccines (Widayanti et al., 2020). Moreover, the challenges in supplementary immunization are *cost*, *risk/benefit (scientific)*, and the *reliability of vaccination supply*. Most people find that the cost of supplementary vaccination, even after being subsidized by the government, is too expensive (Harapan et al., 2017; Harapan et al., 2016; Kristina et al., 2020; Padmawati et al., 2019, 2019; Seale et al., 2015). Some studies have also asserted that the cost that their participants will pay for the vaccine is far under the real cost in the market (Spagnoletti et al., 2019). The *risk/benefit (scientific)* barrier was found in studies on new vaccines, such as Ebola, Zika, Dengue, and Rotavirus vaccines. These

studies have argued that their main consideration to take these vaccines is their ability to fully protect them from diseases with minimum side effects. Studies by Padmawati et al. (2019) and Widayanti et al. (2020) on rotavirus vaccination verified that their participants found that if the disease can be prevented by following common health protocols, then they see that there is no urgency of taking the vaccine. Vaccines listed as supplementary immunization can only be found in certain health facilities unlike vaccines in mandatory immunization that are available in every health facility; thus, finding them requires extra efforts (Widayanti et al., 2020).

4. Discussion

This review found that *beliefs, attitudes, and motivation around health and prevention, social-economics, the role of health-care workers, and cost* are the most consistent barriers that have significant effects toward vaccination behavior in Indonesia. Based on the analysis above, these determinants affect the awareness of vaccine urgency and build the motivation of individuals to participate in preventive behavior; therefore, experience on attaining health care is crucial. Nonetheless, the chance to access health care is mainly determined by socio-economic status due to the consideration of cost (Efendi et al., 2020; Harapan et al., 2016; Holipah et al., 2018; Seale et al., 2015), motivation (Fasli et al., 2017; Gao et al., 2020), and awareness (Harapan et al., 2016; Lienaningrum & Kristina, 2020) to utilize the facility. This finding elucidates to improve vaccination coverage; the government must expand its program beyond health-care centers and focus to make health accessible regardless of the socio-economic situation.

Other determinants that are commonly mentioned are *religion/cultural/gender* and *knowledge and awareness*. Although several publications have stated that these determinants have significant effects on vaccination behavior, there are also publications that have reported otherwise. The inconsistency found in the significance of *religion/cultural/gender* can be explained as the effect of unique contextual factors in every region in Indonesia. For instance, a study by Widayanti et al. (2020) corroborated that religious belief is a significant factor on evaluating vaccination decisions in West Sumatra but not in East Nusa Tenggara. These two provinces have distinct cultural uptake regarding religions. West Sumatra is a province with Muslim majority and known to uphold Islamic teaching as a social norm; therefore, the *haram* barrier regarding vaccine is often found. This situation is different in East Nusa Tenggara with Christian majority, where there is no report regarding religious barriers on vaccine behavior, which is the reason for why a vaccine behavior study must be conducted in every region in

Indonesia to design vaccination campaigns based on the uniqueness of the region.

Knowledge and awareness are mentioned in most of the publications mentioned in this review. Publications that found this determinant significant have argued that the awareness of the availability (Efendi et al., 2020; Gao et al., 2020; Wallace et al., 2019), effectiveness, and the importance of vaccine (Benninghoff et al., 2020; Endarti et al., 2018; Fasli et al., 2017; Harapan et al., 2017; Harapan et al., 2017; Harapan et al., 2016; Harapan et al., 2019; Kristina et al., 2020; Padmawati et al., 2019; Spagnoletti et al., 2019; Yunitasari et al., 2018) are able to impact vaccine intention. Notwithstanding, just by having *knowledge and awareness* is not enough to improve vaccination behavior (Harapan et al., 2016), and the lack of it does not mean poor vaccine attitude either (Widayanti et al., 2020). The awareness of vaccine becomes significant if trust in health-care providers exists and if an individual already has a good attitude toward health and health programs. It also encourages them to integrate the information and participate in vaccination programs (Benninghoff et al., 2020; Efendi et al., 2020; Endarti et al., 2018; Fasli et al., 2017; Harapan et al., 2017; Harapan et al., 2016; Harapan, Anwar, Setiawan, et al., 2016; Holipah et al., 2018; Lienaningrum & Kristina, 2020; Yufika et al., 2020).

This review also has several limitations. Most of the regional studies included in this review were conducted in Aceh and Yogyakarta, and only 6 out of 24 publications were not a national-scale study or conducted in these two provinces. All studies conducted in Aceh that were included in this review were conducted by Universitas Syiah Kuala Banda Aceh, and the one that was conducted in Yogyakarta was performed by Universitas Gajah Mada Yogyakarta. This study was not able to capture the effect of contextual culture and social dynamics on the significance of the relationship between barriers and vaccination behaviors. With the lack of geographical data, the result of this study cannot speculate the nature of vaccination behavior and its barrier in provinces in Kalimantan, Sulawesi, and Papua islands. Thus, studies conducted in these regions are highly beneficial for the further understanding of vaccination behavior in Indonesia.

This study was able to include four qualitative studies only. Qualitative research is important to acquire insights into the antecedent of the relationship between barriers and vaccination behaviors and the process of vaccine decision making. Our study is still unable to provide further investigation of those areas.

5. Conclusion

Our study found that the barriers of vaccine hesitancy in Indonesia revolve around socio-economic condition, religious and cultural beliefs, the lack of ability to understand and acquire vaccine information due low levels of education, and trust in health-care workers. Thus, to increase vaccination coverage, educational programs that drive the importance of adapting health prevention behavior and health-care programs for families are necessary to improve the understanding and awareness of vaccine and vaccine preventable diseases. Nevertheless, with diverse geographics, socio-economics, and politics in Indonesia, each region might need something that is more or other than educational program. Therefore, further studies should be conducted to investigate region-level barriers to form strategies that can meet their specific needs.

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