

RESEARCH ARTICLE

Immunization Coverage and Associated Factors in Aceh Indonesia

Iin Nurlinawati, Mukhlissul Faatih

National Research and Innovation Agency, Jakarta, Indonesia

Abstract

Few studies have looked into why global immunization coverage has plummeted, particularly in Indonesia. The Indonesian government had a childhood immunization program including in Aceh. This study aimed to learn more about immunization coverage in Aceh, Indonesia, and the factors that influence it. This cross-sectional study relied on data from the National Basic Health Surveys conducted in 2013 and 2018. The children in this study ranged in age from 12 to 23. The coverage of vaccines in Aceh fell by 50% between 2013 and 2018. (38.3% to 19.5%, the lowest in Indonesia). The number of children in Aceh who did not receive immunizations increased by 100%. (19.8% to 40.9%). While the percentage of children who have not received their complete vaccination has decreased by 5% (41.9% to 39.56%). The characteristics of the head of household with unvaccinated children were largely poor education, and the majority came from the poorest quartile of wealth. The most common reasons for refusal were families' refusal to allow immunization (43%) and fear of post-immunization fever (32%). Unvaccinated children come from low-income, low-educated families who refuse immunization.

Keywords: Immunizations, National Basic Health Survey

Introduction

Comprehensive basic immunization for infants aged 0–12 months can prevent roughly 3 million children from dying each year from vaccine-preventable infectious illnesses. Immunization can prevent about one-third of all fatalities in children under five. Vaccines were the most cost-efficient and effective technique for reducing disease, paralysis, and death caused by infectious illnesses. In 2012, the World Health Organization (WHO) suggested that the global action plan for 2011–2020 include a requirement that national immunization coverage achieves at least 90%. A district/city must have a vaccination coverage of at least 80%. The Indonesian government had a childhood immunization program. According to the Ministry of Health, tuberculosis, diphtheria, pertussis, measles, polio, tetanus, and hepatitis B are just a few diseases that can be averted by immunization. BCG immunization was given to babies under three months; polio immunization was given to newborns, with the following three doses given in four weeks at the earliest. DPPT-BH immunization was given to babies aged two months, three months, and four months with a minimum interval of four weeks. Measles immunization was given to babies aged two months, three months, and four months with a

minimum interval of four weeks, and the measles vaccine was given to babies as soon as they were nine months old.¹

Few researchers have addressed the fact that global immunization coverage has declined dramatically.^{2–5} Simultaneously, public concern about perceived vaccine safety issues has grown. This increased level of concern frequently leads to an increase in parents refusing vaccines for their children. There were various reasons why parents refused, postponed, or were hesitant to vaccinate their children.³ Reduced parental immunization coverage has been linked to an increased risk of vaccine-preventable disease in children and an increased community risk of contagious disease outbreaks.⁵

Indonesia's National Institute of Health Research and Development (NIHRD) has conducted community-based health research known as Basic Health Research (*Riset Kesehatan Dasar/Riskesdas*). With a large number of samples, *Riskesdas* data represented the public health situation at the national, provincial, and city/district levels. It was founded in 2007 to collect basic data and health indicators that depict health conditions. Data for *Riskesdas* 2013 and 2018 were collected at the household and individual levels. The data covers a wide range of topics, one of which was

Received: 23 November 2021; Revised: 17 April 2022; Accepted: 30 April 2022; Published: 30 April 2022

Correspondence: Mukhlissul Faatih, M.Biotek. National Research and Innovation Agency. Jln. M.H. Thamrin No. 8, Central Jakarta 10340, Special Capital Region of Jakarta, Indonesia. E-mail: mukhlissulfaatih@gmail.com

immunization coverage.

Aceh was one of Indonesia's provinces designated as a special territory. There was a severe lack of research on declining immunization coverage in Aceh. As a result, it was critical to monitor immunization coverage and understand its associations. This study aimed to provide information on immunization coverage in Aceh and the factors that influence it in Aceh, Indonesia.

Methods

This study was a secondary data analysis of the Ministry of Health's Basic Health Research (*Riskesdas*), conducted in 2013 and 2018 with a cross-sectional study design. *Riskesdas* is community-based research that used household and member-of-household samples to represent the population in each of the 34 provinces' districts or cities. Trained enumerators or field officers used structured and standardized questionnaires to collect data. This study's population included all of the children and their parents. The study's inclusion criteria were children aged 12 to 23 months. Children who did not have immunization records or whose immunization status could not be determined were excluded from the study (missing). Because of incomplete/blank records in the Weighing Control Card/the Health of Mother and Child Book, parents or family members may forget whether their children have been immunized or may be unable to accept certain types of immunization.

Immunization data were gathered from the mother or other household members aware of this information. Data supported by immunization records from the Health of Mother and Child Book (*Buku Kesehatan Ibu dan Anak*, KIA), records from the Weighing Control Card (*Kartu Menuju Sehat*, KMS), or records from other child health book records. A child was considered to have "complete" basic immunization if he or she has received the following immunizations: one HB-o immunization, one BCG immunization, three DPT-HB/DPT-HB-HiB immunizations, four polio immunizations or three IPV immunizations, and one measles immunization, as recommended by the Indonesian government.¹ As a result, when a child failed to receive one of the vaccines recommended by the Indonesian government, the child was declared to have "incomplete" immunization. If the children had no immunizations, "no immunization" was

declared. Data immunization is being analyzed with SPSS. For several reasons, the analysis was limited to children aged 12–23 months: (1) the results of the analysis may be close to the estimate of "validity immunization"; and (2) potential bias, as the memories of the mothers interviewed at the time of data collection were less than those of the age groups above.

This study has received ethics approval from the Health Research Ethics Committee, National Institute of Health Research and Development, number LB.02.01/2/KE.024/2018..

Results

The data analyzed in 2013 was 15,727, while there were 18,165 respondents in 2018. Aceh's immunization coverage in 2013 was 38.3 % lower in 2018, falling to 19.5 %, making Aceh the province with the most inadequate immunization coverage in 2018. Between 2013 and 2018, the number of children in Aceh who did not receive vaccines increased significantly, from 19.8 % to 40.9%. While the percentage of people who have not received all of their vaccines has decreased from 41.9 % in 2013 to 39.56 % in 2018.⁶⁻⁹

Almost all districts/cities in Aceh experienced a decline in immunization coverage. Only three of the twenty-three districts have increased immunization coverage. The characteristics of the head of a household with unimmunized children were mainly from the low education group: mostly elementary school graduates (2013 data) in Table 1, an elementary school dropout (2018 data) in Table 2. The majority came from low-income families with occupations such as farmers/laborers/fishermen. The main reasons for refusing immunization were family refusal (43%), fear of post-immunization fever (32%), being busy/troublesome (15%), children being frequently sick (8.3%), immunization points being too far away (6%) and immunization points were unknown (2.1%). The lower the education level, the more households refuse to immunize their children. In contrast, the higher the level of parental education, the higher the level of immunization coverage.

Discussion

In 2018, Indonesian immunization coverage fell by 1.3% to 57.9%,^{7,9} falling short of the WHO-mandated national target of 90% coverage. Some Indonesian provinces had decreased

Table 1 Proportion of Complete Basic Immunizations for Children 12–23 Months by Respondent Characteristics, Aceh 2013

Characteristics	Basic Immunization		
	Complete	Not Complete	No Immunization
Sex			
Male	39.4	40	20.6
Female	37.3	43.9	18.8
Education			
Never attending school	35.7	53.8	10.5
Not graduate elementary school	31.4	45.9	22.7
Graduate elementary school	26.7	41.6	31.7
Graduate junior high school	37	49.2	13.8
Graduate high school	42.2	41.1	16.8
Graduate diploma/bachelor	61.7	25.1	13.3
Professions			
Unemployed	33.6	49.4	17
Employees	57.8	30.5	11.7
Entrepreneurs	31.9	49.1	19
Farmers/laborer/fisherman	35.2	41.7	23.2
Others	51.5	29.2	19.3
Residence			
Urban	42.8	38.6	18.6
Rural	36.5	43.3	20.2
Wealth quantile index			
Lowest	21.7	36.9	41.4
Middle-low	35.6	48.6	15.8
Middle	32.7	52.6	14.7
Middle-high	52.6	34.8	12.6
Highest	50.6	35.5	13.9

Note: *Riskesdas* 2013

immunization coverage, with Aceh becoming the province with the lowest coverage (19.5%).⁹ Lack of immunization for children or parental refusal of vaccines was becoming increasingly common in Aceh. According to Ministry of Health regulations, more children were not immunized, and fewer children received complete immunizations in recent years. Almost all districts/cities in Aceh had refusals to vaccinate their children. Previous research has found that underimmunization increased in children born between 2000 and 2011, while another study discovered that lack of immunization increased in children born between 2004 and 2008.⁵ According to the Romanian National Centre for Infectious Disease Control and Prevention (CNSCBT), immunization coverage has decreased from 95% in 2008 to 80% in 2013. According to the CNSCBT, refusal of immunizations increased from 22.4% to 33.2% in 2009 and 2011, respectively, with the most significant increase occurring in urban areas.¹⁰

According to *Riskesdas* 2013, most parents

who oppose immunizations have a low level of education, which denotes elementary school graduates and below. Meanwhile, parents who provided complete immunizations to their children came from a higher level of education, which was a graduated junior high school or higher (Table 1). In 2018, more parents with higher education refused to give their children vaccines or gave them incomplete immunizations (Table 2). The parents' professional backgrounds also determined this. In 2018, more parents were working as employees who refused the vaccine. The current findings contradict a previous study conducted in Aceh in 2013 by Thaib et al.,¹¹ who discovered that immunization coverage was relatively high in Aceh, and there was no significant relationship between father education and employment. Still, there was a relationship between maternal education and immunization coverage.¹¹ Another study found that mothers with less education were more likely to give their children incomplete immunizations.¹² Another

Table 2 Proportion of Complete Basic Immunizations for Children 12–23 Months by Respondent Characteristics, Aceh 2018

Characteristics	Basic Immunization			n
	Complete	Not Complete	No Immunization	
Sex				
Male	18.97	40.81	40.2	444
Female	20.11	38.31	41.6	442
Education				
Never attending school	23.05	29.82	47.1	17
Not graduate elementary school	8.89	32.34	58.8	101
Graduate elementary school	16.26	40.38	43.4	179
Graduate junior high school	20.47	38.63	40.9	175
Graduate high school	22.36	41.43	36.2	299
Graduate diploma/bachelor	24.74	42.68	32.6	115
Professions				
Unemployed	21.52	33.6	44.9	70
Government employees	28.66	44.72	26.6	69
Employees	35.9	45.1	19	44
Entrepreneurs	16.04	40.39	43.6	226
Farmers/laborer	18.89	38.15	43	320
Fisherman	25.34	27.8	46.9	40
Drivers/maids	13.28	46.38	40.3	66
Others	12.94	41.68	45.4	51
Residence				
Urban	17.14	42.53	40.3	270
Rural	20.59	38.26	41.1	616

Note: *Riskesdas* 2013

study found that the mother's age, educational level, marital status, occupation, and place of residence had no significant relationship with complete immunization coverage in Central Ethiopia in 2011.¹³ It was necessary to educate parents and improve the knowledge of the health workforce. To change parents' attitudes toward immunization, it is essential to educate them about the importance of vaccination in preventing contagious diseases in children.

Not only did a health worker provide information about complete immunizations, but it also required a unique approach to reduce vaccine hesitancy among parents. According to William's¹⁴ research, a solution would be to categorize parents based on their vaccine beliefs, adjust communication styles based on their categories, and finally guide parents to discuss their motivations for vaccination while avoiding persuasive language and arguments. In addition to the alleged discussion style, paramedics can use a participatory discussion style strategy. Another strategy was to use storytelling methods instead of scientific information about the importance of vaccines, as was customary. This method of

storytelling was similar to the system employed by the well-known anti-vaccine website.¹⁴ In Aceh, it was also necessary to have an approach from community leaders and respected religious leaders and use a discussion approach. Other research in Aceh found that maternal knowledge, the role of community leaders/religious leaders, and mother participation all affected the completeness of immunizations in children.¹⁵

Aceh had the most significant decline in immunization coverage compared to other provinces in Indonesia. The main reasons for refusing immunization were family refusal and fear of post-immunization fever. According to Marlina et al.,¹⁵ mothers who have supporting families have more complete immunization coverage than mothers who do not have supporting families. The chi-square test results yielded a p value of 0.03, indicating a significant relationship between family support and infant immunization completeness.¹⁵ Recently, anti-immunization sentiment has grown in Indonesia, particularly in Aceh, an Islamic-ruled province. The most influential news was that the main component of the vaccine maker's product was

not permissible or haram for Muslim families.¹⁶ A positive perception of the utility of immunization will lead to the widespread acceptance of vaccines. It occurs in some Muslim countries worldwide, including Afghanistan, Malaysia, and Pakistan.² This finding was consistent with the results of Harapan et al.¹⁷ in Aceh, who found that the main reason for receiving the vaccine was complete disease protection (25.2%), and the vaccine must be halal or not contain unclean ingredients (22.5%). In Muslim countries, educated parents, were becoming more hesitant and unwilling to have their children immunized. It was critical to understand why parents hesitate or refuse to vaccinate their children to provide appropriate solutions. It was forbidden under Islamic law to use drugs or ingredients containing illegal substances, such as pork products and derivatives from pigs. They refused to give a vaccine to their children. There is currently no halal certification for vaccines worldwide. Parents in Aceh were hesitant to immunize their children due to uncertainty about the halal status of basic immunization.¹⁵ Vaccine refusal was not limited to Muslim countries; according to a separate study conducted in the United States, religious reasons were the most common reason parents refuse immunizations for their children. Other factors include safety concerns, personal beliefs, and a desire for more information about the vaccine.³ There was a misunderstanding among parents, making it difficult for them to provide complete immunization to their children. They would instead risk contracting a contagious disease than receiving a vaccination because they believe that immunity from disease is superior to the exemption from vaccination. Furthermore, there was evidence from the media, the internet, and anti-vaccine groups that some vaccines can cause permanent disability in children, such as the MMR vaccine causing autism and hepatitis B causing chronic fatigue syndrome or multiple sclerosis. As a result, they were concerned about the vaccine's safety.¹⁸

This study had some limitations because some factors could not be quantified. Because of the limited data from the Indonesian Basic Health Research, only a few variables could be elaborated on. In addition, there is potential bias because the memories of the mothers or other family members interviewed about immunization history may have faded at the time of data collection if there is no data in the KIA book or KMS. Despite these limitations, policymakers needed to

know what occurred in Aceh. Authorities in the Philippines declared a highly contagious measles virus outbreak in January 2019 (1,813 measles cases and 26 deaths). There has been a 74% increase since 2018. Unvaccinated children in the Philippines have risen to 2.4 million due to parents' reluctance to immunize their children at government health centers.^{19,20} Learning from the Philippines, Indonesia must be concerned about widespread anti-immunization resistance in Aceh and other provinces. It was feared that an infectious disease outbreak would occur in Indonesia if immunization refusal continued and were not addressed correctly. In this case, the Ministry of Health, the government must act immediately to ensure that the refusal to provide basic immunization to children did not cause future harm.

Conclusions

From 2013 to 2018, complete immunization coverage in Aceh tended to decline and became the lowest immunization coverage In 2018. In 2013, the head of a household with children who were not immunized mainly had low education. Meanwhile, in 2018 were primarily from higher education. They refused immunization because their families did not permit it, and they were afraid of post-immunization fever.

Conflict of Interest

All author declares that there was no conflict of interest in this article.

Acknowledgment

We are grateful to the Indonesia Ministry of Health's National Institute of Health Research and Development (NIHRD) for allowing us to use their valuable work on Indonesia Basic Health Research.

References

1. Peraturan Menteri Kesehatan Republik Indonesia Nomor 12 Tahun 2017 tentang Penyelenggaraan Imunisasi.
2. Ahmed A, Lee K, Bukhsh A, Al-Worafi Y, Sarker MMR, Ming L, et al. Outbreak of vaccine-preventable diseases in Muslim majority countries. *J Infect Public Health*. 2018;11(2):153–5.

3. McKee C, Bohannon K. Exploring the reasons behind parental refusal of vaccines. *J Pediatr Pharmacol Ther.* 2016;21(2):104–9.
4. Smith TC. Vaccine rejection and hesitancy: a review and call to action. *Open Forum Infect Dis.* 2017;4(3):ofx146.
5. Lieu TA, Ray GT, Klein NP, Chung C, Kulldorff M. Geographic clusters in underimmunization and vaccine refusal. *Pediatrics.* 2015;135(2):280–9.
6. National Institute of Health Research and Development, Ministry of Health of Republic of Indonesia. Basic health research (Riskesdas) 2013 [Internet]. Jakarta: National Institute of Health Research and Development, Ministry of Health of Republic of Indonesia; 2013 [cited 2021 December 15]. Available from: <https://labmandat.litbang.kemkes.go.id/ccount/click.php?id=10>.
7. Kementerian Kesehatan Republik Indonesia. Riskesdas Provinsi Aceh 2013. Jakarta: Lembaga Penerbitan Badan Penelitian dan Pengembangan Kesehatan, Kementerian Kesehatan Republik Indonesia; 2013.
8. Badan Penelitian dan Pengembangan Kesehatan, Kementerian Kesehatan Republik Indonesia. Laporan Nasional Riskesdas 2018. Jakarta: Lembaga Penerbit Badan Penelitian dan Pengembangan Kesehatan; 2019.
9. Badan Penelitian dan Pengembangan Kesehatan, Kementerian Kesehatan Republik Indonesia. Laporan Provinsi Aceh Riskesdas 2018. Jakarta: Lembaga Penerbit Badan Penelitian dan Pengembangan Kesehatan; 2019.
10. Barbacariu CL. Parents' refusal to vaccinate their children: an increasing social phenomenon which threatens public health. *Procedia Soc Behav Sci.* 2014;149:84–91.
11. Thaib TM, Darussalam D, Yusuf S, Andid R. Cakupan imunisasi dasar anak usia 1–5 tahun dan beberapa faktor yang berhubungan di Poliklinik Anak Rumah Sakit Ibu dan Anak (RSIA) Banda Aceh. *Sari Pediatri.* 2013;14(5):283–7.
12. Suryawati I, Bakhtiar, Abdullah A. Cakupan imunisasi dasar anak ditinjau dari pendekatan health belief model. *JIK.* 2016;4(1):114–25.
13. Etana B, Deressa W. Factors associated with complete immunization coverage in children aged 12–23 months in Ambo Woreda, Central Ethiopia. *BMC Public Health.* 2012;12:566.
14. Williams SE. What are the factors that contribute to parental vaccine-hesitancy and what can we do about it? *Hum Vaccin Immunother.* 2014;10(9):2584–96.
15. Marlina, Usman S, Marzuki. Faktor kelengkapan imunisasi dasar pada bayi di Puskesmas Sawang Kabupaten Aceh Utara. *Jukema.* 2017;3(1):212–8.
16. Yufika A, Wagner AL, Nawawi Y, Wahyuniati N, Anwar S, Yusri F, et al. Parents' hesitancy towards vaccination in Indonesia: a cross-sectional study in Indonesia. *Vaccine.* 2020;38(11):2592–9.
17. Harapan H, Anwar S, Setiawan AM, Sasmono RT; Aceh Dengue Study. Dengue vaccine acceptance and associated factors in Indonesia: a community-based cross-sectional survey in Aceh. *Vaccine.* 2016;34(32):3670–5.
18. Esposito S, Principi N, Cornaglia G; ESCMID Vaccine Study Group (EVASG). Barriers to the vaccination of children and adolescents and possible solutions. *Clin Microbiol Infect.* 2014;20(Suppl 5):25–31.
19. Dyer O. Philippines measles outbreak is deadliest yet as vaccine scepticism spurs disease comeback. *BMJ.* 2019;364:l739.
20. Ochani RK, Yasmin F, Tariq A, Shaikh A. Philippines hit by deadly measles outbreak – a wakeup call? *Infez Med.* 2019;27(3):353–4.