The Relationship of Perceived Benefit, Perceived Barrier, and Knowledge with Vaccine Hesitancy among Anti- and Pro-Vaccine Community

Aisyah Nur Izzati[1], Retno Indarwati[2], Makhfudli[2]

[1]Student at Master of Nursing, Faculty of Nursing, [2]Lecture, Department of Mental and Community, Faculty of Nursing, Universitas Airlangga, Surabaya, Indonesia

Abstract

Introduction: The phenomenon of basic vaccine hesitancy in parents is the biggest challenge faced by health workers in the global era currently. This study aimed to analyze the relationship between perceived benefits, perceived barriers, and knowledge about vaccines towards vaccine hesitancy among anti and pro-vaccine communities on social media Facebook.

Methods: This study used a cross-sectional design. The sample was 150 members of the anti-vaccine community and 234 members of the pro-vaccine community on social media Facebook using a purposive sampling technique. Data were collected using questionnaire namely; HBM (health belief model) questionnaire which was translated and modified, and Vaccine Hesitancy Scale (VHS) questionnaire. The independent variables in this study were perceived benefits of vaccines, perceived barriers to vaccines, knowledge about vaccines. The dependent variable was vaccine hesitancy. Spearman rho analysis was used to measure the relationship between the dependent and independent variables.

Results: The results of the Spearman rho analysis showed that the perceived benefits of vaccines (p=0.363 of anti-vaccine, p=0.702 of pro-vaccine), the perceived barriers to vaccines (p=0.410 of anti-vaccine, p=0.341 of pro-vaccine), and knowledge about vaccines (p=0.413 of anti-vaccine, p=0.192 of pro-vaccine) was related to vaccine hesitancy in parents.

Discussion: This study results indicated that the perceived benefits of vaccines, perceived barriers to vaccines, and knowledge about vaccines are related to vaccine hesitancy in parents. The implications of the study are essential information for health workers to determine the right and wise strategy in responding to the increasing vaccine hesitancy in public so that basic vaccine coverage will increase.

Keywords: *anti-vaccine, vaccine hesitancy, health belief model*

Introduction

The number of countries reporting vaccine hesitancy in parents has continued to increase since 2017.[1] This controversial issue regarding vaccines is the biggest challenge for the implementation of vaccines in Indonesia.[2] It influences the stagnation of complete basic vaccine coverage. Basic Health Research of the Indonesian Ministry of Health showed that status of complete basic vaccination coverage in children aged 12-23 months had decreased from 59.2% in 2013 to 57.9% in 2018. Vaccination coverage must be maintained high and evenly distributed throughout the region to avoid the occurrence of extraordinary epidemic. Therefore, the government and health workers need to solve this

Corresponding Author:
Dr. Retno Indarwati S. Kp., M.Kes.
Department of Mental and Community, Faculty of Nursing, Universitas Airlangga, Campus C, Mulyorejo, Surabaya, Indonesia, Postal address: 60112,
phone: (031) 5913257, 5913754, fax: (031) 5913257,
E-mail: retno-i@fkp.unair.ac.id

problem immediately.[3]

World Health Organization stated that the anti-vaccine community was one of the ten most significant threats to global health in 2019 since this phenomenon could potentially increase the risk of an epidemic of a disease.[4] The determinant of vaccine hesitancy among parents needs to be investigated further. A study conducted by Brunson stated that vaccine hesitancy and acceptance is a complex and multi-faceted issue so that the way health workers understand them also cannot be universally equalized.[5]

Pro-contra debate of vaccines in Indonesia has spread up again following the emergence of diverse arguments from society ranging from influencers, artists, and even health workers who are broadly spread through social media.[6] Pro-vaccine community consider vaccines are essential to prevent infectious diseases for their children. On the contrary, anti-vaccine community consider vaccines contain dangerous substances that can harm their children. Community members on social media not only share textual context but also images to emphasize the message to other members.[5] The debate between the anti- and pro-vaccine communities on the digital platform about vaccine controversy may decrease public trust in the government and healthcare providers in vaccination program.[7]

Vaccine hesitancy is one of the major challenges in achieving complete basic vaccine coverage. Some parents who accept the administration of vaccines are still worried.[8] Schalkwyk [9] in his study stated that social media is now used as a media to spread dangerous information about vaccines to strengthen the hesitancy of parents in giving vaccines to their children. Social media was chosen because of the increase people's dependency online media to obtain accurate health information.[10] The type of social media most used to spread anti-vaccine propaganda is the Facebook Group.[11]

Indonesia is the fourth highest user of social media Facebook in the world with 130 million active users per month (Hootsuite and We Are Social, 2018).[12] Study results of the Ipsos-Center for International Governance Innovation (CIGI) showed that 65 percent of internet and social media users in Indonesia are susceptible to misinformation provided in cyberspace without prior confirmation. Thus, negative content including hoaxes about vaccines are easy to widespread in community. The current problems in the community obviously cause for concern for all health workers. Various studies on the pros and cons of vaccination have been broadly studied in several other countries, but still very limited in Indonesia. This study aimed to analyze basic vaccine hesitancy in the anti- and pro-vaccine communities on social media Facebook.

Material and Methods

This study used a cross-sectional design.The study was conducted in June-August 2020 by distributing questionnaires to respondents through Google form.The population in this study was mothers of the members of the anti-vaccine and pro-vaccine communities on social media Facebook. The number of the anti-vaccine community members on Facebook was 2,900 people, while the pro-vaccine community members on social media Facebook was 119,000 people. A total of 384 respondents (150 members of the anti-vaccine and 234 members of the pro-vaccine communities) were taken using purposive sampling technique. The inclusion criteria were mothers aged 18-40 years, are active real accounts, and are willing to be respondent. The independent variables in this study were perceived benefits of vaccines, perceived barriers to vaccines, and knowledge about vaccines.The dependent variable in this study was the basic vaccine hesitancy.The research instruments used in this study were adapted from the HBM questionnaire from Hwang et al. 2017, which was translated and modified. The vaccine hesitancy questionnaire was adapted from the Vaccine Hesitancy Scale (VHS) questionnaire by Saphiro G.K. et al. 2018

Quantitative data analysis in this study was performed using the Spearman Rho statistical test.

Results

Most of the anti- and pro-vaccine respondents

were 26-35 years old. Almost all of the religion of the respondents was Muslim, while only a few people were Christians and Catholics on the anti-vaccine group. The religions of pro-vaccine respondents were more diverse, ranging from Islam, Christianity, Catholicism, Hinduism, and Buddhism. The ethnicity of most of the respondents was Javanese, while the rest were Madurese, Batak, Chinese, Osing, and Balinese. Most respondents lived in urban areas, were university graduated, and almost half were high school graduated. More than 50% of the respondents were housewives, while the rest were self-employed, civil servants, and traders with most of them having income of more than 2,500,000 (Table 1).

Table 2 shows that all independent variables showed a significant relationship with basic vaccine hesitancy in the anti- and pro-vaccine communities.

Table 1. Demographic Characteristics of the Respondents (n = 384)

Demographic Characteristic	Category	Anti-vaccine		Pro-vaccine	
		N	Percentage (%)	N	Percentage (%)
Age (year)	18-25	21	14	50	21,4
	26-30	51	34	92	39,3
	31-35	47	31,3	76	32,5
	36-40	31	20,7	16	6,8
Religion	Islam	146	97,3	192	82,1
	Christian	3	2	27	11,5
	Catholic	1	0,7	11	4,7
	Hindu	0	0	3	1,3
	Buddha	0	0	1	0,4
Ethnic	Javanese	133	88,7	177	75,6
	Madura	4	2,7	3	1,3
	Batak	6	4	28	11,9
	Chinese	3	2	13	5,6
	Osing	2	1,3	10	4,3
	Balinese	2	1,3	3	1,3
Area of residence	Urban	80	53,3	139	59,4
	Rural	70	46,7	95	40,6

***Cont.*. Table 1. Demographic Characteristics of the Respondents (n = 384)**

Level of Education	Elementary school	2	1,3	1	0,4
	Junior high school	3	2	14	6
	Senior high school	53	35,4	82	35,1
	College	92	61,3	137	58,5
Occupation	Housewife	84	56	170	72,7
	Entrepreneur	36	24	41	17,5
	Bureaucrat	21	14	20	8,5
	Merchant	9	6	3	1,3
Level of income	<2.500.000	70	46,7	108	46,2
	>2.500.000	80	53,3	126	53,8

Table 2. Test of univariate analysis in the anti and pro-vaccine communities

Variables	**Category**	**Anti-vaccine**		**Pro-vaccine**	
		n	**%**	**N**	**%**
Perceived benefit	Low	16	10,7	-	-
	Moderate	80	53,3	10	4,3
	High	54	36,0	224	95,7
	Spearman Rho	p = 0,000	r = 0,363	p = 0,000	r = 0,702
Percived barrier	Low	15	10,0	132	56,4
	Moderate	99	66,0	100	42,7
	High	36	24,0	2	0,9
	Spearman Rho	p = 0,000	r = 0,410	p = 0,000	r = 0,341
Vaccine's knowledge	Poor	18	12,0	4	1,7
	Enough	43	28,7	29	12,4
	Good	89	59,3	201	85,9
	Spearman Rho	p = 0,000	r = 0,413	p = 0,003	r = 0,192

Almost all pro-vaccine respondents had a high level of perceived benefits (95.7%). Meanwhile, for the anti-vaccine group, more than half of the respondents had a moderate level of perceived benefits (53.3%), 36% had a high level of perceived benefits, and 10.7% of respondents had a low level of perceived benefits. More than half of the anti-vaccine respondents had a moderate level of perceived barriers (66%), 24% were at a high level, and only 10% were at a low level. Meanwhile, in the pro-vaccine group, more than half of the respondents had a low level of perceived barriers (56.4%), while only 2 respondents had a high level of perceived barriers. More than half of the anti-vaccine respondents had good knowledge (59.3%), 28.7% was sufficient, and 12% had a lack of knowledge. Meanwhile, most of the pro-vaccine respondents had good knowledge about vaccines (85.9%) and only 4 respondents had a poor knowledge (1.7%). The results of statistical tests using Spearman Rho showed that perceived benefits, perceived barriers, and knowledge about vaccines had significant relationships with basic vaccine hesitancy.

Discussion

The results of this study indicated that the perceived benefits of vaccines are related to basic vaccine hesitancy in parents. Gowda[13] stated that parents' perceived benefits of vaccination are a specific factor that affects them in considering decisions about vaccination.

The results of a systematic review conducted by Forster[14] found that there are a different perspectives about the benefits of vaccination between people who refuse and accept vaccines. Anti-vaccines community doubt the benefit of vaccines and worry over their children safety. This study results were in line with the previous study, which showed that most of the anti-vaccine respondents in this study confirmed that they disapproved that vaccination was the same as maintaining the health of the surrounding community. They also disagreed with the arguments that all basic vaccines were given by the government is effective and beneficial when there are still incidents that may sacrifice a handful of children.

Karafafillakis[15] emphasized that as of today, scientists tended to discuss the importance of maintaining Vaccine-Preventable Disease (VPD) risks in a population, although most people are more interested in vaccines risks and side effects that might occur to their children. Analyzing the perceived benefits of vaccines felt by each parent seems tricky because it is easier for a person to overestimate risk by comparing its underestimated benefits. Parents are more interested in reading other people's narratives or stories related to the negative effects of vaccines rather than considering the vaccines benefits at the population level.

The health workers must deliver information accurately regarding the risks and benefits of vaccines to the community.[16] Health workers must be honest in explaining the possible side effects of vaccines because providing information focusing on the benefits of vaccination only is ineffective in influencing parents' intention to vaccination program.[17] Health workers should be encouraged to perform effective and open communication, such as by holding discussions while respecting the thoughts and perspectives of parents refusing vaccines.

This study also showed that perceived barriers to vaccination were related to basic vaccine hesitancy in parents. This result is in line with the previous research conducted by William [18], which stated that parents who hesitate to vaccination had high perceived barriers to vaccines, one of which was a sense of concern about the safety of vaccines. The skepticism regarding to the vaccines safety is a complex issue that is being globalized today.[19] The belief that giving vaccines into the children's body will lead to various long-term dangerous side effects and even death is the essential reason for parents to refuse to vaccinate their children.[20]

Anderson [21]added that other barriers that can trigger vaccine hesitancy include confusing vaccine schedules, long queues, and inconvenience in the vaccine process. These various barriers indirectly contribute to the low rate of basic vaccine coverage and delays in the schedule for providing vaccination to children. The previous

study conducted in four countries by Olorunsaiye *et al* [22] showed that the waiting time period in health facilities becomes a barrier for parents to give vaccines. Some parents prefer to stay at home and carry out other essential work rather than have to queue for a long time at health services. This issue may often be underestimated but needs to be addressed immediately to shorten the waiting time for parents who intend to give vaccines in health services

Another barrier experienced by almost all anti- and pro-vaccine participants was related to the depletion of vaccine stocks. Several participants complained that they had to go back home since the health services run out of vaccine stocks. Although health care worker had arranged the new scheduled, but the parents considered it was not effective. According to the statement of Panting [23] that the lack of vaccine stocks and the poor organized schedule of vaccination in health services become one of the reasons for vaccine hesitancy in parents. Overcoming vaccine hesitancy needs a particular process of detection, diagnosis, and intervention since there is no simple strategy that can overcome all the barriers felt by parents in accepting vaccines.[24] Health workers are required to collaborate with policymakers to minimize a number of barriers for parents to accept basic vaccines.[19]

The results of this study indicated that knowledge about vaccines influences basic vaccine hesitancy. It is in accordance with the previous study conducted by Facciola [25] which found that parents with low knowledge about vaccines tend to feel hesitant about vaccination. Consideration of parents' decisions regarding vaccines is context-specific and does not rely on knowledge about vaccines and information obtained only but also on attitudes, values, experiences, and emotions.[26] A study conducted by Ugezu[27] stated that the knowledge and attitudes of health workers regarding vaccines influence the decision of parents to give vaccines. Therefore, health workers need to have the good knowledge and attitude about vaccination program since they are most trusted by the parents and community in the process of making decisions about vaccines (Dybsand, Hall and Carson, 2019).[28]

Knowledge about vaccines is essential but not sufficient to change one's perception of vaccine hesitancy.[29] Providing information constantly and firmly to parents who are hesitant about vaccines can be contradictory because if someone is given continuous information that contradicts their values, they will react defensively and lead to resistance.[30] Therefore, health workers need to identify the most appropriate communication strategies to reduce these unwanted impacts. According to Shapiro [31] effective communication that is performed gradually is the main tool for health workers to disseminate the information about the vaccines needed, the timing of administration, and side effects to increase parents' acceptance of vaccines.

Conclusion

The results of this study indicated that the perceived benefits of vaccines, perceived barriers to vaccines, and knowledge of vaccines are related to basic vaccine hesitancy in parents. The implications of the results of this study are essential information for health workers to determine the right and wise strategy to respond to the increasing vaccine hesitancy of the public so that basic vaccine coverage will increase. This study was conducted to analyze the background of vaccine hesitancy in mothers who are members of the anti and pro-vaccine communities on social media. Further research is needed to explore various other factors that cause vaccine hesitancy in parents in real life.

Conflict of Interest : None

Funding This study was funded by Indonesian Ministry of Research and Technology

Ethical Clereance : This study had received research ethics approval by the Ethics Committee of the Faculty of Nursing of Airlangga University number 1837-KEPK.

References

1. Lane S, MacDonald NE, Marti M, Dumolard L. Vaccine hesitancy around the globe: a three year assessment of data from the annual WHO/UNICEF

Joint Reporting Form. Vaccine. 2018;36(26):3861-7.

2. Ministri of health RI. Immunization.2018
3. Ministri of Health RI. RISKESDAS 2018.2018
4. WHO. Ten threat to Global health.2018
5. Poland CM, Brunson EK. The need for a multi-disciplinary perspective on vaccine hesitancy and acceptance. Vaccine. 2015 Jan 3;33(2):277.
6. *Sundoro J, Sulaiman A, Purwadianto A, Wasisto B. Kampanye Anti-Vaksin oleh Seorang Dokter, Apakah Melanggar Etik?. Jurnal Etika Kedokteran Indonesia. 2018 Mar 19;2(1):1.*
7. Rapaport L 'Russian trolls fan flames in U.S. vaccine debate'.2018.
8. Nicogossian A, Ebadirad N, Zimmerman T, Kreps G, Septimus EJ. Influenza Immunization: Synthesizing and Communicating the Evidence. World Medical & Health Policy. 2010 Jul;2(2):51-84.
9. Van Schalkwyk FB. *New potentials in the communication of open science with non-scientific publics: The case of the anti-vaccination movement* (Doctoral dissertation, Stellenbosch: Stellenbosch University).2018
10. Mitra T, Counts S, Pennebaker J. Understanding anti-vaccination attitudes in social media. InProceedings of the International AAAI Conference on Web and Social Media 2016 Mar 31 (Vol. 10, No. 1).
11. Chiou L, Tucker C. Fake news and advertising on social media: A study of the anti-vaccination movement. National Bureau of Economic Research; 2018 Nov 5.
12. Hootsuite and We Are Social. Digital in 2018 : Essential Insight Into Internet, Social Media, Mobile, and E-Commerce Use Around The World. 2018
13. Gowda C, Dempsey AF. The rise (and fall?) of parental vaccine hesitancy. Human vaccines & immunotherapeutics. 2013 Aug 8;9(8):1755-62.
14. Forster AS, Rockliffe L, Chorley AJ, Marlow LA, Bedford H, Smith SG, Waller J. Ethnicity-specific factors influencing childhood immunisation decisions among Black and Asian Minority Ethnic groups in the UK: a systematic review of qualitative research. J Epidemiol Community Health. 2017 Jun 1;71(6):544-9.
15. Karafillakis E, Larson HJ. The benefit of the doubt or doubts over benefits? A systematic literature review of perceived risks of vaccines in European populations. Vaccine. 2017 Sep 5;35(37):4840-50.
16. ECDC. *Individual Decision-making and Childhood Vaccination Background : Perspectives from Medical Sociology on Vaccination Uptake*. Stockholm: European Centre for Disease Prevention and Control.2013
17. Ward PR, 'Understanding the perceived logic of care by parents : A qualitative study in Australia'. 2017 pp. 1–15.
18. Williams SE. What are the factors that contribute to parental vaccine-hesitancy and what can we do about it?. Human vaccines & immunotherapeutics. 2014 Sep 2;10(9):2584-96.
19. Ximena, A., *'Vaccine hesitancy is a global public health threat. Are we doing enough about it?'*Available at: https://www.elsevier.com/connect/vaccine-hesitancy-is-a-global-public-health-threat-are-we-doing-enough-about-it.2019 (Accessed: 16 April 2020).
20. Guzman-Holst A, DeAntonio R, Prado-Cohrs D, Juliao P. Barriers to vaccination in Latin America: A systematic literature review. Vaccine. 2020 Jan 16;38(3):470-81.
21. Anderson EL. Recommended solutions to the barriers to immunization in children and adults. Missouri medicine. 2014 Jul;111(4):344.
22. Olorunsaiye CZ, Langhamer MS, Wallace AS, Watkins ML. Missed opportunities and barriers for vaccination: a descriptive analysis of private and public health facilities in four African countries. The Pan African medical journal. 2017;27(Suppl 3).
23. Panting AJ. 'Potential factors contributing to vaccine hesitancy among parents in malaysia : an overview', dalam : *International Journal of Health Sciences and Research*, 2018 pp. 360-365
24. MacDonald NE, Butler R, Dubé E. Addressing barriers to vaccine acceptance: an overview. Human vaccines & immunotherapeutics. 2018 Jan 2;14(1):218-24.
25. Facciolà A, Visalli G, Orlando A, Bertuccio MP, Spataro P, Squeri R, Picerno I, Di Pietro A. Vaccine hesitancy: An overview on parents' opinions about vaccination and possible reasons of vaccine refusal. Journal of public health research. 2019 Mar 11;8(1).

26. Wilder-Smith AB, Qureshi K. Resurgence of measles in Europe: a systematic review on parental attitudes and beliefs of measles vaccine. Journal of epidemiology and global health. 2020 Mar;10(1):46.
27. Ugezu C. and Essajee M.,,'Exploring patients ' awareness and healthcare professionals ' knowledge and attitude to pertussis and in fl uenza vaccination during the antenatal periods in Cavan Monaghan general hospital', dalam *Human Vaccines & Immunotherapeutics*. Taylor & Francis, 14(4), 2018 pp. 978–983.
28. Dybsand L., Hall K., and Carson P, 'Immunization attitudes , opinions , and knowledge of healthcare professional students at two Midwestern universities in the United States', dalam *BMC Medical Education*. BMC Medical Education. 2019, pp. 1–9.
29. Corace K, Garber G. When knowledge is not enough: changing behavior to change vaccination results. Human vaccines & immunotherapeutics. 2014 Sep 2;10(9):2623-4.
30. Nyhan B, Reifler J. Does correcting myths about the flu vaccine work? An experimental evaluation of the effects of corrective information. Vaccine. 2015 Jan 9;33(3):459-64..
31. Shapiro GK, Tatar O, Dube E, Amsel R, Knauper B, Naz A, Perez S, Rosberger Z. The vaccine hesitancy scale: Psychometric properties and validation. Vaccine. 2018 Jan 29;36(5):660-7.