Artikel Penelitian

Knowledge and Attitude towards Disaster and Emergency Situation: A Multicentre Study

Vito Filbert Jayalie,* Beryliana Maya Anisa,* Rania Zahra,* Luther Holan Parasian,* Caren Andika Surbakti,* Nela Lutfiana,* Adrian Reynaldo Sudirman,* Lintang Sekar Sari, Indah Nur Rachmah,*** Hasna Ibadurrahmi,**** M. Sopiyudin Dahlan,***** Riyadh Firdaus******
*Indonesia Emergency Knowledge and Attitude Evaluator Team**

**Faculty of Medicine Universitas Indonesia, Central Jakarta, Indonesia, **Faculty of Medicine Universitas Andalas, Padang, Indonesia, ***Faculty of Medicine Universitas Hasanuddin, Makassar, Indonesia, ****Faculty of Medicine Universitas Pembangunan Nasional "Veteran" Jakarta, South Jakarta, Indonesia, *****Epidemiologi Indonesia, Central Jakarta, Indonesia, ******Department of Anesthesiology and Intensive Care Cipto Mangunkusumo Hospital, Faculty of Medicine Universitas Indonesia, Central Jakarta, Indonesia, * Equal contribution in writing this article*

Abstract

Introduction*: Being in the ring of fire have caused Indonesia prone to emergency and disasters. This condition should make a positive correlation to level of citizen's knowledge and attitude towards emergency and disaster situation. However, there is no study to assess this condition. This study aims to assess the knowledge and attitude of Indonesian in emergency and disaster using a cross-sectional study collected from questionnaire interviewed by trained medical students in four centers (Jakarta, Depok, Padang, and Makassar).*

Method*: Samples were collected using random cluster sampling. Out of 570 samples participated, most of the respondents had a poor knowledge (56.1%) and attitude (60.7%).*

Result*: There is a significant relationship between knowledge and attitude ($p<0.001$). Age, education, and training on disaster can affect both knowledge and attitude towards emergency and disaster situation ($p<0.05$). However, disaster experience only had a significant contribution towards knowledge ($p<0.05$) but not the attitude ($p = 0.856$).*

Conclusion*: Most of the population in this study had poor knowledge and attitude in emergencies. These presented data also indicate that training on disaster is urgently needed to give impact on citizen's awareness. Moreover, further research is needed.*

Keywords: *knowledge, attitude, emergency condition, disaster*

Korespondensi: Vito Filbert Jayalie
Email: V_Lie@hotmail.com

Pengetahuan dan Sikap terhadap Situasi Bencana dan Kegawatdaruratan: Sebuah Studi Multisenter

Vito Filbert Jayalie,* Beryliana Maya Anisa,* Rania Zahra,* Luther Holan Parasian,* Caren Andika Surbakti,* Nela Lutfiana,* Adrian Reynaldo Sudirman,* Lintang Sekar Sari,** Indah Nur Rachmah,*** Hasna Ibadurrahmi,**** M. Sopiyudin Dahlan,***** Riyadh Firdaus****** *Indonesia Emergency Knowledge and Attitude Evaluator Team

**Fakultas Kedokteran Universitas Indonesia, Jakarta Pusat, Indonesia, **Fakultas Kedokteran Universitas Andalas, Padang, Indonesia, ***Fakultas Kedokteran Universitas Hasanuddin, Makassar, Indonesia, ****Fakultas Kedokteran Universitas Pembangunan Nasional "Veteran" Jakarta, Jakarta Selatan, Indonesia, *****Epidemiologi Indonesia, Jakarta Pusat, Indonesia, ******Departemen Anestesiologi dan Terapi Intensif Fakultas Kedokteran Universitas Indonesia - Rumah Sakit Dr. Cipto Mangunkusumo, Jakarta Pusat, Indonesia*

Abstrak

***Pendahuluan**: Sebagai "ring of fire", Indonesia memiliki tingkat kerentanan tinggi terhadap bencana. Hal ini seharusnya memiliki korelasi positif terhadap tingkat pengetahuan dan sikap masyarakat dalam menghadapi kondisi gawat darurat dan bencana. Namun, belum ada studi yang menelaah mengenai hal ini. Penelitian ini bertujuan untuk menilai pengetahuan dan sikap masyarakat Indonesia dalam kondisi gawat darurat dan bencana dengan menggunakan studi potong lintang yang dikumpulkan dari wawancara menggunakan kuesioner oleh mahasiswa kedokteran yang telah terlatih pada empat unit (Jakarta, Depok, Padang, dan Makassar).*

***Metode**: Sampel dikumpulkan dengan menggunakan cluster random sampling. Dari 570 sampel yang berpartisipasi, kebanyakan responden memiliki pengetahuan (56,1%) dan sikap (60,7%) yang buruk dalam menghadapi kondisi gawat darurat dan bencana.*

***Hasil**: Hasil studi ini juga menunjukan terdapat hubungan yang signifikan antara pengetahuan dan sikap ($p<0,001$). Usia, pendidikan, dan pelatihan menghadapi bencana memiliki kontribusi signifikan terhadap pengetahuan dan sikap masyarakat dalam menghadapi kondisi kegawatan dan bencana. Namun, pengalaman bencana hanya memiliki korelasi terhadap pengetahuan ($p<0.05$) tetapi tidak dengan sikap ($p=0,856$).*

Kesimpulan: *Sebagian besar populasi dalam penelitian ini memiliki pengetahuan dan sikap yang rendah pada situasi gawat darurat. Selain itu, data di atas juga menunjukkan bahwa pelatihan dapat memberikan efek pada kesiapan masyarakat dalam menghadapi bencana. Oleh karena itu, penelitian lanjutan diperlukan.*

***Kata kunci**: pengetahuan, sikap, kondisi gawat darurat, bencana*

Introduction

In regards to disaster, Indonesia is a vulnerable country. Having floods, earthquake, tsunami, landslide, dryness, and forest fire is not uncommon in this archipelago country.[1] Several factors are thought to influence the occurrence of this disaster, such as the condition of the country itself and also the villagers. Indonesia located on three tectonic slides, those are Australia slide, Eurasia slide, and Pacific slide. By having this condition, earthquake and volcano eruption may occur more frequently; thus, Indonesia is known as a country with Ring of Fire.[2,3] Also, due to people condition, climate change, and development of social and economic factor, flood often take place in Indonesia.[4]

The World Bank's data showed that 90 million people in Indonesia or almost 40 percent of the Indonesian population are vulnerable to disaster. Disasters always cause an emergency, which leads to health crisis and victims.[5] Based on the data of the Indonesian Health Ministry, from 435 disasters that occurred in Indonesia, 781 were dead, 2.578 were seriously injured, 152.508 had minor injuries, and 357.602 were evacuated.[6] Other data from Global Assessment Report (GAR) on Disaster Risk Reduction

showed that from 1815 to 2012, there were 1.078.124 houses shattered, and 1.111.843 houses damaged because of the disasters. The data also showed that Indonesia was in the third position as a country with the most economically disadvantaged due to the disasters with the total loss of USD 42,963,611,766.30.[7]

This high number of disaster actually should make a positive correlation to the number of citizen's readiness towards disaster and emergency as the first step to make a proper disaster preparation. Seeing a country like Japan, which has many common geological, geographical, and climatic characteristics with Indonesia that make kind of hazards common to both of these countries. Japan, on the other hand, has been arguing as the country with the best preparedness in facing disaster and emergency disaster. Japan has been investing considerable resources into awareness-raising in the population. The most notable example is the 'Disaster Prevention Week' and which has been organized since 1982. The 'Disaster Prevention Week' consists of training, dissemination of information material, and aims to raise citizen awareness about disaster preparedness. Increasing population awareness and educating them the right knowledge and attitude towards disaster is a base for the proper disaster preparation for Japanese.[8]

Seeing the condition of Indonesia, unfortunately, there is no data available about the Indonesian's knowledge and attitudes during emergency and disaster.[9] Regarding that problem, this study aims to know the knowledge and attitude of Indonesian people in emergency and disaster conditions in order to make a good start for disaster preparation.

Methods

Study Design and Samples

This study was a multicentre, cross-sectional study to assess the knowledge and attitude of Indonesian citizen towards disaster and emergency. The endpoints of the study were to know the level of knowledge and attitude of Indonesian citizen, to know the relationship between characteristic of samples with knowledge and attitude, and the association between knowledge and attitude of the citizen during emergency and disaster condition.

Samples were selected by using cluster random sampling based on four different cities around Indonesia where four Faculty of Medicine in Indonesia (Faculty of Medicine Universitas Indonesia (Depok), Faculty of Medicine Universitas Andalas (Padang), Faculty of Medicine Universitas Hasanuddin (Makassar) and Faculty of Medicine Universitas Pembangunan Nasional "Veteran" Jakarta (South Jakarta)) reside. The sampling area was chosen based on the agreement of each faculty of medicine in that area to join this multicentre study. Ethics was not required by the ethical committee as this study did not give any intervention.

First of all, each center must find out the number of hamlet units (Rukun Warga/RW) in their city. Then, they ran the randomization to choose one hamlet unit. After that, they would randomize once more to pick one smaller citizen unit (known as neighborhood unit (Rukun Tangga/RT) of the chosen hamlet unit as the sample target. From the selected neighborhood unit, the center would count the number of citizen age above 18 years old and take all of them as the respondents. If the number of respondents from one selected neighborhood unit had not met the demand, the center must continue to pick one more random neighborhood unit to take more respondents until they fulfilled the minimum number of respondents needed.

The inclusion criteria in this study were: (1) Indonesian citizens (proved by Indonesian Citizenship Card), (2) 19 years or older, (3) having signed an informed consent form and (4) lived in the sampling area based on the population data. On the other hand, the exclusion criteria were not living in the sampling area (even though they were written in the population data), physical or mental disability to respond to the interviewer and to give a response in an emergency.

Data collection were done from September 2015 until September 2016. After that, data entry was conducted by each institution in October 2016 to November 2016 before being sent to the primary institution (Faculty of Medicine Universitas Indonesia) for data analysis.

Questionnaire

A questionnaire was developed in this study to assess the demographic status (education, occupation, income, the experience of disaster and disaster management training), the knowledge and attitude of the respondents in a disaster and emergency. Knowledge was measured from the answer on the definition of disaster, type of disaster, factors which may affect disaster, Basic Life Support (BLS), Emergency Situation Response System (Sistem Penanggulangan Gawat Darurat Terpadu/ SPGDT), sign and symptoms of an emergency and

emergency tool-kit. The reaction and the reaction time when they encounter victim and disaster were assessed from the interview to define the attitude.

The definition of emergency and disaster was predefined based on Indonesia Law Number 24 the Year 2007. By that law, emergency is defined as a condition (in this study disaster condition) which may cause dangerous risk to health, soul, thing or environment in the short term; whereas disaster (in this study natural disaster) is an event which may disturb and threaten community life that happens because of environmental or human factor and lead to fatalities, loss of properties and psychological impact.

The questionnaires were asked by the medical students who had been trained by the training video. There was also a guideline to provide a clear explanation about each question as well as the interviewing method. After the training video and guidelines were spread among interviewers, we asked whether they had any questions related to the process of sample collection to make sure that the interviewer had similar knowledge. Moreover, along with their medical background and guideline provided, all of the interviewers hopefully would have a similar understanding of the process of interview.

This questionnaire had been validated in the pilot study on 30 respondents and undergone reliability analysis by using SPSS for Windows version 11.5 with Alpha Cronbach 83.4%. From this pilot study, a total score of knowledge and attitude were counted. Moreover, the cut-off value of knowledge and attitude levels were extracted and used for the main study (value ≥ 14 and ≥ 3, the median value from the pilot study, are considered as a good level of knowledge and attitude).

Sample Size Calculation

There were three sample size calculations, following the endpoint of the study. The first sample size was gathered to understand the descriptive data of respondent's knowledge and/or attitude by using alpha 5%, an estimated target sample of 0.5 and 0.05 precision with added by anticipated drop out of 10%. Thus, the minimum sample for the descriptive data was 422.57 or 423 samples for all contributing centers.

To know the minimum sample size for the correlation between knowledge and attitude, with 5% type one error, 80% power, the proportion in good knowledge group 0.65, a minimal difference of 5%, 1374.74 or 1375 samples were needed. Moreover, to determine the contributing factors towards knowledge and attitude, we used the corrected rule of thumb to calculate the sample size. By using the prevalence of 0.5, six independent variables, the minimum sample required were 120 samples. From the three sample calculation, the minimum sample size required was 1375.

Statistical Analysis

Each institution did data entry, and the result of the interview was sent to the main center (Universitas Indonesia). The statistical analysis was done by a selected team who did not do the data collection. To determine the association between knowledge (total score of definition of disaster, type of disaster, a factor which may affect disaster, Basic Life Support (BLS), Emergency Situation Response System (Sistem Penanggulangan Gawat Darurat Terpadu/SPGDT), signs and symptoms of an emergency situation, emergency tool-kit) and attitude (total score of the reaction when someone encounter victim during disaster) of respondents, Chi-Square or Fischer Exact Test will be performed under SPSS for Windows version 11.5. Moreover, multivariate regression logistic analysis was done to determine the adjusted significant factor to the knowledge and attitude level of the respondents.

Results

There were 570 samples from 4 centers of different cities in different islands across Indonesia. Those centers were located in Jakarta, Depok, Padang, and Makassar as a representative of the different conditions in Indonesia population and geographic condition. Out of 570 samples participated, most of the respondents had poor knowledge (56.1%) and attitude (60.7%).

Most of the samples were female (61.6%) with an age range between 20-86 years old, 64.9% of them highly educated, but had low income (75.3%). The data also showed that even the majority of our samples were female, there was no significant correlation to their knowledge and attitude towards the emergency ($p = 0.869$ and 0.115 for knowledge and attitude respectively). In regards to characteristics of samples, we found that age, level of education, income, gained disaster training, and their experience in facing disaster had a significant correlation with knowledge. Younger people had better knowledge than the older (p=0,001) with a median age of 38 and 45 years old, respectively. This study also showed that most people had a high education but low income, and this correlates with the increasing knowledge on a disaster, where people who participated in a higher level of education

Table 1. Level of Knowledge in Different Characteristics of Samples

		Overall Condition	Knowledge		OR (95% CI)	p-value	OR (95% CI)[3]	p-value3 (Multivariate)
			Good ((n=250)	Poor (n=320)				
Age (Median)*		42 (20-86)	38 (20-86)	45 (20-80)	0.97 (0.95 - 0.98)	0.001***	0.98 (0.96-0.99)	0.002
Sex(%)**	Male	219(100.0)	97 (44.3)	122 (55.7)	1.03 (0.73-1.45)	0.869	-	-
	Female	351(100.0)	153 (43.6)	198 (56.4)				
Education (%)[1,**]	High	370(100.0)	214 (57.8)	156 (42.2)	6.25 (4.12-9.47)	0.001***	5.14 (3.33-7.92)	0.001
	Low	200(100.0)	36 (18.0)	164 (82.0)				
Income (%)[2,**]	High	141(100.0)	73 (51.8)	68 (48.2)	1.53 (1.04-2.24)	0.029***	-	-
	Low	429(100.0)	177 (41.3)	252 (58.7)				
Training on Disaster (%)**	Yes	145(100.0)	85 (58.6)	60 (41.4)	2.23 (1.52-3.28)	0.001***	1.67 (1.09-2.57)	0.019
	No	425(100.0)	165 (38.8)	260 (61.2)				
Disaster Experience (%)**	Yes	369(100.0)	174 (47.2)	195 (52.8)	1.47 (1.03-2.08)	0.032***	1.53 (1.03-2.27)	0.036
	No	201(100.0)	76 (37.8)	125 (62.2)				

*Mann Whitney
** Pearson Chi-square
*** Qualified for multivariate analysis
1 High education level means that the respondents at least finished the compulsory education from the government (9 years of education; graduated from at least Senior High School)
2 High level of income means that the respondents earned more than 3 million rupiah in one month (average minimum wage of work in Indonesia)
3 Final model of logistic regression; Hosmer and Lemeshow Test: 0.778, Area Under the Curve (AUC): 74,0% (95% CI = 70,0%-78,1%)

had 6.25 times odds of having better knowledge than people with the low level of education (95%CI: 4.12-9.47; p=0.001). People with a low income tend to have poor knowledge of emergency and disaster condition (p=0.029). Besides, although having experience on disaster may increase people knowledge (good knowledge in subjects who had experienced disaster vs no experience: 47.2% vs 37.8%, p=0.032), disaster and emergency training still an essential part in increasing people's knowledge (p=0.001). Altogether, after multivariate analysis, age, education level, training on disaster, and disaster experience had an association with the level of knowledge towards disaster and emergency. The attitude of people towards the emergency was influenced by age, level of education, and disaster training. Younger age showed a better attitude towards disaster (OR: 0.97; 95%CI: 0.96-0.98; p=0.001). Unfortunately, a higher level of education did not guarantee someone to have a good attitude were a similar percentage of people who had a good and poor attitude in people with high education. Moreover, people with training on disaster did not show a good attitude towards the emergency (good vs poor attitude 46.2 and 53.8%, p = 0.049). Also, experiencing disaster did not significantly influence on attitude towards disaster (p = 0.856). After being adjusted with logistic regression, only age and education influenced people's attitude (OR 0.98 and 3.52 respectively). Further assessment was performed to know the response of the Indonesian citizen when there was a di-

saster. Most of the Indonesian will go to an assembly point and contact the nearest people to ask for help (61.4%). The response time of people when someone asked for help was under 15 minute (60.9%). To know more about the association between knowledge on disaster and emergency, Pearson Chi-Square was performed. Table 3 showed that most of the respondents had poor knowledge (56.1%) and attitude (60.7%). Moreover, when statistically analyzed, there was a significant association between knowledge and attitude of the respondent (OR: 9.28, 95%CI: 6.29-13.7; p = 0.001).

Table 2. Level of Attitude in Different Characteristics of Samples

		Overall condition	Attitude		OR (95% CI)	p-value	Adjusted OR (95% CI)3	p value3 (multivariate)
			Good (n=224)	Poor (n=346)				
Age (Median)*		42 (20-86)	38 (20-86)	44 (20-85)	0.97 (0.96-0.98)	0.001***	0.98 (0.97-0.99)	0.002
Sex (%)**	**Male**	219 (100.0)	95 (43.4)	124 (56.6)	1.32 (0.93-1.86)	0.115***		
	Female	351 (100.0)	129 (36.8)	222 (63.2)				
Education (%)1,**	**High**	370 (100.0)	185 (50.0)	185 (50.0)	4.13 (2.75-6.19)	0.001***	3.52 (2.32-5.35)	0.001
	Low	200 (100.0)	39 (19.5)	161 (80.5)				
Income (%)2,**	**High**	141 (100.0)	62 (44.0)	79 (56.0)	1.29 (0.88-1.90)	0.190***		
	Low	429 (100.0)	162 (37.8)	267 (62.2)				
Training on disaster (%)**	**Yes**	145 (100.0)	67 (46.2)	78 (53.8)	1.47 (1.00-2.15)	0.049***		
	No	425 (100.0)	157 (36.9)	268 (63.1)				
Disaster experience (%)**	**Yes**	369 (100.0)	144 (39.0)	225 (61.0)	0.97 (0.68-1.38)	0.856		
	No	201 (100.0)	80 (39.8)	121 (60.2)				

*Mann Whitney
** Pearson Chi-square
*** Qualified for multivariate analysis
1 High education level means that the responden at least finished the compulsory education from the government (9 years of education; graduated from at least Senior High School)
2 High level of income means that the responden earned more than 3 million rupiah in one month (average minimum wage of work in Indonesia)
3 Final model of logistic regression; Hosmer and Lemeshow Test: 0.009, Area Under the Curve (AUC): 69,6% (95% CI = 65,2%-73,9%)

Discussion

From this data, we found that most of the Indonesian citizens did not have enough knowledge towards emergency and disaster situation. They also did not reveal the right attitude when a disaster happened. From all of the factors, young age, high education, and having previous disaster training, give a significant impact to Indonesian's knowledge and attitude. On the other hand, gender and level of income did not show any role to this. Experiencing disaster only affects their knowledge but not to their attitude towards emergency and disaster situation.

Age played a significant role in knowledge and attitude during an emergency. This result might be due to higher education the younger generation received nine years of education compared to the elderly where there were only six years of compulsory education. The importance of a high level of education also supported by the association between education and knowledge of the citizens. However, a higher level of education did not affect the attitude of Indonesian citizens towards an emergency. The tendency towards good attitude was not affected only by the level of education, but also other types of learning, modeling others, and direct experiences in a particular situation.[10] Thus, further assessment is needed to find the best way to increase people's attitude in an emergency setting.

In regards to income, there was a comparable result between high income with excellent and inadequate knowledge. Low-Income yield to poor knowledge and attitude towards emergency and disaster. This result might be due to low education level

Table 3. Association Between Knowledge and Attitude of Indonesian Citizen.

		Attitude				OR (95% CI)	p-value
		Good (n=224)		Poor (n=346)			
		n	%	n	%		
Knowledge	Good (n=250)	167	66.8	83	33.2	9.28 (6.29-13.70)	0.001
	Poor (n=320)	57	17.8	263	82.2		

Pearson Chi-Square

achieved by low-income respondents

Even though most of the population in Indonesia, which represented in our samples had experienced a disaster, they still had a poor attitude. Most of them never heard about essential life support, did not have a preparation such as clothes, food, medicine towards disaster, and did not know to whom they should contact during an emergency. This result may be due to lack of training the ex-victims had.

Based on our study, there were only 25.5% of samples who received disaster training before being interviewed. This result was still far from the vision of the National Disaster Management Authority (BNPB) to have a robust nation is facing disaster.[11] Samples who experienced disaster training reveal good knowledge but not the attitude towards disaster and emergency. Thus, disaster training to all of the citizens, especially in an area which is prone to disaster is urgently needed.

Moreover, repeated training also encouraged to build the right attitude. If we want to emulate other countries which have similar in disaster characteristics such as Japan, we need to take attention to providing disaster training to all community. Japan has been investing considerable resources into awareness-raising in the population. The most notable example is the 'Disaster Prevention Week' and which has been organized since 1982. The 'Disaster Prevention Week' consists of pieces of training, dissemination of information material, and aims to raise citizen awareness about disaster preparedness.

This is the first study which assessed the comparison between knowledge and attitude in a disaster situation. As far as the author(s) searching, there was no similar study which took the general population as their subjects and assessed their disaster readiness. The previous study (Taghizahed AO et al., 2012) discussed factors associated with preparedness against an earthquake in Tehran City. They found that lack of previous experience, working as labor, businessman, employee, or being a housewife are factors associated with low knowledge. However, their study suggested that preparedness programs should target people with lower educational level and people in high-risk regions.[12]

As a multicentre study, we recruited the medical students in the local area as the interviewer aiming to have equal understanding for each question asked. We also had validated a questionnaire to describe citizen's knowledge and attitude, illustrating their situation in emergency and disaster. Unfortunately, due to some limitations mentioned below, only four centers were willing to participate in this study. Although it might not represent all of the Indonesian citizens, this study can be a pioneer in giving sufficient data/representation of the current situation.

We used the study power of 80% to assess the correlation between citizen's knowledge and attitude towards emergency and disaster situation. Unfortunately, with such high study power, we could not complete the minimum sample required due to lack of funds for running the study. This limitation caused only four centers participated until the endpoint of data collection. Nevertheless, from the collected data, we can see that there is a correlation between knowledge and attitude. To know more about the situation of Indonesian citizen in detail, more extensive research covering all of Indonesian is recommended in the future.

This level of knowledge and attitude urge a need to do a multidisciplinary intervention if Indonesian do not want to bargain with high burden caused by the disaster. This paper presents findings that may assist public and private sectors in creating an intervention to raise public awareness, such as providing disaster training preparation for the young age. Younger age had significantly better emergency knowledge and attitude.

Knowledge and attitude towards disaster and emergency were significantly correlated in this

study. Nevertheless, most of the respondents had poor knowledge and attitude. Added by the fact of willingness to help each other and that the nearest person is the one people will seek for help, training about the first response in disaster and capability to do basic life support are urgently needed in this disaster-vulnerable country.[2,3]

Conclusion

In conclusion, several variables were associated with knowledge and attitude towards disaster and emergency, such as age, sex, education level, training on the disaster, and disaster experience. Moreover, having an association between knowledge and attitude, added to a large number of inadequate knowledge and attitude observed, training is urgently needed in Indonesia. Further researches are needed primarily to know which type of training is suitable for this archipelago country.

Conflict of Interest

The authors hereby declare that there is no conflict of interest in writing this paper.

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Collaborators

Indonesia Emergency Knowledge and Attitude Evaluator Team:

- Faculty of Medicine Universitas Indonesia: Heriyanto Khiputra, Albert Prabowo, Felix Kurniawan, Suripto, Stefanus Imanuel Setiawan, Ferry valentino, Euginia Christa, Felix Lee, Ida Bagus Yudhistira, Hera Afidjati, Nindia L Septipa
- Faculty of Medicine Universitas Andalas: Anisa Aprilia Adha, Ikmah Fauzan, Nuri Kurniawan, Crisdina Suseno, Berliana Islamiyarti Hydra, Intan Kartika Sari, Dwi Sekar Ayu Gunasari, M. Irfan, Aulia Rahmi
- Faculty of Medicine Universitas Hasanuddin: Qadriyah Ramadhani, Amalia Nurul Hatinah, Andi Anisa Nasir, Andi Yusriana Azzahra, Gede Dewagama M, Henry Prawira M, Siti Marwah Alwi, Tasya Aisyah P. Maasba, Virginia Lestari R, Citra Wulandari Sofyan, Muh. Fiqhi Hardiansyah, Nirwan Badaruddin, Sari Rajwani Artika, Yusfiana Majid
- Faculty of Medicine Universitas Pembangunan Nasional "Veteran" Jakarta: Hawasyalna Anasyifa, Retno Putri Setiawan, Agnes Listyanakristi Prabawati, Aulia Eka Purwani, Qonita Aizati, Siska Sulistiyowati, Sarah Jihaan Danarto, Puspita Kurnia Wangi, Shabrina Petatriana

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