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ORIGINAL RESEARCH

The Knowledge of Non-Medical Individuals in Surabaya Regarding Basic Life Support

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Abstract:

Background: Basic life support (BLS) is one of the keys to saving lives following a cardiac arrest and poor outcomes have been shown as the result of delayed BLS. Cardiac arrests more often occur outside of the hospital, making the first-responder layperson that was present at the scene the key to the success of the chain of survival. Knowledge is important in the learning process, thus for non-medical individuals to be able to give proper BLS, they need sufficient knowledge regarding BLS itself. Objectives: To assess the knowledge of non-medical individuals in Surabaya regarding BLS. Method: A descriptive cross-sectional study using a questionnaire to assess the respondents' knowledge regarding BLS. Results: For the high school students group, all questions need to be eliminated ($p>0.05$). While for the university students group, all questions can be kept and most of them scored 56.25%. For the workers group, some questions need to be eliminated ($p>0.05$) and when compared to the university students, there is no significant difference ($p>0.05$) between the two groups' knowledge regarding the common questions. Conclusion: High school students in Surabaya do not have adequate knowledge regarding BLS. While the knowledge of non-medical university students in Surabaya regarding BLS is the highest among other groups of this research. As for the knowledge of non-medical workers in Surabaya regarding BLS, it is lower than university students, although there is no significant difference in both groups' knowledge regarding cardiac arrest findings.

Keyword: Basic Life Support, BLS, Non-Medical Individual, Preventable Death, Knowledge.

Introduction:

Cardiac arrest is the sudden loss of heart function found in a person that may or may not have previously been diagnosed with a heart disease. It can happen in an abrupt manner, or begins with other symptoms prior to the arrest. If appropriate steps are not taken immediately, most of the times it will be fatal [1].

One of the keys to save lives following a cardiac arrest is by performing basic life support (BLS), as it is considered to be the fundamental point when it comes to cases of cardiopulmonary resuscitation (CPR). BLS defines the primary sequence of resuscitation that will make saving someone's life possible [2].

A person without a specialized knowledge in the medicine field can, and should be able to, recognize a cardiac arrest, call for help, support the circulation, and maintain the airway and support the breathing (without using equipment other than personal protective devices) of the person who is having a cardiac arrest [3]. Poor outcomes have been shown as the results of delayed BLS by first-responding laypersons [3][4]. The chance of survival decreases by approximately 10% per minute following arrest and the longer it takes for the patient to receive CPR, the higher the possibility for her or his brain to be irreversibly injured [5]. This is due to the fact that after cardiac arrest occurs it will be followed by loss of consciousness, and this condition is not immediately reversed, oxygen tension will decrease, leading to a series of cellular changes that will cause a cellular death and resulting in brain oedema [6]. Whereas if a layperson managed to perform BLS then the patient's survival rate will increase 2 to 3 times [7].

Regarding the cardiac events in Indonesia itself, 1.5% of its population have been diagnosed by doctors with a heart disease in 2018. Out of 34 provinces, East Java is on the 14th place. For hypertension, 8.4% of Indonesia's population have been diagnosed with the disease and East Java is in 21st place [8].

From the explanation above, we can learn that the ability of a layperson to perform CPR correctly plays an important role in the chain of survival in out of hospital cardiac arrest. It impacts the chance of survival of the patient for the better. One of the methods that can be used, is to increase the knowledge and insight of the public, as in the layperson or bystander.

A bystander finds it difficult to perform CPR and this is caused by inadequate knowledge or training, absence of skill, lack of confidence, and fear of litigation. For them to be able to give correct and proper treatment to the patient, they need a sufficient knowledge and insight on the BLS itself. That is why, in order to increase CPR and BLS success, one of the important methods is to increase public knowledge and understanding of the practical application of BLS [9].

The author chose to do a research on knowledge, and not skill, because knowledge plays an important part in learning process. Based on the original Bloom's taxonomy [10], the hierarchy begins with knowledge then followed by comprehension, application, analysis, synthesis, and evaluation. From here we know that knowledge is important because it is the first level and step in learning process. More importantly, as of now there are no data regarding the level of knowledge on BLS of people in Surabaya.

The author chose non-medical individuals as a sample because there is a very high possibility for them to be the bystander that is present when a cardiac arrest occurs outside of the hospital and far from medical personnel. Questionnaires would be administered and the collected data would be analysed further to reach a conclusion.

Having said that, in this study the author would like investigate the knowledge of non- medical individuals in Surabaya regarding BLS. Other than to obtain the information of non- medical individuals' knowledge, the author also hope to give an impact to them. To raise their awareness in BLS after taking the questionnaire.

Methods:

This research is a descriptive cross-sectional study and the tool is a multiple-choice questionnaire. Inclusion criteria were: non-medical individuals who are currently in high school, non-medical individuals who are currently taking or have already graduated from higher education, and non-medical individuals who are currently working and literate. Exclusion criteria was: non- medical individuals who are currently in high school but have not reach the age of 18. The Health Research Ethics Committee of Medical Faculty of Airlangga University approved this study through letter No. 95 / EC / KEPK / FKUA / 2020.

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The questionnaire was then distributed to the respondents via online, considering the occurring pandemic at the time this research was conducted, it was deemed unsafe to meet the respondents in person. The questionnaire was distributed to the respondents in July, 2020. The questionnaire that is used is sourced from a previous research done in Saudi Arabia and it is openly available from the source [11]. The questionnaire was then translated into Bahasa Indonesia and some questions were eliminated thus the author conducted a reliability test once the modifications were made.

For the reliability test, the author used Cronbach's Alpha as a measurement and the score from the test was 0.578. Seeing that the score was still low (below 0.7), it was decided that a post- hoc analysis would be conducted once the questionnaire had been distributed and a Pearson-product moment correlation test would also be conducted afterward, the function of this test is to measure the strength of the relationship of two variables (in this case, the respondents and their knowledge of each question) and it will be used to determine which questions that need to eliminated.

The data for this research will be processed by using descriptive statistics, which will be divided into two categories. They are measures of central tendency and measures of variability (spread). The data analysis used for this research is a univariate analysis.

Result and Discussion:

For the post-hoc analysis, it was conducted separately so that each group's comprehension regarding the questionnaire can be determined. The group with the highest Cronbach's Alpha score, or the one who was most familiar with the terms that is used in the questionnaire, was the workers, with a total score of 0.508. Then the university students followed in with a score of 0.426 and last was the high school student group with a score of 0.261.

From the results, a pattern was seen. The older the respondent gets, the more they are familiar with the terms that are used in the questionnaire. But even so, the Cronbach's Alpha score of the worker group was still low since it did not reach 0.7, the score that indicates an acceptable level of reliability. All three Cronbach's Alpha scores of each group shows that the non-medical individuals in Surabaya are still quite foreign to the terms that are used in the questionnaire. For the high school student group, all of the p-value scores for the Pearson product-moment correlation test are above 0.05, this data suggest that the high school student respondents of this research do not have a good comprehension regarding basic life support and therefore all of the questions need to be eliminated.

The reason for this might be due to lack of education regarding BLS that is given to the high school students. A study conducted among Korean high school students shows that after the students was given education for 3 months, there was a significant increase in their knowledge regarding BLS. In Korea, BLS education have been included as the essential educational curriculum of primary schools since 2009, but it was only given through lectures. In the study, the intervention that was used is the Peer-assisted Learning (PAL) method and it is proven to be an effective technique to teach high school students about BLS [12].

While in Indonesia, BLS is not even part of the essential educational curriculum. As seen in the content standards for primary and secondary education, BLS is not listed as one of its material coverages [13].

For the university student group, all of the p-value scores for the Pearson product-moment correlation test are below 0.05, indicating that there is a strong correlation and that the university student respondents of this research have a good comprehension regarding basic life support and therefore all of the questions can be kept.

52.9% of the university student respondents of this research know which is the correct location for chest compression. This is quite low when compared to a research that was conducted among university students in Malaysia which shows 70.5% of the respondents were able to give a correct answer regarding the location for chest compression [14]. But, when compared to a study done in Saudi Arabia, the score of this study's university student respondents is higher. From the research among university students in Saudi Arabia, it shows that 44% of the respondents know the correct location for chest compression [14].

For the proper chest compression rate and chest compression depth, 30.3% and 47.1% of this research's respondents know the correct answer. Although the number is quite low, it is still better when compared to the research among university students in Saudi Arabia that shows 24.2% of the respondents know the proper chest compression rate and 40.8% of the respondents know the proper chest compression depth [14].

Table 1. The descriptive statistics of knowledge regarding the correct location, proper rate, and correct depth for chest compression among non-medical university students in Surabaya.

	University Student Score		
	Correct Location for Chest Compression	***Proper Chest Compression Rate***	***Correct Chest Compression Depth***
Mean	0.5294	0.3025	0.4706
Median	1	0	0
Mode	1	0	0
Std. Deviation	0.50124	0.46129	0.50124
Variance	0.251	0.213	0.251
Range	1	1	1
Percentiles 25	0	0	0
Percentiles 50	1	0	0
Percentiles 75	1	1	1

Table 2. The frequency distribution of knowledge regarding the correct location, proper rate, and correct depth for chest compression among non-medical university students in Surabaya.

		Frequency	***Percent***
Correct Location for Chest Compression	0	56	47.1
	1	63	52.9
	Total	119	100
Proper Chest Compression Rate	0	83	69.7
	1	36	30.3
	Total	119	100
Correct Chest Compression Depth	0	63	52.9
	1	56	47.1
	Total	119	100

The question with the lowest mean score is the eight question which is used to assess the respondents' knowledge regarding the proper ratio of chest compression and artificial ventilation during BLS. While the question with the highest mean score is the second question, which is used to assess the respondents' knowledge regarding how to determine if a person is conscious or not.

For the worker group, after conducting the Pearson product-moment correlation test, there are several questions that has a p-value score above 0.05. Those questions are question number 5, question number 9, question number 10, question number 11, and question number 12. Thus, all those five questions need to be eliminated and this shows that the worker respondents of this research do not have a good comprehension regarding the meaning of a chest compression (represented by the fifth question), which part of the chest for performing chest compression (represented by the ninth question), how many times per minute should the chest compression be performed (represented by the tenth question), how much force is used during giving chest compression (represented by the eleventh question), and a defibrillator (represented by the twelfth question). Although not all questions were eliminated, this data indicates that the comprehension of the workers in this research regarding those eliminated questions are still lower than the university students. These eliminated questions are used to assess the respondents' knowledge on BLS.

For the common question that are kept for both groups, when we look at the descriptive statistics the worker group's score is lower than the university student group. But after conducting the Mann-Whitney test, it showed that there is no significant difference between the score of the common questions among the two group ($p=0.861$). Meaning that for the questions that are kept, both the worker and the university student respondents of this research have the same amount of knowledge regarding those questions. The questions that are kept assess the respondents' knowledge regarding the signs of a cardiac arrest (represented by question number one), how to determine a person's consciousness (represented by question number two), how to determine if a person is breathing or not (represented by question number three), how to determine if a person circulation is disturbed or not (represented by question number four), and the proper ratio of chest compression and artificial ventilation during massage (represented by question number eight).

Table 3. The descriptive statistics of knowledge regarding the first, second, third, fourth, and eight question among university students and workers.

	First Question		***Second Question***		***Third Question***		***Fourth Question***		***Eight Question***	
	University Students	***Workers***	***University Students***	***Workers***	***University Students***	***Workers***	***University students***	***Workers***	***University Students***	***Workers***
Mean	1.8151	1.5952	1.5294	1.5714	2.437	2.5	0.7479	0.8095	0.1092	0.119
Median	2	1.5	2	2	2	2	1	1	0	0
Mode	2	1	2	2	2	2*	1	1	0	0
Std. Deviation	0.92943	1.01356	0.64864	0.66783	1.0942	1.21475	0.43605	0.39744	0.31326	0.32777
Variance	0.864	1.027	0.421	0.446	1.197	1.476	0.19	0.158	0.098	0.107
Range	3	3	2	2	4	4	1	1	1	1
Percentiles 25	1	1	1	1	2	1.75	0	1	0	0
Percentiles 50	2	1.5	2	2	2	2	1	1	0	0
Percentiles 75	3	2.25	2	2	3	4	1	1	0	0

Table 4. The frequency distribution of knowledge regarding the first question among university students and workers.

	University Students		*Workers*	
	Frequency	***Percent***	***Frequency***	***Percent***
0	9	7.6	6	14.3
1	37	31.1	15	35.7
2	40	33.6	11	26.2
3	33	27.7	10	23.8
Total	119	100	42	100

Table 5. The frequency distribution of knowledge regarding the second question among university students and workers.

	University Students		*Workers*	
	Frequency	***Percent***	***Frequency***	***Percent***
0	10	8.4	4	9.5
1	36	30.3	10	23.8
2	73	61.3	28	66.7
Total	119	100	42	100

Table 6. The frequency distribution of knowledge regarding the third question among university students and workers.

	University Students		*Workers*	
	Frequency	***Percent***	***Frequency***	***Percent***
0	2	1.7	1	2.4
1	24	20.2	9	21.4
2	39	32.8	13	31
3	28	23.5	6	14.3
4	26	21.8	13	31
Total	119	100	42	100

Table 7. The frequency distribution of knowledge regarding the fourth question among university students and workers.

	University Students		*Workers*	
	Frequency	***Percent***	***Frequency***	***Percent***
0	30	25.2	8	19
1	89	74.8	34	81
Total	119	100	42	100

Table 8. The frequency distribution of knowledge regarding the eight question among university students and workers.

	University Students		*Workers*	
	Frequency	***Percent***	***Frequency***	***Percent***
0	106	89.1	37	88.1
1	13	10.9	5	11.9
Total	119	100	42	100

Out of all the five questions, the question with the lowest score for the worker group is the eight questions, which assess the respondents' knowledge regarding the proper ratio of chest compression and artificial ventilation during massage. This question is also the only question that assess the respondents' knowledge regarding BLS, all the other four questions are used only to assess their knowledge in cardiac arrest findings (such as the signs of a cardiac arrest, how to determine a person's consciousness, how to determine if a person is breathing or not, and how to determine if a person circulation is disturbed or not) and out of all the four questions, the question with the highest score is the fourth question, which is used to assess the respondents' knowledge regarding how to determine if a person circulation is disturbed or not.

From all the data, it shows that the worker respondents of this group have a same amount of knowledge regarding the cardiac arrest findings when compared to the university student respondents, but their knowledge in BLS are still lower than the university student respondents.

This could be due to the role of social media. Most of the workers belong to generation X and Y, while most of generation Z are still in school or only recently graduated from university. Generation X tend to use social media to share information about business or politics, news, or research updates with strangers. While generation Y tend to use social media to communicate and share information with friends using a more traditional networking such as Facebook [15]. Recently, people have used social media as a platform to campaign about BLS. One study shows that by using social media to campaign about a resuscitation science symposium, the engagement was quite good [15].

Conclusion:

The knowledge of high school students in Surabaya regarding BLS is still low and all of the questions were eliminated for this group, thus this indicates that high school student respondents of this research do not have an adequate knowledge regarding BLS, while the knowledge of non-medical university students in Surabaya regarding BLS is the highest among other groups, and the knowledge of non-medical workers in Surabaya regarding BLS is lower than the university students, although there is no significant difference in both groups' knowledge regarding cardiac arrest findings.

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Conflicts of Interest:

There is no conflict of interest.

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