



# Knowledge Level of Medan City Resident about Cardiac Lung Brain Resuscitation in Basic Life Support

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## Abstract

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**BACKGROUND:** In 2015, approximately 350,000 adults in the United States experienced nontraumatic out-of-hospital cardiac arrest and were treated by the emergency medical services (EMS) personnel. Despite recent increases, <40% of adults receive layman-initiated cardiopulmonary resuscitation (CPR), and <12% apply an automated external defibrillator before EMS personnel.

**AIM:** To know the ability of the Medan city community in handling cardiac arrest for the first time and implementing the 2020 AHA basic life support (BLS).

**METHODS:** This study used a descriptive method with a cross-sectional approach and was conducted in the city of Medan in the period July–October 2021. Sampling used cluster sampling and purposive sampling with inclusion and exclusion criteria.

**RESULTS:** In this study, it was found that the majority of the people of Medan City had less knowledge about CPR in BLS. In this study, only respondents from Medan Marelan District were dominated by good knowledge by 80%. It was found that the people of Medan City have a good level of knowledge about these cardiac events, and the people of Medan City have a low level of knowledge about BLS and CPR.

**CONCLUSION:** The ability of the people of Medan City in implementing BLS and CPR in BLS for cardiac events outside the hospital is still lacking.

## Introduction

Cardiovascular disease is still a global threat and is a disease that plays a major role as the number one cause of death worldwide. According to World Health Organization data, over 17 million people in the world died from heart and blood vessel disease. In Indonesia, heart disease is the second deadliest disease after stroke. In Indonesia, the incidence of cardiac arrest or cardiac arrest is around 10 out of 100,000 normal people under the age of 35 years and per year reaches around 300,000–350,000 events.

Emergency incidents such as the ones above that occur in Indonesia rarely receive first aid by the local community before emergency medical service (EMS) personnel arrive. Patients should receive first life support from the community or people around them in the event of such an emergency. The 1 h is a very important time in providing basic life support (BLS) to accident victims because it can reduce up to 85% of the death rate [1].

The golden time for us to do cardiopulmonary resuscitation (CPR) is the first 5 min after cardiac arrest occurs. After 5 min, brain cells begin to die and

after 10 min we consider it brain dead. We should teach BLS to all elements of society. Ideally, everyone in the world has received regular training on BLS [2]. In Indonesia, the Indonesian Red Cross and the Association of Indonesian Medical Student Medical Assistance Teams has carried BLS training out. Despite the training, many people are still reluctant to provide first life support.

It has carried previous research on BLS out in the city of Medan but only at the limits of officers at the Kualanamu airport or only in certain sub-districts in the city of Medan. The title of the previous research was the level of knowledge and attitude of Kualanamu international airport officers towards BLS and a description of the knowledge of the people of the East Medan region towards BLS. In previous studies, the results were in the form of fairly good knowledge about basic life-support measures for Kualanamu airport officers and the people of the East Medan sub-district. Therefore, researchers want to get a clearer and up-to-date picture of the level of knowledge of the people of Medan City about BLS.

It strongly influenced the prognosis of cardiac arrest patients outside the hospital by first aid from the community. Therefore, researchers are very interested

in examining the level of knowledge of the people of Medan City about CPR in BLS. In addition, it is hoped that this research will serve as an overview and also the basis for data to conduct education and socialization about BLS in the city of Medan.

## Methods

This study is a cross-sectional descriptive study, which is a study that describes the level of knowledge of the people of Medan City about CPR in BLS. We conducted this research in all sub-districts of Medan City. This research runs for 1 month and the population in this study is people who live in the city of Medan. According to the Central Statistics Agency, the population in Medan City is 2,983,868 people.

The sampling of this research used a cluster sampling technique. Wherefrom the research population will be divided into several clusters, then from each cluster will be taken by purposive sampling. In this research, the researcher will choose the sample directly according to the capability of the respondent. The reason for using the cluster sampling technique is that researchers want to take samples from every sub-district in Medan City. By calculating the sample size, the total sample got is 5 people per sub-district in Medan City.

The inclusion criteria in this study were male or female with an age range of 17–45 years, domiciled in the city of Medan, had a device to fill out an online questionnaire, and they answered all statements in the questionnaire. While the exclusion criteria in this study were the respondents did not fill out the questionnaire completely and the respondents did not understand using a device to answer the questionnaire. Primary data in this study is data got directly from data sources. Data collection is done by distributing online questionnaires to research subjects and researchers will register online when the online questionnaire has been completed. We chose the online distribution due to the current Covid-19 pandemic condition in Indonesia.

We gave the distribution of online questionnaires as a Google Form link to research subjects. Google Forms is a useful tool to help make surveys and gather information easy and efficient. Google Form link submission via available social media. Considering that the respondent must have a device to fill out the Google Form where the researcher uses a cluster sampling technique that meets the respondent's inclusion criteria. We processed the data using statistical software. We analyze statistically the data and present the resulting data as a statistical software results table.

## Results

This study is a cross-sectional descriptive study, which is a study that describes the level of knowledge of the people of Medan City about cardiopulmonary brain resuscitation in BLS carried out in all sub-districts in Medan City. This research runs for 1 month, where the sample is obtained using the cluster sampling technique. Wherefrom the research population will be divided into several clusters, then from each cluster will be taken by purposive sampling.

In this research, the researcher will choose the sample directly according to the capability of the respondent. The reason for using the cluster sampling technique is because researchers want to take samples from every sub-district in Medan City so that the total sample in this study is 105 people. We conducted this research based on the approval of the Ethics Commission with Number: 655/KEP/USU/2021. The frequency distribution of research respondents, namely the people of Medan City based on gender, age, and occupation, is presented in Table 1.

**Table 1: Demographic characteristics**

Variable	Frequency (n)	Percentage	p-values
Gender			0.032*
Male	41	39	
Female	64	61	
Age			0.001*
17–25 years	69	65.7	
26–35 years	19	18.1	
36–45 years	17	16.2	
Occupation			0.001*
Stay-at-home parent	5	4.8	
Employees	36	34.2	
Government employees	2	1.9	
Teachers	7	6.7	
Entrepreneur	44	41.9	
Students	4	3.8	
Unemployed			
Total	105	100	

\*Chi-square test.

In Table 1, 64 respondents (61%) are female and 41 respondents (39%) are male. For age characteristics, most of the respondents were aged 17–25 years as 69 people (65.7%), 19 respondents aged 26–35 years (18.1%), and 17 respondents aged 36–45 years (16.2%). Most respondents' occupations were students as many as 44 people (41.9%) than entrepreneurs as many as 36 people (34.2%), teachers and entrepreneurs every 7 people (6.7%), not working 4 people (3.8%) and government employees as many as 2 people (1.9%). The frequency distribution of research respondents based on the level of knowledge described per question item is presented in Table 2 and Figure 1.

Of all the question items, the average respondent answered correctly and the most were on question number 5 which reads "A person is given BLS if?" as many as 102 people (97.1%), then question number 2 which reads "BLS or in English called BLS is the meaning of?" as many as 101 people (96.2%), and question number 15 which reads "Seeing how to breathe can be done?" as many as 94 people were

**Table 2: Frequency distribution of knowledge levels based on questions**

Questions	Answers			
	Correct (n)	Percentages	Incorrect (n)	Percentages
Question no 1	89	84.8	16	15.2
Question no 2	101	96.2	4	3.8
Question no 3	76	72.4	29	27.6
Question no 4	86	81.9	19	18.1
Question no 5	102	97.1	3	2.9
Question no 6	80	76.2	25	23.8
Question no 7	57	54.3	48	45.7
Question no 8	48	45.7	57	54.3
Question no 9	60	57.1	45	42.9
Question no 10	84	80	21	20
Question no 11	56	53.3	49	46.7
Question no 12	23	21.9	82	78.1
Question no 13	49	46.7	56	53.3
Question no 14	74	70.5	31	29.5
Question no 15	94	89.5	11	10.5
Question no 16	19	18.1	86	81.9
Question no 17	22	21	83	79
Question no 18	51	48.6	54	51.4
Question no 19	95	90.5	10	9.5
Question no 20	25	23.8	80	76.2

right (89.5%). While most respondents answered dominantly incorrectly on question item number 16 which reads "Breathing assistance can be done in a way?" as many as 86 people (81.9%), question number 17 which reads "Pulse check is carried out every cycle of cardiac massage and artificial respiration" as many as 83 people (79%) and question number 12 which reads "Heart massage is done with frequency?" as many as 82 people (78.1%). Question 20 which reads "Have you received any training or information on BLS?" showed results where as many as 80 respondents (76.2%) had never received training or information on BLS, while 25 other respondents (23.8%) answered that they had received training or information on BLS.

Meanwhile, according to the sub-district of origin, it can be seen in Table 3 which describes the frequency distribution between the sub-district of origin and the respondent's level of knowledge regarding BLS.

**Table 3: Frequency distribution of knowledge levels based on domicile origin**

Domicile origin	Knowledge levels		
	Good knowledge (%)	Moderate knowledge (%)	Lack knowledge (%)
Medan amplas	1 (20)	1 (20)	3 (60)
Medan area	1 (20)	1 (20)	3 (60)
Medan barat	0 (0)	3 (60)	2 (40)
Medan baru	0 (0)	4 (80)	1 (20)
Medan belawan	1 (20)	1 (20)	3 (60)
Medan deli	1 (20)	1 (20)	3 (60)
Medan denai	0 (0)	3 (60)	2 (40)
Medan helvetia	1 (20)	1 (20)	3 (60)
Medan johor	0 (0)	3 (60)	2 (40)
Medan kota	0 (0)	2 (40)	3 (60)
Medan labuhan	0 (0)	1 (20)	4 (80)
Medan maimun	1 (20)	3 (60)	1 (20)
Medan marelana	4 (80)	0 (0)	1 (20)
Medan perjuangan	1 (20)	0 (0)	4 (80)
Medah petisah	1 (20)	2 (40)	2 (40)
Medan polonia	0 (0)	3 (60)	2 (40)
Medan selayang	0 (0)	1 (20)	4 (80)
Medan Sunggal	0 (0)	3 (60)	2 (40)
Medan tembung	2 (40)	2 (40)	1 (20)
Medan timur	2 (40)	2 (40)	1 (20)
Medan tuntungan	1 (20)	1 (20)	3 (60)

Based on the table above, respondents from Medan Amplas District, Medan Area, Medan Belawan, Medan Deli, Medan Helvetia, Medan Kota, Medan Labuhan, Medan Perjuangan, Medan Selayang and

Medan Tuntungan were dominated by poor knowledge (>50%). Meanwhile, the sub-districts of Medan Barat, Medan Baru, Medan Denai, Medan Johor, Medan Maimun, Medan Polonia, and Medan Sunggal were dominated by sufficient knowledge (>50%). In this study, only respondents from Medan Marelana District were dominated by good knowledge by 80%.

Related to the category of knowledge level, the researcher categorizes the interpretation of the BLS knowledge questionnaire into several groups, namely Good Knowledge with a score of 76–100% (Score 14-18), Knowledge Enough with a value of 60–75% (Score 9–13) and Knowledge Less with a value of 60% (Score 0–8) shown in Table 4.

**Table 4: Frequency distribution of knowledge level category**

Category	Frequency (n)	Percentages	p-values
Good knowledge	17	16.2	0.001*
Moderate knowledge	38	36.2	
Lack knowledge	50	47.6	
Total	105	100	

\*Chi-square test.

In Table 4, the most respondents found with less knowledge were 50 people (47.6%), then sufficient knowledge was 38 people (36.2%) and good knowledge was 17 people (16.2%) where the data between groups differed significantly as indicated by the value  $p = 0.001$  through the Chi-square test.

## Discussion

BLS is the provision of initial treatment for an illness or injury, usually by a bystander, until medical care is accessible. Early recognition and activation of EMS and BLS are the most important factors that determine the probability of survival in patients. This in turn depends entirely on the knowledge and actions of the observers. Evidence suggests that difficulties in performing bystander CPR in developing countries are due to inadequate knowledge or training, lack of skills, lack of confidence, and fear of litigation [3].

Provision of BLS should provide immediate assistance to patients who need emergency treatment can make a big difference in the outcome. BLS as the first action taken for the management of common injuries and illnesses reduces the incidence of future disease and its complication rate. In certain self-limiting illnesses or minor injuries, appropriate life support/ first aid measures may be sufficient to avoid medical consultation and risk of death [1].

Accidental and different life-threatening accidents can happen anywhere at any time in our daily lives. This requires immediate and appropriate life-saving treatment before the affected person gets further medical or surgical treatment options. This life-saving treatment or BLS is an assessment and

intervention that can be carried out by the closest person immediately with minimal or no medical equipment. The patient's chances of survival are not only of concern to healthcare professionals but also of the general public, who have the opportunity to act when witnessing an accident or unintentional injury [3].

The goal of BLS is to stop or reverse a possible hazard at a certain time before it reaches the appropriate health facility. BLS knowledge is a method and technique used to carry out practices related to the prevention and management of health emergencies. It can be provided in all areas such as household, school, workplace, and recreation area. Beyond health issues, BLS knowledge also enhances community social responsibility and reinforces values. Therefore, it is important to have basic knowledge of BLS. The proportion of BLS knowledge was reported to be 39.2% in Saudi Arabia, 43.7% in Iran, 74.3% in Egypt, and 44.0% in Jimma [2].

Other similar studies, in Saudi Arabia and Addis Ababa also reported that BLS knowledge was 50.0%, 45.8%, 40.0%, and 50.3%, respectively. education, gender, and income were significantly associated with knowledge scores on BLS. Research in Saudi Arabia revealed that higher income and education levels were significantly associated with higher knowledge scores towards BLS. Another study in Saudi Arabia also showed that respondents' age, higher education, and attending training courses significantly increased knowledge of BLS information [4].

Previous research from European researchers suggests a widespread consensus that there is an unmet need to strengthen BLS knowledge among the general public. Despite a large number of educational initiatives, there is no clear evidence of the most effective methods. A study in Norway on first aid in cases of out-of-hospital cardiac arrest (OHCA) has shown that a large proportion of the general population in Norway experience first aid training based on the mandatory national school curriculum but theoretical first aid knowledge of OHCA or trauma turned out to be worse than expected. A Polish survey among rock festival respondents indicated a permanent need to improve BLS knowledge and skills of the population under supervision as well as the general public. It was concluded that there is a need for regular teaching of official first aid rules following the current provisions of the Institute [5].

In Germany, information on BLS knowledge among the general population is scanty and difficult to access. The Deutsches Reanimations register for the period 2004–2012 showed that only 16.1% of OHCA cases were reported, first aid was provided by observers, a value that proved to be on par with Poland (27%) and Romania (6%) but very low compared to other European countries such as Sweden or the Netherlands (>60%). The low score may be an indication of the low level of

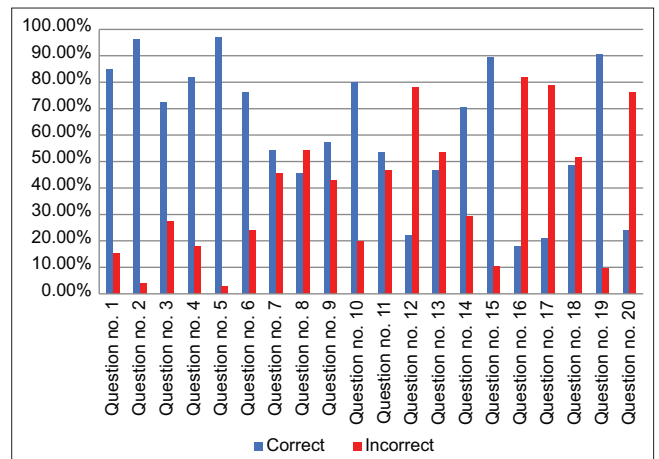


Figure 1: Frequency distribution of knowledge levels based on questions

BLS/CPR knowledge among the German population. Not surprisingly, the overall survival rate after OHCA incidents has not increased significantly over the past few years despite medical measures, possibly as a result of inadequate enrollment of data in line [1].

Research conducted in India, Egypt, the Republic of Slovenia, Saudi Arabia, and Portugal revealed that having training in first aid was significantly related to knowledge. Research conducted in Addis Ababa also revealed that respondents who received first aid training were almost 5 times more likely to have adequate knowledge of BLS compared to respondents who did not attend training. Community knowledge about BLS is as important as the care provided in the hospital [4].

In a study conducted by Mekonnen and Muhye in 2020 regarding the level of community knowledge regarding BLS in Ethiopia, it was shown that among a total of 423 research respondents, 412 responded to interviews with a response rate of 97.4%. The average age of the respondents was (35.09 ± 8.737 SD) with a range of 18–56 years. The majority (67.0%, 68.0%, and 71.8%) were male, married, and urban residents. Most of the 355 (91.5%) study respondents did not attend training on BLS. Among the respondents around (62.9%) had one chance to be trained on BLS [6].

Among the variables included in the multiple logistic regression analysis age, gender, place of residence, training on BLS, having heard of BLS, and exposure to people requiring BLS were significantly associated with knowledge scores. In this case, being at the age of 30–40 years was 50% (AOR = 1.50, 95% CI [1.15–1.97]) more for having a good knowledge of BLS. Meanwhile, those aged >40 years were 2.45 (AOR = 2.45, 95% CI [1.53–3.91]) times wider than other respondents [4].

The results of this study are in line with research conducted in Addis Ababa, Saudi Arabia, and Iran which were 40.0%, 40.3%, and 45.8%,

respectively. The results of the current study are lower than studies conducted in Addis Ababa 50.3%, Saudi Arabia 50%, Egypt 74.3%, respectively. Explanations maybe because of the tool variation in using the cut-off point, socio-demographic variation, and inclusion criteria variation. Most of the research respondents in the above studies have at least a formal education and most have a bachelor's degree, while in the current study the majority do not even have formal education. Therefore, for this and that reason, the knowledge score can be reduced or increased. The findings of this study are higher than the study conducted in Saudi Arabia which showed that 39.2% of the study respondents knew BLS or first aid during an emergency [7].

Variations that may occur may be because of socio-demographic differences, variations, sample sizes, and cutoff variations that lead to significant differences in scores. Being an urban residency showed a higher mean score of knowledge compared to rural (19.48 vs. 17.92). An explanation may be since 85% of the rural population is uneducated compared to 15% of the urban population. Urban communities may have access to information on BLS than rural areas [7], [8].

## Conclusion

In this study, we found that most of the people of Medan City had a low level of knowledge about CPR in BLS. In this study, only respondents from Medan Marelan District were dominated by good knowledge by 80%. We found that the people of Medan City had a good level of knowledge about the incidence of cardiac arrest, and the people of Medan City had a low level of knowledge about BLS and CPR. The ability of the people of Medan City in implementing CPR in BLS in cases of cardiac arrest outside the hospital is still lacking.

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