

Comparison of Self-Directed Video and Simulation Methods on Hand-Only CPR Skills

Nanda Putri Nur Azizah, M. Hanif Prasetya Adhi*, Sri Suparti, Nurul Fitriana Fatwati

Faculty of Nursing, Universitas Muhammadiyah Purwokerto

Email Corresponding:
hanifprasetya01@gmail.com

Page : 265-274

Keywords:
Self directed video method,
Simulation method, Skill

Article History:
Received: 2024-11-15
Revised: 2025-01-14
Accepted: 2025-04-30

Published by:
Tadulako University,
Managed by Faculty of Medicine.
Email: healthytadulako@gmail.com
Phone (WA): +6285242303103
Address:
Jalan Soekarno Hatta Km. 9. City of
Palu, Central Sulawesi, Indonesia

ABSTRACT

Background: Current data shows that most cases of cardiac arrest occur outside the hospital, the mortality rate is almost 90%. Indonesia is in second place in the Asian continent after the Philippines with 317,000 people suffering from heart disease. **Objective:** The purpose of this study was to determine the effect of providing education and simulation of hand-only CPR on the level of skills through the self-Directed Video method and simulation in students of SMA Muhammadiyah Tambak-Banyumas. **Method:** The method used is Quasi Experimental with a pre-test and post-test control group design approach. The instrument used in this study was an observation sheet to measure the level of skills about hand-only CPR. **Result:** The results of the study showed the effect of differences in the comparison of the self-directed video and simulation methods on hand-only CPR skills with a posttest value of self-directed video 79.00 and simulation 70.00. **Conclusion:** This shows that training using the self-directed video method has a greater effect on hand-only CPR skills compared to the simulation method in students of SMA Muhammadiyah Tambak-Banyumas.

Introduction

Cardiac arrest is a common, unexpected event that can cause rapid death. Cardiac arrest is a condition in which the heart suddenly stops functioning due to the loss of electrical activity in the heart and is accompanied by respiratory arrest¹. Victims who experience cardiac arrest will receive limited blood and oxygen flow so that it is inadequate for the blood and oxygen needs of the brain and muscles, this will result in sudden death when the heart's electrical system does not function and the heart rhythm becomes abnormal². Most cardiac arrests occur outside the hospital and are generally not known³.

According to Yasin et al., (2020) the death rate due to out-of-hospital cardiac arrest Out-Of-Hospital Cardiac Arrest is a problem that occurs in today's health. Cardiac Arrest is an emergency from heart disease, Global

statistics show 9.4 million deaths from cardiovascular disease each year, with 45% of these being caused by coronary heart disease. This figure is expected to continue to increase to 23.3 million by 2030⁵. Cardiac arrest occurs when heart function stops suddenly. This can happen to people who have never had a cardiac arrest before. Cardiac arrest occurs very quickly after signs and symptoms appear⁵. Activity or rest can cause cardiac arrest. In addition, sufferers who have a history of heart disease or not can also experience cardiac arrest. However, sufferers who have a risk of heart disease are more susceptible to cardiac arrest⁶.

Heart disease in the Asian continent is in first place, which is around 712.1 thousand people. In the Southeast Asian continent, the Philippines is in first place, which is around 376.9 thousand people and for Indonesia, it is

in second place with 371.0 thousand people for heart disease sufferers⁷. The World Health Organization (WHO) recommends two hours of CPR training for children aged 12 years and over as an effective way to improve CPR skills. In contrast, Taiwan, Canada, many states in the United States, and several European countries have made CPR training mandatory in their schools⁸.

According to Darwati and Setianingsih (2020) Adolescents are one of the groups of lay people, Lay people who first find cardiac arrest victims need to know hand-only CPR so they can help until officers arrive and take over. In reality, lay people's knowledge of hand-only CPR is still low. According to research by Aaberg et al (2014), it was stated that most high school students' knowledge of hand-only CPR was low before receiving BHD training. Students need to be given hand-only CPR training for victims of cardiac arrest..

Salah satu perawatan yang paling penting ketika seseorang mengalami henti jantung adalah *Cardiopulmonary Resuscitation* (CPR), juga dikenal sebagai tindakan pompa jantung. CPR adalah teknik penyelamatan orang yang terindikasi henti jantung memungkinkan peningkatan harapan hidup dengan memberikan kompresi pada dada sampai korban kembali ke kondisi normal. *American Heart Association* (2020) menyatakan bahwa tingkat keberhasilan penanganan henti jantung meningkat jika tindakan CPR dilakukan lebih awal. Penundaan satu menit memiliki tingkat keberhasilan 98 persen, penundaan tiga menit memiliki tingkat keberhasilan 50 persen, dan penundaan sepuluh menit memiliki tingkat keberhasilan hanya 1 persen. Oleh karena itu, penanganan penolong masyarakat awam dan tenaga medis yang mampu menjalankan percobaan secara mandiri saat henti jantung. Diperlukan pelatihan untuk dapat meningkatkan jumlah penolong OHCA

melalui metode simulasi dan self directed video¹².

One of the most important treatments when someone experiences cardiac arrest is Cardiopulmonary Resuscitation (CPR), also known as heart pump action. CPR is a technique for saving people who are indicated for cardiac arrest, allowing for increased life expectancy by providing chest compressions until the victim returns to normal. The American Heart Association (2020) states that the success rate of cardiac arrest treatment increases if CPR is performed early. A one-minute delay has a 98 percent success rate, a three-minute delay has a 50 percent success rate, and a ten-minute delay has a success rate of only 1 percent. Therefore, the handling of lay rescuers and medical personnel who are able to carry out experiments independently during cardiac arrest. Training is needed to be able to increase the number of OHCA rescuers through simulation methods and self-directed videos¹².

Self Directed Video is one of the good learning methods that can be used to increase the number of cardiac arrest rescuers. This method is effective for conducting learning and allows the community to learn independently through video displays containing hand-only CPR action training in the videos presented. The advantage of the Self Directed Video method is that they can be used by the community. Lay people who only watch Hand Only CPR training videos in simulations are more likely to perform resuscitation compared to people who have never seen the training video¹³. Introduction to hand-only CPR is done through self-directed videos and simulations to prevent situations that indicate respiratory arrest or cardiac arrest both before and after the incident. The goal of CPR is to reduce the number of deaths due to cardiac arrest¹⁴. Basic Life Support (BLS) Knowledge if you only know the theory without doing simulation training, then the

skills are not trained when facing a real disaster or emergency¹⁵.

The only CPR training method recognized in Indonesia today is simulation, which is used by both the general public and professionals. The advantage of the simulation method is that it is more interactive because the trainer and the public can ask questions and pay attention directly. The disadvantage of the simulation method is that it requires a lot of time and a large space, so the audience must set aside time to come to the training¹³. According to research Syaifuddin K et al (2023), students at an Islamic boarding school in Lumajang, East Java, experienced significant changes in their knowledge and skills after participating in Hand-only CPR training at the Islamic boarding school¹⁶.

The novelty of the research conducted is to compare 2 learning methods, namely self-directed video and simulation to measure students' skills in hand-only CPR training which is only conducted abroad and with better simulation results compared to the self-directed video method, therefore the researcher is interested in trying to conduct research comparing the 2 methods in Indonesia.

Based on a preliminary study conducted on August 20, 2024 to 10 students, they said that so far they did not know about hand-only CPR and had never received counseling and training on hand-only CPR. Of the 10 high school students interviewed, data was obtained that 50% of them said they wanted to help victims of cardiac arrest but they did not know what to do. This shows that their level of skills regarding hand-only CPR is still very low. The purpose of this study was to determine the skills of Muhammadiyah Tambak-Banyumas High School Students before and after learning using the self-directed video and simulation methods, because these two methods are often used in learning in the world of health. The main

purpose of this training is to improve student skills. Student skills in hand-only CPR are still not good enough and tend to be lacking according to several studies. Research conducted in Malang showed that 31% of respondents had poor CPR skills, and only 13% had good skills in hand-only CPR²⁰.

Based on the introduction described above, the researcher is interested in conducting a study comparing two methods, entitled "Comparison of Self-Directed Video and Simulation Methods on CPR Hand-Only Skills Among Students at SMA Muhammadiyah Tambak-Banyumas." The researcher hopes that this study will contribute to the development of learning methods and CPR hand-only training, as well as improve students' skills in providing proper first aid to cardiac arrest victims.

Materials and Methods

Study Design

This study employed a quantitative method with a quasi-experimental design using a two control group pretest-posttest design. The purpose of this design was to identify cause-and-effect relationships and compare the effectiveness of two training methods in improving hand-only Cardiopulmonary Resuscitation (CPR) skills. The study was conducted on two groups: the first group was trained using a self-directed video method, while the second group used simulation with the innovative SIKOMJARU (Cardiopulmonary Compression Education) tool.

Sample

This study involved 60 students from Muhammadiyah High School Tambak, Banyumas, selected using the total sampling technique. The sample was equally divided into two groups of 30 students each. The first group underwent training through the self-directed video method, while the second group

used direct simulation with the SIKOMJARU innovation tool.

Data Collection Technique

CPR skill data were collected using an observation sheet developed based on eight standard operating procedures (SOPs) from the 2020 American Heart Association (AHA) guidelines. Assessments were conducted before and after the intervention to measure changes in skills. SIKOMJARU, the innovative tool used in the simulation, was designed with PVC material and equipped with SOP audio guides and a metronome sound to help students perform compressions according to the standard.

Data Analysis Technique

Data were analyzed using the Guttman scale with assessment categories of fair, moderate, and good. The Mann-Whitney test was used to compare CPR skills between the two groups, as the data were ordinal and not normally distributed. Additionally, an independent sample t-test was performed to identify significant differences between the two training methods in improving students' skills. Statistical significance was set at $p < 0.05$. All analyses were conducted using appropriate statistical software to ensure accuracy and reliability of the results, and the interpretation of findings considered both statistical outcomes and practical implications for CPR training programs.

Ethical Consideration

This study was approved by the Ethics Committee with reference number KEPK/UMP/84/IX/2024, and permission was granted by the principal of Muhammadiyah High School Tambak, Banyumas. The research process included informed consent signed by the students to ensure voluntary participation and compliance with research ethics principles. Throughout the study, the

confidentiality of participants' data was strictly maintained, and all procedures were conducted in accordance with ethical guidelines to protect the rights and well-being of the participants.

Results

Based on the results of the study conducted by the researcher on 60 respondents, consisting of 30 respondents who received training using the self-directed video method and 30 respondents who received training using the simulation method, with data collected using an observation sheet, the following data were obtained:

Table 1. Respondent Characteristics of the Self-Directed Video and Simulation Methods Based on Gender, Age, and Education (n=60)

Respondent Characteristics	Group			
	Self directed video		Simulation	
	f	%	f	%
Gender				
Female	13	43,3	20	69,3
Male	17	56,7	10	30,7
Age				
14 Years	1	3,3	5	16,5
15 Years	17	56,7	13	43,5
16 Years	12	40,0	12	40,0
Pendidikan				
Class 11A	30	50,0	30	50,0
Class 11B	30	50,0	30	50,0
High School	30	50,0	30	50,0

Source: Primary Data

The respondent characteristics data in Table 1 consist of gender, age, and education level. This study shows that the largest sample distribution based on gender in the self-directed video method group was male respondents, totaling 17 students (56.7%), while in the simulation method group, the largest distribution was female respondents, totaling 20 students (69.3%). The largest age distribution was 15 years old, with 17 students (56.7%) in the self-directed video method and 13 students (43.5%) in the simulation method. The distribution based on education level was

evenly divided between Class 11A (50%) and Class 11B (50%).

The analysis results in Table 2 show that among the 30 respondents, before receiving the self-directed video intervention on hands-only CPR, the minimum score was 10 and the maximum score was 40. After receiving the self-directed video intervention, the minimum score increased to 70 and the maximum to 80. For the 30 respondents who received the simulation intervention on hands-only CPR, the minimum score before the intervention was 10 and the maximum score was 20, while after the simulation intervention, the minimum score was 50 and the maximum was 80. Based on these results, it can be concluded that the self-directed video method had a greater impact on improving hands-only CPR skills among the students of Muhammadiyah Tambak Senior High School, Banyumas.

Table 2. CPR Hand-Only Skills Before and After Intervention Using Self-Directed Video and Simulation Methods

Skills	Mean (SD)	95% CI	P
Pretest			
Self-Directed Video	23.33	20.34 – 26.33	0.000
Simulation	24.67	20.78 – 28.56	
Posttest			
Self-Directed Video	79.00	77.86 – 80.14	0.001
Simulation	70.00	64.04 – 75.96	

Source: Primary Data

Table 3. Comparison of CPR Hand-Only Skills Using Self-Directed Video and Simulation Methods

Category/Parameter	Pretest	Posttest
Self-Directed Video		
Mean	23.33	79.00
Median	20.00	80.00
Minimum	10	70
Maximum	40	80
Simulation		
Mean	24.67	70.00
Median	20.00	80.00
Minimum	10	20
Maximum	50	80

Source: Primary Data

The Mann-Whitney test results in Table 3 show that there is a significant difference (p -value = 0.001; $p < 0.05$) between the post-test skill scores of the group using the self-directed video method and the group using the CPR hand-only simulation method among the students of Muhammadiyah Tambak Senior High School, Banyumas. This indicates that there is a statistically significant difference in CPR hand-only skills between the two training methods.

Discussion

According to the study conducted by Addiarto & Yunita (2021), there are differences between gender and skills. Previous research found that several reasons for not performing CPR include panic or lack of confidence, not knowing how to perform and apply CPR to the victim, fear of legal consequences if mistakes are made that result in the victim's death, inability to recognize cardiac arrest, fear of disease transmission through mouth-to-mouth ventilation, and fear of causing harm to the victim, especially those experiencing cardiac arrest⁸.

Previous research has shown that men are more likely to perform CPR on victims of the same sex and are more positive about CPR²³. Men are more likely to receive CPR training in a public setting than women, and men are 23% more likely to survive than women. This may be due to male anatomy and CPR trainers being more comfortable performing CPR on men¹¹.

Age is one of the components that can indicate a person's physical, psychological, and social maturity, which provides more freedom to behave. Age affects a person's abilities and way of thinking. A person's comprehension and way of thinking develop with age. So, more knowledge is learned as adults. Age will affect the way we think and make decisions. According to research conducted by Jiang et al., (2020), adolescents

are very good at obtaining extensive information, including the impact of out-of-hospital cardiac death, and adolescents are able to recognize the importance of CPR early on. In addition, the age group of students influences their peers in learning CPR, and high school students can get training and teach their peers well about Cardiopulmonary Resuscitation (CPR)²⁶.

According to this study, the best age to understand hands-only CPR training is 15 years old, at the age of 15, teenagers are generally physically and cognitively capable of learning basic life-saving skills. They can understand the steps required to perform CPR and why it is important. Researchers suggest that the cognitive abilities that develop at age 15 allow them to learn skills that involve problem-solving and quick decision-making, which are key in emergency situations such as performing hands-only CPR²⁷.

In this study, most 15-year-olds already have sufficient physical strength to perform hands-only CPR. Training shows the compression depth needed to produce blood circulation is about 5-6 cm, and 15-year-olds usually have enough strength to achieve this depth. Adolescents aged 15 years have good memory and the ability to repeat learned actions. The process of learning through direct practice and repetition also makes them more confident in performing these actions in real situations.

Characteristics based on education are mostly high school/equivalent level, this study is in line with the cast study²⁸. That the level of education can affect students' learning ability in understanding lessons. Apart from many previous researchers who have conducted research on the knowledge and abilities of high school students in performing hand-only CPR, only a few researchers have used the case scenario model approach to study the skills of acting to perform hand-only CPR from the perspective of respondent

gender. Therefore, the purpose of this study was to determine the ability of high school students in performing hand-only CPR using a case model²⁹.

Based on the results of the Mann Whitney Sign Rank test, a value of 0.001 was obtained, indicating a significant change in respondents who performed hand-only CPR. This result is supported by the results of the Hand-only CPR value after the simulation, there is a difference or increase in the minimum and maximum values. Respondents showed that they performed CPR on the phantom properly and correctly, and understood the stages of first aid using the Simulation method.

In the self-directed video method, respondents receive instructions and learn independently. This is an advantage that this method is very flexible and can be learned anytime and anywhere. The quality of skills acquired by respondents cannot be identified if they learn independently. In contrast, simulation requires a mentor or trainer who is proficient in hand-only CPR, which makes it less effective and flexible. However, researchers can provide direct feedback on participant skills.

Distinguishing the comparison of self-directed video and simulation methods with each control group, students in this study received hand-only CPR training with different methods with a research duration of 30 minutes, using the self-directed video and simulation methods used to measure the hands-only CPR skills of high school students. The researcher concluded that self-directed video training compared to simulation showed a number of different results. The Mann Whitney results that have been explained previously showed that hand-only CPR training using self-directed video was more effective than simulation. Thus, the self-directed video method can be used as an alternative for CPR training.

According to research by Indah et al (2020), in general, students' learning focus is on one type of learning style method³⁰. This study found that using self-directed video has advantages because it can be used by students with free time and the content is consistent. However, the simulation method is different even though this method is not flexible and requires mentors and companions, companions can provide feedback or responses in the form of participant skills training. This study found that the comparison between the self-directed video and simulation methods had a significant difference by using the self-directed video method, students understood more and were more interested in learning hand-only CPR where they could learn it at their own time and in their spare time, they can also share information via social media to share methods and techniques for hand-only CPR.

Conclusion

Based on the results and discussion of the study on the comparison of self-directed video and simulation methods on the hand-only CPR skills of students at SMA Muhammadiyah Tambak Banyumas, it is shown that the most effective method to improve hand-only CPR training is the self-directed video method. This method is more effective than the simulation method because it can be accessed and learned by students anytime and anywhere during their free time, increasing flexibility and learning opportunities. Thus, the self-directed video method can be used as an alternative for hand-only CPR training. The suggestion in this study is that hand-only Cardiopulmonary Resuscitation training for students can be further developed to help improve knowledge and practical skills in performing hand-only CPR for cardiac arrest victims with unknown medical history. Moreover, schools are encouraged to integrate this training into the curriculum and periodically evaluate its

effectiveness to ensure students' readiness in providing immediate assistance during emergency situations.

Acknowledgment

The researcher would like to thank everyone who has helped and supported this research. First, to my supervisor Mr. Hanif Prasetya Adhi who has provided guidance during the research. The researcher would also like to thank fellow researchers for being discussion partners and supporting each other during the research process. Thank you also to the students of SMA Muhammadiyah Tambak-Banyumas who have been willing to be respondents in this research.

References

1. Mody Purav, Pandey Ambarish, Slutsky Arthur, et al. Gender-based differences in outcomes among resuscitated patients with out-of-hospital cardiac arrest. *Circulation*. 2021;143(7):641-649. Doi:10.1161/circulationaha.120.050427
2. Addiarto Widya, Yunita Rizka. Faktor indeks massa tubuh, kelelahan fisik dan gender yang berhubungan dengan kualitas kompresi dada pada simulasi resusitasi jantung paru (rjp). *J nurs care biomol*. 2021;6(2):146-152.
3. Deo Rajat, Albert, Cristine. Epidemiology and genetics of sudden cardiac death. *Circulation*. 2012;125(4):620-637. Doi:10.1161/circulationaha.111.023838
4. Yasin Dudella Desnani Firman, Ahsan , Racmawati Septi Dewi. Pengetahuan remaja tentang resusitasi jantung paru berhubungan dengan efikasi diri remaja di smk negeri 2 singosari malang. *Care j ilm ilmu kesehat*. 2020;8(1):116. Doi:10.33366/jc.v8i1.1751

5. Elfi Eka Fithra, Decroli Eva, Nasrul Ellyza, Yanwirasti, Darwin Eryati. Faktor risiko penyakit jantung koroner dan hubungannya dengan sintase nitrat oksida endotel. 2021;9:451-456.
6. Yusniawati Yustina Ni Putu, Lewar Emaunuel Ileatan, Putra I Gde Agua Shuarsedana, Putra Komang Adidhana Nugraha. Peningkatan pengetahuan dalam deteksi dini henti jantung pada orang dewasa dan pelatihan resusitasi jantung paru (aha 2020) pada siswa anggota palang merah remaja (pmr) di smk kesehatan pgri 1 denpasar. *J kreatif pengabdian kpd masy.* 2023;6(3):895-906. Doi:10.33024/jkpm.v6i3.8502
7. World Health Organization. Untuk dunia yang lebih aman, sehat, dan adil. Published online 2020.
8. Lioua Fang-yu, Lina Kun-Chang, Chienb Chian-Shiu, et al. Dampak dari resusitasi jantung paru pada pasien dengan serangan jantung di luar rumah sakit. 2021;2019:1078-1083. Doi:10.1097/jcma.0000000000000630.hak
9. Darwati Eka Leatari, setianingsih. Peningkatan pengetahuan orang awam tentang penanganan out of hospital cardiac arrest melalui aplikasi resusitasi jantung paru pada smartphone improvement of knowledge people about handling out of hospital cardiac arrest through the application of lung hea. *Ilm stikes kendal.* 2020;10(1):97-102. <https://journal.stikeskendal.ac.id/index.php/pskm/>
10. Aaberg Anne Marie Roust, Larsen Caroline Emilie Brenner, Rasmussen Bodil Steen, hansen Carolina Marta, Larsen Jacob Moesgaard. Basic life support knowledge, self-reported skills and fears in danish high school students and effect of a single 45-min training session run by junior doctors; a prospective cohort study. *Scand j trauma resusc emerg med.* 2014;22(1):1-6. Doi:10.1186/1757-7241-22-24
11. American Heart Association. *Pedoman cpr dan ecc.* Vol 86.; 2020.
12. Metrikayanto Wahyu Dini, Saifurrohman Muhammad, Suharsono Tony. Perbedaan metode simulasi dan self directed video terhadap pengetahuan, sikap dan ketrampilan resusitasi jantung paru(rjp) menggunakan i-carrer cardiac resuscitation manekin. *J care.* 2018;6(1):79-91. <https://core.ac.uk/download/pdf/235209979.pdf>
13. Bobrow Bentley, Vadeboncoeur Tyler, Spaite Daniel, et al. The effectiveness of ultrabrief and brief educational videos for training lay responders in hands-only cardiopulmonary resuscitation implications for the future of citizen cardiopulmonary resuscitation training. *Circ cardiovasc qual outcomes.* 2011;4(2):220-226. Doi:10.1161/circoutcomes.110.959353
14. Abilowo Ashar, Yulia Asri, Lubis Sari. Edukasi Resusitasi Jantung Paru Pada Masyarakat Kabupaten Belitung. *Ahmar Metakarya (Jurnal Pengabdian Masyarakat)* 2022;1(2):85-89.
15. Diah Mutiarasari, Rihan Isyraq Muhamad, Mursid Kata kunci: tingkat pengetahuan, keterampilan, bantuan hidup dasar (Bantuan Hidup Dasar), puskesmas baluase. *Kesehatan.* 2020;4(3):23-29.
16. Kurnianto Syaifuddin, Arista maisyaroh, Eko Prasetya Widiyanto. Meningkatkan keterampilan cpr tangan siswa melalui bls kegiatan simulasi: studi pra-

- eksperimental di pesantren khomsani nur lumajang 2023;5(1):1-6.
17. Prasetya Muhammad Hanif, Royan , Taufiq Arif Johar. Effectiveness of digital resuscitation pad technology innovation on the accuracy of cardiac and lung resuscitation compression. *Jnki (jurnal ners dan kebidanan indones (indonesian j nurs midwifery)*. 2024;12(1):11. Doi:10.21927/jnki.2024.12(1).11-20
18. Prasetya Muhammad Hanif, Setiyabudi ragil, Endiyono. The relationship between body mass index with quality of cpr compression in nursing students. *Jnki (jurnal ners dan kebidanan indones (indonesian j nurs midwifery)*. 2022;9(4):305. Doi:10.21927/jnki.2021.9(4).305-309
19. Endiyono, Rachmat Dwi Prasetyo. Pengaruh latihan basic life support terhadap pengetahuan dan keterampilan tim muhammadiyah disaster management (mdmc) banyumas. 2018;1:68-75.
20. Maulidia Rahmawati, Loura Nining. Hubungan tingkat pengetahuan kognitif dengan kemauan melakukan cardiopulmonary resuscitation (cpr) pada remaja di sman malang. *J kesehat mesencephalon*. 2019;5(1):6-13. Doi:10.36053/mesencephalon.v5i1.95
21. Kanita Maria Wisnu, Ayuningsyas Loulita Ayuningsyas, Nurichasanah Yani Siti, Nurnaningtyas Brigita Larasati. Pengaruh pelatihan bantuan hidup terhadap keterampilan, kesiapan motivasi penanganan cardiopulmonary resuscitation pada mahasiswa ners. *J kesehat kusuma husada*. 2024;15(1):124-132.
22. Endiyono Runi Pramesti Putri. Perbedaan keterampilan resusitasi jantung paru (rjp) menggunakan inovasi prejaru dengan phantom Bantuan Hidup Dasar di unit kegiatan mahasiswa pramuka. 2019;2(2):1-5.
23. Wingen Sabine, Ecker Hannes, Schroeder Daniel, Bartholme Berenice, böttiger Bernd, wetsch Wolfgang. Addressing the helper's and victim's gender is crucial in schoolchildren resuscitation training—a prospective, educative interventional trial. *J clin med*. 2022;11(9):1-9. Doi:10.3390/jcm11092384
24. Ngurah I Gusti Ketut Gede, Putra I Gede Sudyadnya. Pengaruh pelatihan resusitasi jantung paru terhadap kesiapan sekaa teruna teruni dalam memberikan pertolongan pada kasus kegawatdaruratan henti jantung. *J gema keperawatan*. 2019;12(1):12-22. <https://ejournal.poltekkes-denpasar.ac.id/index.php/jgk/article/download/659/263>
25. Jiang Yi, Wu Bangsheng , Long Long, li Jiaxing, jin Xiaoqing. Attitudes and willingness toward out-of-hospital cardiopulmonary resuscitation: a questionnaire study among the public trained online in china. *Bmj open*. 2020;10(10):1-7. Doi:10.1136/bmjopen-2020-038712
26. Mao Jiani, Chen Feng, Xing Dianguo, Zhou Huixian, Jia Ling, Zhang Yan. Knowledge, training and willingness to perform bystander cardiopulmonary resuscitation among university students in chongqing, china: a cross-sectional study. *Bmj open*. 2021;11(6). Doi:10.1136/bmjopen-2020-046694
27. Rahman Abdul, Urbayatun Siti. Jenis dan karakteristik kekerasan seksual pada siswa laki-laki di SMA/SMK Kota Yogyakarta. *Heal Tadulako J (Jurnal Kesehat Tadulako)*. 2022;8(2):97-104.
28. Torizellia Cast, Wahyunita Sari, Nasrullah Muhammad. Pengaruh edukasi

- leaflet terhadap perilaku menggunakan masker dan cuci tangan (sebagai upaya pencegahan covid-19 di kelurahan loktabat utara). *Heal Tadulako J (jurnal kesehat tadulako)*. 2022;8(1):17-23. Doi:10.22487/htj.v8i1.488
29. Yuyu Angriani M Nawawi. Pengaruh Produktivitas Kerja terhadap Intesitas Kebisingan dengan Gangguan Pendengaran Pekerja Mesin Pembangkit Listrik di PT PLN. *Healthy Tadulako J (Jurnal Kesehatan Tadulako)*. 2022;10(2277):16-17.
30. Indah Puspasari Kiay, Muhammad Irsan, Gina andyka hutasoit, Asriadi. Hubungan Gaya Belajar dengan Nilai Tentamen Anatomi pada Mahasiswa Kedokteran Universitas Tadulako. *Healthy Tadulako J (Jurnal Kesehatan Tadulako)* 2020;4(2):12-18.