



Innovation Article

# An innovative cardiopulmonary resuscitation mannequin for common people

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## A B S T R A C T

**Background:** The success of basic life support is determined by the role of the individual(s) who first encountered a patient with a heart attack, and he will be a helper in the situation. Lack of socialization and training for laypeople makes them unable to implement a right first aid in cases of cardiac arrest. There is a need for innovations in cardiac, pulmonary resuscitation for ordinary people to facilitate them in practicing compression measures.

**Technic:** CPR mannequin is made of a plywood material in the shape of the human body; it is 34 cm long, 34 cm wide, and 6.5 cm high. There are 2 LED lights to detect the accuracy of the compression depth.

**Conclusion:** CPR mannequin can facilitate and improve the skills of laypeople in performing cardiopulmonary resuscitation

## INTRODUCTION

According to the Indonesian Heart Association, the rate of cardiac arrest is around 10 out of 100,000 healthy people under the age of 35 and annually reaches around 300,000-350,000 events <sup>1</sup>. Some heart attacks occur when they are at home. The studies show that 70% of patients had a heart attack when they were with family, friends, and co-workers. While the other 30% had it as they were alone, in case such an attack is not treated too long, it leads to death<sup>2</sup>.

Basic life support (BLS) measures usually are carried out by health workers. In developed countries like the US, it can be done by laypeople who have received prior training. The success of basic life support is inseparable from the role of the community who first encountered the incident, and anyone with the skill can be a savior for him/her.

In Indonesia, such a community help is tough to find. It is due to the in-depth knowledge of the society about the matter. The lack of socialization and training provided for the potential helpers have prevented them from giving their

first aids, which are very critical in the cases of cardiac arrest. Besides, such training requires simple media to facilitate the learning and practices for ordinary people. Thus, they will be able to execute the cardiopulmonary resuscitation (CPR).

The first aid in cardiac arrest is to provide BLS, where this action aims to restore blood circulation throughout the body and prevent organ failure, especially the brain. In the case of a cardiac arrest, the first few minutes is a golden period that can increase success in performing CPR <sup>3</sup>. The speed critically determines the success of help in providing initial BLS measures. The experts and the medical practitioner think over how to do an effective BLS action and train lots of people to perform these actions correctly and adequately <sup>4</sup>. Based on the fact, it requires innovation of CPR training for the laypeople.

## TECHNIC

The CPR mannequin is made of plywood material shaped like a human body with a heart-shape at its chest. The dimension is 34 cm in length, 34 cm width, and its-

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**Figure 1.** CPR mannequin



**Figure 2.** An easy way of using the mannequin

thickness of 6,5 cm. It is like a body with a compression spot indicated by a heart shape covering foam material inside. There are 2 LEDs indicated the right depth of the compression following that of the American Heart Association (AHA) (Figure 1). Its usage is straightforward; a trainee needs to push the "heart" and does the compression in a depth of 5-6 cm. A right compression will be indicated by the light of the two LEDs (Figure 2).

## DISCUSSION

CPR mannequin is an innovation to facilitate the people in the training of giving BLS for an early cardiac arrest. It is made in an attractive design to be like a human body. It is easy to learn and understand by the public. The mannequin has made the laymen easy to perform the first aid cardiac arrest to prevent fatal conditions. In other words, the innovation can increase the life rate. The team has conducted CPR training with the mannequin for 30 students of the boy scout group. The participants were given the materials related to CPR and provided with the actual practices of chest compression on the mannequin.

Based on the result, it was indicated that the mannequin is effective in increasing the ability of the subjects to perform PCR. The factors supporting their performance are its functional design and the precise spot of the compression. Being similar to the human body makes it easy to project the training to its real situation; they perceived that their object is an individual need their help to survive. The heart shape shows the right spot to put their hands and push for compression in a depth of 5-6 cm. They will know instantly that they have done the right compression from the LEDs.

Other advantages of this doll are practical, easy to carry when conducting CPR training. It is also designed by

taking a pearl of local wisdom, by putting on blangkon and Indonesian batik. However, there is a little shortage in the material. The chest part of the compression spot is made of foam; the frequent use will make it harder, and consequently, the right push will fail to reach.

## CONCLUSIONS AND RECOMMENDATION

The PCR mannequin is a good breakthrough for CPR training. It has been proved to facilitate PCR training for laypeople. CPR training with the mannequin has improved the skills of the participants in doing the right CPR. Its exciting design, compression spot, and LED indicators have contributed to the success of the training. With its practicality and a quite low price, the mannequin may help to educate the people about PCR independently.

## REFERENCES

1. Indonesian Heart Association. Henti Jantung. Indonesian Heart Association. [http://www.inaheart.org/education\\_for\\_patient/2015/5/7/henti\\_jantung](http://www.inaheart.org/education_for_patient/2015/5/7/henti_jantung). Published 2015.
2. Banks AD, Dracup K. Factors associated with prolonged prehospital delay of African Americans with acute myocardial infarction. *Am J Crit Care.* 2006;15(2):149-157.
3. Hazinski MF, Shuster M, Donnino MW, et al. Highlights of the 2015 American Heart Association Guidelines Update for CPR and ECC. American Heart Association; 2015
4. Hasselqvist-Ax I, Riva G, Herlitz J, et al. Early Cardiopulmonary Resuscitation in Out-of-Hospital Cardiac Arrest. *N Engl J Med.* 2015;372(24):2307-2315. doi:10.1056/NEJMoa1405796