MJoSHT
Malaysian Journal of Science, Health & Technology

USIM

Article

Empowering Medical Students by Facilitating Cardiopulmonary Resuscitation Training for Their Peer

Hafizah Zainal Abidin[1,2] and Juliza Jamaludin[3]

[1]*Faculty of Medicine and Health Sciences, Universiti Sains Islam Malaysia, Bandar Baru Nilai, 71800 Nilai, Negeri Sembilan, Malaysia.*

[2]*Sim-NEXUS Research and Innovation Group, Universiti Sains Islam Malaysia.*

[3]*Faculty Engineering & Built Environment, Universiti Sains Islam Malaysia, Bandar Baru Nilai, 71800 Nilai, Negeri Sembilan, Malaysia.*

Correspondence should be addressed to:
Hafizah Zainal Abidin; dr.hafizah@usim.edu.my

Article Info
Article history:
Received: 4 July 2024
Accepted: 17 September2024
Published:7 October 2024
Academic Editor:
Mohd Hafiz Abu Hassan

Malaysian Journal of Science, Health & Technology

MJoSHT2024, Volume 10, Issue No. 2
eISSN: 2601-0003

https://doi.org/10.33102/mjosht.v10i2.434

***Abstract*— Cardiopulmonary Resuscitation (CPR) training is an essential component of medical education, equipping students with life-saving skills to respond effectively in emergencies. Following a CPR training program, this study investigates the impact of medical students' knowledge and confidence levels as they facilitate hands-on CPR sessions for their peers. Through a review of literature and empirical analysis, this research elucidates the benefits of peer-assisted learning in CPR education. Results indicate a significant improvement in both knowledge and confidence levels among facilitators following the CPR training program. Overall, the findings highlight the invaluable role of medical student facilitators in enhancing CPR training outcomes and fostering a culture of peer support and empowerment within the medical community. This study underscores the significance of integrating peer-assisted learning strategies into CPR education programs, providing medical students with opportunities for both personal and professional growth. By leveraging the expertise and enthusiasm of medical student facilitators, educators can enhance the effectiveness and sustainability of CPR training initiatives, ultimately contributing to improved patient outcomes and community resilience in emergencies.**

***Keywords*— Cardiopulmonary resuscitation, medical students, simulation training, medical education.**

I. INTRODUCTION

The Faculty of Medicine and Health Sciences (FPSK), Universiti Sains Islam Malaysia (USIM) began operations in 2005, offering unique courses to future doctors trained not only in medicine and surgery but also in higher Islamic studies.

The Bachelor of Medicine, Bachelor of Surgery (MBBS) program, spanning six years, is meticulously designed to balance foundational medical sciences and clinical training. During the first three years, students primarily concentrate on basic medical sciences, building a robust foundation in subjects such as anatomy, physiology, and biochemistry. The final three years, however, have shifted the focus to clinical teaching, immersing students in various clinical specialities to prepare them for the practical demands of the medical profession.

These years are crucial as students rotate through different medical disciplines, gaining hands-on experience and developing the clinical acumen necessary to diagnose and treat patients effectively. The program aims to equip students with the technical skills required for medical practice and to instil the values and principles of being a compassionate and ethical Muslim doctor. Accordingly, this holistic approach ensures that graduates are well-prepared to meet the healthcare needs of their communities with both competence and integrity.

The Faculty of Engineering and Built Environment (FKAB) is the newest faculty, established on January 4, 2016. It is the ninth faculty at USIM, with a mission to lead education in engineering and the built environment, integrating Naqli and

Aqli knowledge. FKAB offers three bachelor's degree programs: architecture, electronic engineering, and electrical engineering, aiming to produce ethical professionals with Al-Qawiy and Al-Amin characteristics. The electrical and electronic engineering programs span four years, while the architecture program lasts three years.

Electrical and electronic engineering students study electrical machines, power systems, control systems, communication systems, instrumentation, and power electronics. They conduct real-time experiments using devices like power metres, signal generators, and oscilloscopes, handling both Alternating Current (AC) and Direct Current (DC) at various voltage levels. However, they face electrical risks such as defective receptacles, missing ground prongs, and faulty equipment, leading to electric shock, electrocution, fires, and explosions. These hazards are also present during internships in the electrical and electronics industries.

Architecture students engage in studio learning and on-site practice, developing drawing presentations, model making, animation, visualization, digital fabrication, and live presentation skills. They encounter workplace hazards like slips, trips, falls, continuous loud noise, radiation, sun rays, and ultraviolet rays at construction sites.

Given these risks, engineering and architecture students are encouraged to participate in basic life practice training, including Cardiopulmonary Resuscitation (CPR), to better handle potential workplace dangers and be better prepared for emergencies. This training enhances FKAB graduates' ability to manage workplace risks effectively. Following this, a CPR course for final-year FKAB students was held on May 12, 2024, at the Faculty of Science and Technology, USIM. Accordingly, a total of 80 students were scheduled to participate in this short course.

USIM Healthcare Sdn Bhd, a corporate organization managing the USIM medical and dental specialist clinic, and the FPSK Medical Students' CPR Club were engaged in facilitating the course. In addition to the fact that FKAB's students benefit from the course, this event allows FPSK students to participate as CPR facilitators for their peers. Studies have proven that medical students have a gap in confidence and practical knowledge regarding CPR. Thus, this course helps build their proficiency and confidence in CPR [1], [2]. This paper aims to assess the confidence levels and knowledge of medical students in CPR by facilitating a CPR training course for their peers.

II. Material And Method

Due to the scheduling arrangements between the two faculties, only first-year and final-year students were available for the planned training session. Although CPR is not formally included in the first-year curriculum, the students have already demonstrated competence in the basic sciences covered in their initial year. As for the final-year students, although they have been exposed to the practical aspects of CPR during their clinical years, most are currently engaged in clinical postings, which are not based at the main campus in Nilai. The final year students have undergone CPR theory and practical teaching and assessment during their studies in Basic Clinical Sciences and Emergency Medicine posting; other than that, they are not certified CPR providers yet.

Thus, a total of 20 first-year medical students volunteered to serve as facilitators for the CPR course. Additionally, five final-year medical students volunteered to supervise the session alongside the first-year students (Figure 1).

Figure 1. The facilitators after the training session.

A. Training the Trainer

A pre-reading material was provided for the students to read beforehand [3]. This guideline by the Ministry of Health is specifically tailored for CPR training for the public, in contrast to the CPR training for healthcare providers that the students typically receive.

Due to the tight schedules of FPSK students and the lecturer, who is also a certified CPR provider, the training was conducted in two stages. First, an online teaching session was made compulsory for first-year students, as they had not yet been introduced to this topic. This 1-hour session focuses on the theory of CPR, emphasizing the steps of CPR and the basic science related to it.

The second stage consisted of a hands-on training session in the FPSK clinical skills lab between their ongoing classes. While first-year students can attend this session, final-year students cannot participate due to their tight class schedules and the remote location of their postings. Consequently, they were required to revise the CPR technique independently on their own without a certified trainer. However, they receive an online briefing and another physical briefing by the certified trainer before the course.

During the hands-on session, the first-year students were briefed on four stages on the following topics: 1) the content of the CPR course according to time management, 2) the steps of adult CPR emphasizing the chest compression technique, 3) familiarization with the mannequin, the use of a CPR feedback monitoring device and the Automated External Defibrillator (AED) machine, and 4) responding to possible questions from participants.

The training and assessment were given by a certified CPR trainer. At the end of the training, each student was informally assessed for their knowledge and competency in all the four listed topics that were given. In particular, they are required to be able to plan the session with their teammates, explain the steps to initiate CPR, perform high-quality CPR on adults, and the correct steps to handle an AED machine. They are required to perform a similar informal assessment for the participants on

the day of the course, which includes 1) the correct steps of adult CPR, 2) the demonstration of high-quality chest compression, and 3) the use of an AED machine. If any of these assessments fail, they are required to refer to the certified trainer for a formal assessment, who will monitor the whole course.

B. Supervision of the Trainer

The CPR course was planned for half a day. It involved a one-hour lecture by the certified trainer and a hands-on session for the participants.

The participants were divided into ten groups, with two first-year students facilitating the CPR training in each group. Since this is their first time being a facilitator, partnering with another final-year student is beneficial and aids in building their confidence. Each final-year student was assigned to supervise two groups. Their tasks include monitoring and assisting the first-year facilitators during the session. They are also prepared to assist with answering participants' questions, especially when the first-year students need help.

III. Results And Discussion

A total of 66 FKAB students participated in the course. The lecture follows with an interactive question-and-answer session with the certified trainer at the end (Figure 2).

A. CPR hands-on training session

Lecture rooms were converted into large training rooms consisting of ten training stations, each comprising a CPR mannequin and an AED training machine (Figure 3). The hands-on session lasted for about 2 hours. During the session, participants are given an introduction to CPR, a demonstration of the steps of CPR, high-quality chest compression in CPR and the usage of AED by the facilitators (Figures 4-7).

The students and facilitators demonstrated proficiency and confidence during the hands-on sessions, requiring minimal troubleshooting that warranted the involvement of the final-year students and the certified trainer. Nevertheless, the final-year students remained engaged in interactions with the participants throughout the session.

Facilitators and participants in several groups even initiated case-based discussions by developing scenarios related to CPR situations, which were not taught during their training sessions. This was facilitated by the active and creative involvement of the participants in the group.

Figure 2. CPR Lecture

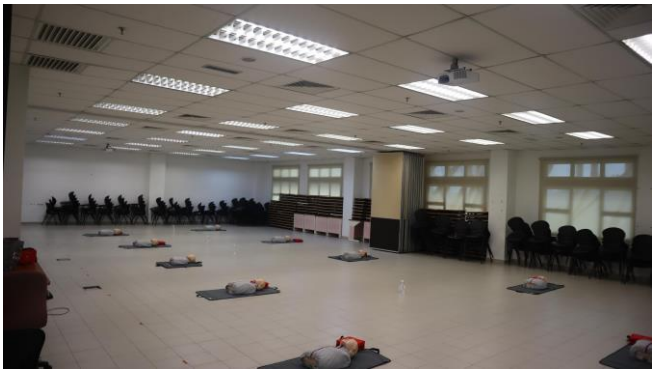

Figure 3. Hands-on training stations

Figure 4. Facilitators brief the participants.

Figure 5. Explaining the steps of CPR.

Figure 6. Demonstration of high-quality chest compression.

Figure 7. Facilitating participants in AED usage.

B. Facilitators' and supervisors' feedback

At the end of the session, all participants successfully demonstrated proficiency in performing high-quality CPR and succeeded in the informal CPR assessment by the facilitators. The assessment includes the steps of CPR and the technique of high-quality chest compression. Following the session, feedback forms were distributed to both facilitators and supervisors.

A total of 18 students provided feedback. For the majority (94.4%), this is the first CPR event they are involved in as a facilitator or trainer (Figure 8).

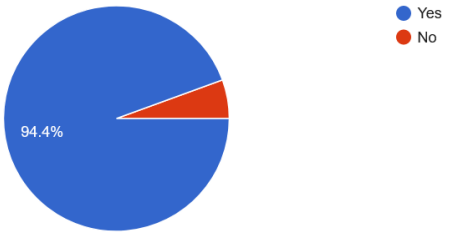

Figure 8. Is this your first time as a CPR trainer?

One-third (61.1%) of the students have never had any formal or informal training in CPR prior to this event (Figure 9).

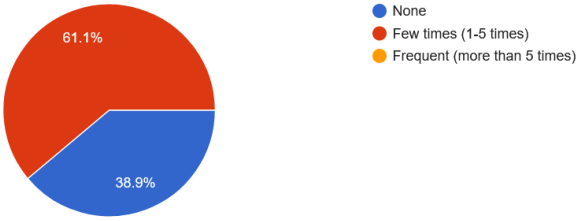

Figure 9. How many informal or formal CPR classes have you attended before this?

A majority, 77.8% of students, think the duration of teaching and training before the event is adequate, and the others (22.2%) are not sure (Figure 10).

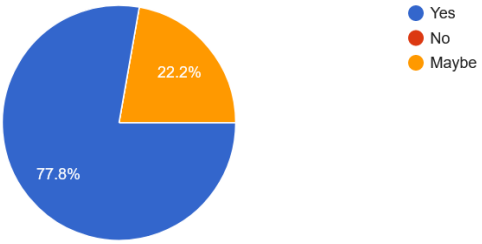

Figure 10. Was the online session and the hands-on skill lab session adequate/enough for you?

This event aimed to improve the students' knowledge and confidence levels in performing CPR by becoming facilitators to their peers. Prior to the event, the mean knowledge level among students was 4.94, with a median of 5. After the event, there was a noticeable increase in students' knowledge levels, with the mean rising to 8.29 and the median increasing to 9. For confidence level, the mean confidence level was 4.82, with a median of 3 before the event, the mean rising to 9.06, and the median increasing to 9 after the event.

These results suggest that the event positively impacted students' knowledge and confidence levels, as indicated by the significant increase in both mean and median levels. This report provides a clear summary of the change in confidence levels before and after the intervention, highlighting the improvement observed in both the mean and median confidence levels.

C. Discussion

The training of facilitators involved comprehensive didactic and practical sessions, which proved beneficial in multiple ways. Through didactic sessions, facilitators gained a deeper understanding of CPR principles, including the latest guidelines and techniques. These sessions equipped facilitators with the knowledge necessary to effectively convey CPR concepts to their peers during training sessions. Additionally, practical sessions provided facilitators with hands-on experience in performing CPR manoeuvres and utilizing CPR equipment such as AEDs. By actively participating in simulated CPR scenarios, facilitators developed proficiency in delivering practical demonstrations and providing feedback to their peers [4], [5]. Moreover, the training sessions served as opportunities for facilitators to refine their teaching skills, communication strategies, and leadership abilities. As a result, facilitators emerged from the training sessions with enhanced CPR knowledge and the confidence and competence required to fulfil their roles effectively. Accordingly, this dual emphasis on didactic and practical training ensures that facilitators are well-prepared to deliver high-quality CPR training sessions and contribute to the overall success of the program [5].

Medical students playing the role of facilitators in CPR courses for their peers represent a unique and valuable educational approach. This study explores how assuming the role of facilitators in CPR training sessions can contribute to the knowledge and confidence levels of medical students, enhancing their educational experience and professional development.

Firstly, acting as facilitators in CPR courses allows medical students to reinforce their understanding of CPR principles and techniques. In particular, teaching CPR to their peers requires a comprehensive understanding of the subject, including anatomy, physiology, and emergency procedures. In preparing to instruct others, medical students must review and consolidate their knowledge, ensuring they are well-equipped to effectively convey essential CPR concepts. This process of revisiting and reinforcing fundamental principles deepens the facilitators' understanding of CPR, enhancing their knowledge base [6].

Furthermore, the act of teaching has long been recognized as a potent tool for learning. By guiding their peers through CPR training, medical students engage in active learning experiences that promote the retention and application of knowledge [7]. Teaching requires facilitators to articulate complex concepts in simpler terms, demonstrate practical skills, and respond to inquiries effectively. Accordingly, they must organize and articulate information coherently, enhancing their comprehension and retention of CPR principles. Moreover, facilitating discussions and answering questions from peers fosters critical thinking and problem-solving skills, further strengthening the facilitators' grasp of CPR concepts.

Beyond reinforcing existing knowledge, assuming the role of facilitators in CPR courses offers medical students an opportunity to expand their skill set and clinical competence. Effective facilitation demands clear communication, leadership, and interpersonal skills, all of which are essential attributes for healthcare professionals. By guiding their peers through CPR simulations and providing constructive feedback, medical student facilitators enhance their communication skills and develop proficiency in delivering instructions and demonstrations. Moreover, facilitating collaborative learning environments fosters teamwork and collaboration among peers, skills invaluable in healthcare settings where interdisciplinary collaboration is essential.

Moreover, serving as facilitators in CPR courses empowers medical students to actively promote health and safety within their communities. CPR is a vital life-saving skill that can significantly improve outcomes in cardiac arrest emergencies. By imparting CPR knowledge and skills to their peers, medical student facilitators contribute to the creation of a more prepared and resilient community. Moreover, through their efforts, they empower their peers to act confidently and decisively in emergencies, potentially saving lives. This sense of agency and contribution to public health can profoundly impact medical students' sense of purpose and professional identity, fostering a commitment to lifelong learning and service [8].

Additionally, the experience of facilitating CPR courses can positively impact medical students' confidence levels. Assuming leadership roles and guiding peers through practical exercises can boost self-confidence and self-efficacy. As medical student facilitators witness their peers mastering CPR skills under their guidance, they gain reassurance in their abilities and competence. Moreover, receiving positive feedback from peers and instructors reinforces their confidence in their teaching and communication skills, affirming their capacity to make meaningful contributions to healthcare education and practice [7].

Furthermore, the role of the facilitator provides medical students with valuable opportunities for reflection and self-assessment. Engaging in teaching activities allows facilitators to evaluate their performance, identify improvement areas, and set further development goals. Through self-reflection and feedback from peers and instructors, medical student facilitators can refine their teaching techniques, enhance their communication skills, and adapt their approach to better meet the needs of their audience [9]. This continuous self-assessment and improvement process fosters a growth mindset and cultivates a commitment to ongoing professional development.

From another perspective, having peers as facilitators in CPR courses offers several distinct advantages for participants. Firstly, peer facilitators can create a supportive and relatable learning environment. Being of similar age and educational background, peer facilitators understand the challenges and concerns their fellow students face, fostering a sense of camaraderie and mutual understanding. This relatability helps to alleviate anxiety and apprehension among participants, creating a more conducive atmosphere for learning. Additionally, peer facilitators may use familiar language and examples that resonate with participants, enhancing comprehension and retention of CPR concepts [6]. Thus, by leveraging their shared experiences and perspectives, peer facilitators can effectively engage participants and tailor the training session to meet their specific needs and preferences.

Additionally, peer facilitators serve as role models and sources of inspiration for participants. Observing their peers confidently and competently demonstrate CPR techniques instil a sense of confidence and motivation among participants. Witnessing fellow students successfully navigate the challenges of CPR training encourages participants to believe

in their own abilities and aspire to achieve similar proficiency. Moreover, peer facilitators embody the values of teamwork, collaboration, and peer support, which are essential attributes for healthcare professionals. By demonstrating these qualities in their role as facilitators, peer facilitators inspire participants to cultivate these attributes within themselves, fostering a culture of collaboration and mutual support within the medical community. Overall, the presence of peer facilitators in CPR courses enhances participants' learning experience and nurtures a sense of solidarity and empowerment among students, laying the foundation for future success in their healthcare careers.

This study, which investigates the role of medical students as facilitators in CPR courses, is subject to several potential biases and confounding factors that may influence the outcomes. First, selection bias is a concern due to the inclusion of only first-year and final-year students, which may not provide a representative sample of the entire student body. Notably, middle-year students excluded from the study could exhibit different levels of knowledge and confidence. Furthermore, self-selection bias is introduced as the facilitators and participants volunteered for the study. Hence, it is possible that those who volunteered were inherently more motivated or confident, which could skew the results and limit the generalizability of the findings.

Another concern is performance bias, particularly regarding the facilitators' prior experience. Final-year students, having been previously exposed to CPR training during their clinical rotations, may have demonstrated higher competence in teaching than first-year students. This discrepancy could affect how the participants responded to the sessions and perceived their value.

Several confounding factors may also have affected the outcomes. For instance, some students may have had prior exposure to CPR training through external courses or personal experiences, which would offer them an advantage over their peers, independent of the training provided in the study. Additionally, the facilitators and participants might have accessed extra learning resources outside the formal sessions, which could confound the relationship between the peer-led training and the observed improvements in knowledge and confidence. The varied clinical environments encountered by final-year students during their placements may have also introduced confounding elements, as the nature of their experiences could influence their baseline knowledge and teaching ability.

The timing of the intervention is another potential confounder. First-year students, who have not yet been formally taught CPR in their curriculum, may have benefitted more from the training than the final-year students, who were already exposed to CPR techniques during their clinical postings. This discrepancy in the timing of education could influence the study outcomes, as first-year students might demonstrate greater improvement simply due to the novelty of the material.

Finally, group dynamics played a role, as students participating in group-based training might have been influenced by peer pressure or group expectations, affecting their performance or survey responses. Group settings could foster greater confidence or cause some students to conform to the opinions of their peers, leading to less accurate individual assessments.

In recognizing these potential biases and confounding factors, future research should take steps to address and control for these elements to improve the validity and reliability of the findings. Careful study design, such as randomization and more objective assessment tools, could mitigate some of these influences and provide a clearer understanding of the true impact of peer-led CPR training.

Progressing ahead, it is recommended that organizations consider implementing faculty development programs tailored to the needs of peer facilitators in CPR training sessions. In addition, future research should focus on identifying the most effective strategies for strengthening and maintaining peer facilitator competency, as well as assessing the cost-effectiveness of different faculty development interventions in this context. Nevertheless, by investing in the professional development of peer facilitators, organizations can ensure the delivery of high-quality CPR training and contribute to the continuous improvement of resuscitation education programs [10].

IV. CONCLUSIONS

In conclusion, medical students serving as facilitators in CPR courses for their peers play a critical role in enhancing their knowledge and confidence levels. By assuming the responsibility of teaching CPR to their peers, medical student facilitators reinforce their understanding of CPR principles, expand their skill set, and contribute to the promotion of public health and safety. In particular, the experience of facilitating CPR courses fosters self-confidence, leadership skills, and a commitment to lifelong learning and service among medical students. Overall, engaging in facilitation activities represents a valuable educational experience that enriches the learning journey of medical students and prepares them for future roles as competent and compassionate healthcare professionals.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest regarding the publication of this paper.

ACKNOWLEDGEMENT

We would like to thank USIM Healthcare Sdn Bhd for their cooperation in organizing the CPR training program.

REFERENCES

[1] Saleem, M., Sheikh, M. A., Khan, M. A., Islam, H., Syed, R., & Khan, M. (2023). Empowering Tomorrow's Healers: Assessing Knowledge and Attitude Regarding CPR Training among Final-Year Doctor of Physical Therapy Students in Karachi-Cross Sectional Study. Journal of Health and Rehabilitation Research, 3(2), 782-786.

[2] Panchal, A., Keim, S., Ewy, G., Kern, K., Hughes, K. E., & Beskind, D. (2019). Development of a medical student cardiopulmonary resuscitation elective to promote education and community outreach. Cureus, 11(4).

[3] Kementerian Kesihatan Malaysia (2019), Manual CPR Untuk Komuniti.

[4] Upadhayay, N. (2017). Clinical training in medical students during preclinical years in the skill lab. Advances in medical education and practice, 189-194

[5] Handeland, J. A., Prinz, A., Ekra, E. M. R., & Fossum, M. (2021). The role of manikins in nursing students' learning: A systematic review and thematic metasynthesis. Nurse Education Today, 98, 104661.
[6] Priftanji, D., Cawley, M. J., Finn, L. A., Hollands, J. M., Morel, D. W., Siemianowski, L. A., & Bingham, A. L. (2018). Performance and retention of basic life support skills improve with a peer-led training program. Currents in Pharmacy Teaching and Learning, 10(6), 744-749.
[7] Stigmar, M. (2016). Peer-to-peer teaching in higher education: A critical literature review. Mentoring & Tutoring: partnership in learning, 24(2), 124-136.
[8] Robak, O., Kulnig, J., Sterz, F., Uray, T., Haugk, M., Kliegel, A., ... & Domanovits, H. (2006). CPR in medical schools: learning by teaching BLS to sudden cardiac death survivors–a promising strategy for medical students?. BMC medical education, 6, 1-10.
[9] Zhang, H., Liao, A. W. X., Goh, S. H., Wu, X. V., & Yoong, S. Q. (2022). Effectiveness of peer teaching in health professions education: A systematic review and meta-analysis. Nurse Education Today, 118, 105499.
[10] Ko, Y. C., Hsieh, M. J., Cheng, A., Lauridsen, K. G., Sawyer, T. L., Bhanji, F., & Greif, R. (2022). Faculty development approaches for life support courses: a scoping review. Journal of the American Heart Association, 11(11), e025661