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PERFORMANCE OF CARDIO-PULMONARY RESUSCITATION AMONG MEDICAL STUDENTS IN A MILITARY MEDICAL FACULTY

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ABSTRACT

Cardiac arrest is an escalating public health problem as it contributes to cardiovascular morbidity and mortality, accounting for almost 15–20% of all deaths. Cardiac arrest may also occur among active individuals, such as during sports activities. Hence, Cardiopulmonary Resuscitation (CPR) is crucial and proven to prevent cardiac death when correctly performed. Precise CPR techniques do improve a patient's prognosis and reduces complications. This study aimed to determine CPR knowledge among medical students in our medical faculty. This was a cross-sectional study involving 106 students in year 1, 2 and 5, with a response rate of 76.8%. A structured questionnaire was distributed among the students and included socio-demographic data collection and questions on CPR knowledge based on the CPR teaching module. More than half the students were male (58.5%) with a mean age of 21.6 (±1.71) years. The students' ethnicity comprised Malay (62.3%), Indian (26.4%) and Chinese (11.3%). The student subject proportions were 32.1% from year 1, 34.9% from year 2 and 33.0% from year 5. A majority were cadet students (71.7%). The preferred study method was self-study followed by study group. More than quarter of them used YouTube videos to improve their understanding, and only 5.7% used e-learning. As for CPR knowledge, 89.9% of the students passed the CPR assessment. Female students (p=0.04) and Year 5 students (p=0.006) were significantly associated with good CPR performance. Medical students be updated current CPR knowledge as CPR techniques evolve. The faculty needs to be proactive in delivering effective teaching methods and tools to improve CPR knowledge among our medical students to prepare them for future job practice.

Keywords: *Cardiopulmonary resuscitation, Cardiac arrest, Knowledge, Techniques, Effective teaching*

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INTRODUCTION

The incidence of cardiac arrest continues to be a major global public health concern and the leading cause of mortality (Wong et al., 2019). Sudden cardiac death can result from cardiac arrest, and there are many diseases related to cardiac arrests, such as myocardial infarction (MI), cardiac abnormalities such as cardiomyopathy, myocarditis, and congenital abnormalities (Soo et al., 2021). Unfortunately, it has been noticed that there has been a significantly increasing trend of attributable ischemic heart disease burden, from being a common burden in many countries worldwide to one that mainly affects low and middle-SDI countries in Asia, Oceania and sub-Saharan Africa (Wang et al., 2021). Cardiac arrest may also occur among active and younger individuals, such as during sports activities. In 2012 it was noted that cardiovascular death accounted for 98.9 deaths per 100,000 population in Malaysia, or 29,400 deaths, which is 20.1% of all deaths (World Health Organization, 2021). According to the Malaysian statistical report 2020, the principal cause of death in Malaysia has remained ischemic heart disease (Department of Statistics Malaysia, 2021).

Basic life support is crucial to improve the survival of patients with cardiac arrest. Achieving successful resuscitation after cardiac arrest involves several elements or links in the chain of survival. It involves trained rescuers recognising the condition early, activating the emergency medical services (EMS) and beginning effective cardio-pulmonary resuscitation (CPR). These are the crucial first steps in the chain of survival (Nolan et al., 2020). The subsequent steps include early defibrillation, progression to advanced expert resuscitation and post-resuscitation care, and supported recovery (Nolan et al., 2020). Hence, basic knowledge of basic life support is crucial in order to save people's lives. CPR is one of the vital elements in the chain of survival needed to manage both out-of-hospital cardiac arrest (OHCA) and in-hospital hospital cardiac arrest (IHCA) (Rea et al., 2021). For medical personnel, they must possess correct and precise skills in cardiopulmonary resuscitation.

Undoubtedly, CPR is an essential skill for everyone but especially practices ensuring in their medical curriculum. We believe that it is vital for medical students to be prepared for their eventual houseman ship or internship training and to achieve this, their knowledge and hands-on skills need to be good and up to date. The primary focus in resuscitation education is to ensure an extensive and consistent implementation of the scientific basis of resuscitation into practice by people, or healthcare providers. This is achievable through acknowledgement of and compliance with the updated scientific statements and guidelines available regarding CPR and cardiovascular life support (Rea et al., 2021).

In Malaysia the National Defence University of Malaysia (NDUM) has the youngest public medical school in Malaysia; established in 2011. This faculty is unique compared to other Malaysian medical faculties as it is the only medical school with a military medicine curriculum incorporated. This distinctive feature benefits the military cadets of the university who will later serve in the Armed Forces and is an added value knowledge content for the civilian students enrolled in the NDUM medical program who will eventually serve in the public sector. Basic life support and CPR are taught in the military medicine syllabus, which is delivered in year 1, 2, 3 and 5. Additionally, it is also revisited by the students in other clinical year postings, such as, in the emergency medicine and anaesthesiology postings during their year 4 medical curriculum.

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No study to date has assessed the performance of CPR among military medical students in Malaysia. This is very important as the knowledge gathered will be useful to improve the existing curriculum in military medicine and also the overall medical curriculum for the students. We hypothesize that the data would provide some input to improve or reinforce the military medicine teaching syllabus and improve our educational system towards students achieving better knowledge and clinical skills. It is hoped that the results of this study will facilitate continuous quality improvement in teaching-learning activities and optimize the future performance of the students at work. Hence, the aims of this paper are to describe the findings of two main objectives which are the student's understanding of CPR and its associations with their sociodemographic.

METHODOLOGY

This was a cross-sectional study involving the medical students of year 1, year 2 and year 5 studying in the Faculty of Medicine and Defence Health of the National Defence University of Malaysia. The study was conducted at the end of 2015. The students were recruited during their military medicine posting to facilitate the presence of the whole batch of students. A structured English language questionnaire was designed based on the information available in published literature and the AHA 2015 guidelines on CPR. Face validation of the questionnaire was performed among a group of lecturers from the faculty to improve its content. The questionnaire collected socio-demographic data of the participant's characteristics and contained a checklist on CPR performance based on the CPR training module used. The CPR knowledge questionnaire involved 30 single best answer questions. A pre-test study was conducted among 10 medical students selected randomly from different earlier batches. Modification was done after receiving the feedback. The researchers involved then briefed and explained to the students about the research before their participation. Written consent was obtained before the students answered the questionnaire. Students were allowed to decline participation in the study.

All completed questionnaires were checked and compiled. The data was coded and entered into the Statistical Package for Social Sciences (SPSS) version 25 for analysis. The participants' data was each given a unique identification number to maintain confidentiality. The variables were read, collated and frequency runs performed to check for any errors or missing data. The total number of questions answered correctly in each category were counted and scored. Total scores were converted into percentages and divided into following grades, A as ≥ 75%, B as 60 - 74%, C as 50 – 59% and F as <50%. Descriptive statistics such as mean, median, standard deviation and interquartile range were used to describe the data characteristics. Chi-square and Fisher tests were used to determining the association between the CPR variables.

RESULTS

A total of 106 students completed the questionnaire, which was a total of 78% of the students invited (response rate). More than half of the students were males (58.5%) and their mean (±SD) age was 21.6 (±1.71) years. The students' ethnicities were Malay (62.3%), and Indian (26.4%) The students involved in this study were from year 1 (32.1%), year 2(34.9%) and year 5 (33%). A majority of the students were student cadets' (71.7%) and the remainder (28.3%)

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were civilian students. This study revealed that 89.9% of the students passed the CPR question assessments for CPR knowledge while 10.1% failed the test. Females (p=0.04) and year 5 students (p=0.006) were significantly associated with good CPR knowledge.

As for the study method the students used, 78.3% chose the study group as their preferred study method, while 88.7% also chose self-study. More than a quarter of them used YouTube (39.6%) videos to improve their understanding and only 5.7% used the e-learning method for their study.

Table 1. Student's demographic and CPR performances

Students	***Pass n (%)***			***Fail n (%)***	***Fisher-Exact***	***P***
	Grade A 70-100	***Grade B 60-69***	***Grade C 50-59***	***Grade D-F 0-49***		
Gender					8.13	0.04*
Male	18 (29.0)	17 (27.4)	17 (27.4)	10 (16.1)		
Female	19 (43.2)	15 (34.1)	9 (20.5)	1 (2.3)		
Ethnicity					8.71	0.19
Malay	24 (36.4)	18 (27.3)	20 (30.3)	4 (6.1)		
Chinese	4 (33.3)	6 (50.0)	1 (8.3)	1 (8.3)		
Indian	9 (32.1)	8 (28.6)	5 (17.9)	6 (21.4)		
Year					17.9	0.006*
1	12 (35.3)	9 (26.5)	7 (20.6)	6 (17.6)		
2	8 (21.6)	10 (27.0)	14 (37.8)	5 (13.5)		
5	17 (48.6)	13 (37.1)	5 (14.3)	0 (0)		
Group					0.74	0.80
Military	26 (34.2)	23 (30.3)	20 (26.3)	7 (9.2)		
Civilian	11 (36.7)	9 (30.0)	6 (20.0)	4 (13.3)		

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Study method						
Study group	30 (36.1)	24 (28.9)	22 (26.5)	7 (8.4)	2.26	0.52
Self -study	35 (37.2)	27 (28.7)	23 (24.5)	9 (9.6)	2.55	0.47
YouTube	14 (33.3)	15 (35.7)	11 (26.2)	2 (4.8)	3.17	0.37
E-learning	3 (50.0)	1 (16.7)	2 (33.3)	0	2.29	0.52

DISCUSSION

Cardiopulmonary resuscitation (CPR) is a life-saving procedure which is utilized following cardiopulmonary arrest (Nolan et al., 2020; Rea et al., 2021). This study revealed that a majority of NDUM medical students had adequate CPR knowledge, especially among females (p=0.04) and final-year students (p=0.006).

This study was conducted to assess the CPR knowledge among medical students in NDUM. Studies have shown that establishing good basic knowledge, skills and attitude is essential to providing medical services to patients (Baksha, 2010). This study highlighted that the CPR knowledge among medical students was average, as about one tenth of the students failed the CPR questionnaire assessment. Similar findings reported that final year medical students had better CPR knowledge as compared to those in their junior years (Ralapanawa et al., 2016); however, not all of them could perform CPR due to lack of practice and training (Tsegaye et al., 2015). Nevertheless, some studies revealed that their medical students, health care providers (Almesned et al., 2014), and interns (Avabratha et al., 2012) had inadequate knowledge of basic life support. In order to improve CPR knowledge and basic life support among medical students, effective training and regular assessments need to be done (Lami et al., 2016). Hence, CPR training must involve both theory and practical knowledge and skills while the training part has to be formulated to improve the self-confidence among trainees and, in our case, our medical students.

This study highlighted that the preferred study method used by the students to explore more on the CPR knowledge was self-study as a majority of the respondents chose this method. However, there was no significant association between their CPR knowledge and preferred study method. E-learning was underutilized, as only 5.7% respondents chose to use it as their study method. These findings were similar to previous study which reported that e- learning was the least preferred way of learning in the educational environment of NDUM (Jaffar et al., 2019). The reason may be due to the poor coverage of the university's wireless internet access points or the quality of the medical curriculum modules. Video-assisted learning such as the use of YouTube videos, was preferred by some of the medical students in this study which was also a similar finding reported among Ethiopian University medical students (Tsegaye et al., 2015).

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As for the current situation, amid the Covid 19 pandemic, every healthcare provider, including medical students, has had to be receptive and able to adapt to new technology and innovative ways to update themselves and gain new knowledge. Thus, it is important to provide attractive, concise, and informative learning material appropriate to the curriculum within the e-learning platform to address the identified issues and enrich the student's learning environment. The medical curriculum needs to be revised to address student-centeredness with technology-assisted care and learning activity.

LIMITATIONS

In this study, we only assessed theoretical CPR knowledge using a self-reported questionnaire and did not assess the practical components of CPR and BLS training. This study was done only in a single university with a unique medical student population, and thus its generalisation to medical students in other universities is limited.

CONCLUSION

This study highlighted that senior medical students performed better when compared to their juniors. The most preferred study method was self-study and study groups whilst the least preferred was e-learning. However, since we are still in a pandemic, the students should be provided with comprehensive e-learning facilities and online learning modules to better enhance their understanding and nurture lifelong learning habits.

Author's Contributions

HAH, AJ contributed to the research ideas, design, and implementation of the project to the analysis of the results. HAH and AJ wrote the first draft of the manuscript. All authors discussed on the results and recommendations and contributed to the final version of the manuscript.

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Conflict of Interest

The authors have no conflicts of interest to disclose.

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REFERENCES

Almesned, A., Almeman, A., Alakhtar, A. M., AlAboudi, A. A., Alotaibi, A. Z., Al-Ghasham, Y. A., & Aldamegh, M. S. (2014). Basic life support knowledge of healthcare students and professionals in the Qassim University. *International Journal of Health Sciences*, *8*(2), 141–150. https://doi.org/10.12816/0006080

Avabratha, K. S., Bhagyalakshmi, K., Puranik, G., Shenoy, K. V., & Rai, B. S. (2012). A Study of the Knowledge of Resuscitation among Interns. *Al Ameen J Med Sci*, *5*(2), 152–156.

Baksha, F. (2010). Assessing the need and effect of updating the knowledge about cardio pulmonary resuscitation in experts. *Journal of Clinical and Diagnostic Research*, *4*(3), 2512–2514.

Department of Statistics Malaysia. (2021). *Statistics On Cause of Death, Malaysia*. https://www.dosm.gov.my/v1/

Jaffar, A., Hassan, H. A., Lugova, H., Manickam, M., & Feizal, V. (2019). Evaluating Medical Students' Perceptions of the Educational Environment at the National Defense University of Malaysia. *International Journal of Academic Research Business and Social Sciences*, *9*(1), 802–815.

Lami, M., Nair, P., & Gadhvi, K. (2016). Improving basic life support training for medical students. *Advances in Medical Education and Practice*, 241. https://doi.org/10.2147/AMEP.S102111

Nolan, J. P., Maconochie, I., Soar, J., Olasveengen, T. M., Greif, R., Wyckoff, M. H., Singletary, E. M., Aickin, R., Berg, K. M., Mancini, M. E., Bhanji, F., Wyllie, J., Zideman, D., Neumar, R. W., Perkins, G. D., Castrén, M., Morley, P. T., Montgomery, W. H., Nadkarni, V. M., … Hazinski, M. F. (2020). Executive Summary 2020 International Consensus on Cardiopulmonary Resuscitation and Emergency Cardiovascular Care Science With Treatment Recommendations. *Resuscitation*, *156*, A1–A22. https://doi.org/10.1016/j.resuscitation.2020.09.009

Ralapanawa, D. M. P., Jayawickreme, K. P., Ekanayake, E. M. M., & Kumarasiri, P. V. R. (2016). A study on the knowledge and attitudes on advanced life support among medical students and medical officers in a tertiary care hospital in Sri Lanka. *BMC Research Notes*, *9*(1), 462. https://doi.org/10.1186/s13104-016-2270-5

Rea, T., Kudenchuk, P. J., Sayre, M. R., Doll, A., & Eisenberg, M. (2021). Out of hospital cardiac arrest: Past, present, and future. *Resuscitation*, *165*(May), 101–109. https://doi.org/10.1016/j.resuscitation.2021.06.010

Soo, S. S., Budin, S. B., Ishak, I., Nor, F. M., & Anuar, N. N. M. (2021). Cardiac and coronary artery study on sudden death cases in Hospital Canselor Tuanku Muhriz. *Life Sciences, Medicine and Biomedicine*, *5*(1).

Tsegaye, W., Tesfaye, M., & Alemu, M. (2015). Knowledge, attitude and practice of cardiopulmonary resuscitation and associated factors in Ethiopian university medical

students. *Journal of General Practice*, 1–5.

Wang, L., Wu, X., Du, J., Cao, W., & Sun, S. (2021). Global burden of ischemic heart disease attributable to ambient PM2.5 pollution from 1990 to 2017. *Chemosphere*, *263*, 128134. https://doi.org/10.1016/j.chemosphere.2020.128134

Wong, C. X., Brown, A., Lau, D. H., Chugh, S. S., Albert, C. M., Kalman, J. M., & Sanders, P. (2019). Epidemiology of Sudden Cardiac Death: Global and Regional Perspectives. *Heart, Lung and Circulation*, *28*(1), 6–14. https://doi.org/10.1016/j.hlc.2018.08.026

World Health Organization. (2021). *Cardiovascular disease*. https://www.who.int/news-room/fact-sheets/detail/cardiovascular-diseases-(cvds)