ORIGINAL ARTICLE

Awareness of Do Not Resuscitate (DNR) Order among Medical Students in Universiti Sains Malaysia

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ABSTRACT

Introduction: Do Not Resuscitate (DNR) order is a type of Advance Medical Directive (AMD) that documents a patient's wishes or desire to refrain from Cardiopulmonary Resuscitation (CPR), especially in the terminally ill patient. It is a sensitive issue in patient care and less is known on medical students awareness on the area. Aim: This study assessed the opinion, knowledge, awareness and familiarity toward Do Not Resuscitate (DNR) order among undergraduate medical students from year 1 to 5 in Universiti Sains Malaysia. Methods: A cross-sectional study was conducted with 250 undergraduate medical students using an online questionnaire on awareness towards DNR orders. Descriptive statistics, independent t-test and one-way ANOVA were applied to examine the distribution and association of DNR awareness among medical students with year of study, gender, race and religion. Results: The study indicated that most participants (84.4%) were familiar with DNR orders. There was no significant association between all 4 variables (year of study, gender, race and religion) with level of awareness among undergraduate medical students in HUSM. Conclusion: Undergraduate medical students have a good awareness on DNR orders. Despite having a multiracial and multi religion community, the medical students have similar patterns in their knowledge about DNR. *Malaysian Journal of Medicine and Health Sciences* (2024) 20(1):227-233. doi:10.47836/mjmhs.20.1.30

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INTRODUCTION

Dorland (2011) defined death as an irreversible cessation of total cerebral function, a spontaneous function of the respiratory and circulatory system (1). There is no denying that death is a possible end for a patient in the hospital bed, but it is essential to consider the emotional impact the death may have on the family members of the deceased. First and foremost, Do Not Resuscitate (DNR) order is a type of Advance Medical Directive (AMD) that documents a patient's wishes or desire to refrain from Cardiopulmonary Resuscitation (CPR), especially the terminally ill patient. In general, CPR is a procedure to restore one's life or consciousness which includes such measures as artificial respiration and chest compression. While it may not be successful in all life-saving cases, the only absolute contraindication to CPR is patient refusal (2). Patients have the option to make an advance directive or DNR decision outlining their wishes not to receive further medical treatment or intervention (3). Patients with adequate mental capacity to decide for themselves should have their decision respected. However, a DNR order usually involves a dilemma of choice between patient, family and healthcare providers (4). DNR can also be complicated due to country of origin, cultural differences, religious beliefs, legal requirements, clinical staff's psychological and mental health, decisions and preferences of the patients, and other circumstances. (5). Ahmed Salim et al. (2017) stated that it would be more suitable to use the wording "Allow Natural Death" instead of DNR as DNR seems to appear harsh for the patient and family members (6).

The doctors or treating medical team would not be performing CPR in the event of cardiorespiratory collapse, when DNR status is established. The doctors are responsible to establish the patients' wish for DNR status for those terminally ill patients and respect their decision making even if contraindicate with the doctors' original intention to treat and cure the patients. As a

result, Yuen et al. (2011) reported that the burden of deciding DNR was transferred to most of the patients' family members if the patients were incapacitated in decision making of DNR order (7). In Malaysia, there was lack of studies regarding awareness or understanding of DNR order among medical students. The unique context of Malaysia where we were highly influenced by race and religious belief. Thus, the study aimed to assess the opinion, knowledge, and familiarity toward Do Not Resuscitate (DNR) order among undergraduate medical students from year 1 to 5 in Universiti Sains Malaysia and the association between awareness and year of study, gender, race and religion.

MATERIALS AND METHODS

This study was conducted in Universiti Sains Malaysia (USM), a medical school located in the East-coast of peninsular Malaysia. All clinical teaching is mainly conducted in the teaching hospital, Hospital Universiti Sains Malaysia (HUSM). The study was approved by the Universiti Sains Malaysia Human Research Ethics Committee (USM/JEPeM/21020178).

The sample size of this study was calculated according to Krejcie and Morgan sample size calculation methods (Krejcie & Morgan, 1970) (8). It was determined that 362 participants were required to represent this population, with a 30% non-response rate. All undergraduate medical students (Year 1 to 5) were invited to participate in the study, and 250 participants responded.

This study utilized a self-administered questionnaire package that consisted of three parts. The first part asked on participants demographic information (gender, race, religious belief, and year of study). The second part consisted of a questionnaire from Alsaati et al. (2019) that assessed on opinion and knowledge towards DNR order (9, 10). This questionnaire contains 22 items on student's familiarity to DNR (two items), lecture efficacy on DNR (two items), DNR discussion barriers (1 item), concerns over religions and legal concerns (six items), concerns about patient inclusion in decisions (four items), concerns about DNR patient care (four items), concerns about organ donation in DNR patients (two items). As for concerns over religions and legal concerns, patient inclusion in decisions, patient care, and organ donation in DNR patients, participants were requested to assess on a Likert scale: strongly disagree (one), disagree (two), natural (three), agree (four), strongly agree (five), in order to gauge their level of awareness regarding the DNR order. As this questionnaire was previously developed for medical students in Saudi Arabia, it was piloted among USM medical students prior to the data collection. The pilot study demonstrated good validity evidence and Cronbach alpha for each domain (ranging from 0.740-0.911). Using convenience sampling, the survey was conducted online via the Google Forms platform and invitation was sent through students WhatsApp group. The informed consent form was provided on the first page of Google Forms and was obtained before the participants answered the questionnaire.

The data in this study was analysed using Statistical Package for the Social Sciences (SPSS) version 27.0 (IBM Corp., Armonk, NY, USA). First, the data homogeneity was determined using Levene's test. Demographic distribution of the participants and each component of the second part of the questionnaire were reported using descriptive statistics. Subsequently, independent t-test or one-way analysis of variance (ANOVA) was utilised evaluating the relationship between the year of study, gender, race, and religion with awareness of DNR orders. The level of significance was set at $p < 0.05$.

RESULTS

A total of 250 students participated in the study with a response rate of 69.1%. The distribution of respondents was detailed in Table I. There was almost an equal participation from all batches. Most of the participants were females (63.6%), Malay (75.2%), Muslim (77.2%) and first year medical students (22.0%). Meanwhile, no statistical significance was found between the level of awareness of DNR orders among medical students in HUSM with year of study (p=0.576), gender (p=0.908), race (p=0.367), and religion (p=0.365) (Table I).

Table I: Association Between Demographic Variables and Level of Awareness of DNR Orders Among Medical Students in Hospital Universiti Sains Malaysia (HUSM), (N=250)

Demographic Variables		Frequency, n (%)	*P*-Value
Year of study			0.576
	First year	64 (25.6)	
	Second year	45 (18.0)	
	Third year	55 (22.0)	
	Fourth year	43 (17.2)	
	Fifth year	43 (17.2)	
Gender			0.908
	Male	91 (36.4)	
	Female	159 (63.6)	
Race			0.367
	Malay	188 (75.2)	
	Chinese	36 (14.4)	
	Indian	26 (10.4)	
Religion			0.365
	Islam	193 (77.2)	
	Buddhist	34 (13.6)	
	Hindu	16 (6.4)	
	Christian	4 (1.6)	
	Other	3 (1.2)	

*Independent t-test was used to analyse level of awareness of DNR orders between gender.
**One-way ANOVA test was used to analyse level of awareness of DNR orders between year of study, race, and religion.
†*P*-value < 0.05; level of significance is indicated by *p*-value.

The knowledge and exposure of medical students regarding DNR order in general were assessed using questions in Section B (Table II). The majority of participants (84.4%) were aware of the meaning of DNR. Lectures or formal discussion sessions (38%) were the main source of information, followed by the social networking sites and the internet (both 27.2%) as the secondary sources of information.

Table II: Student's familiarity to DNR and their source of information, (N=250)

Section B1: Student's familiarity to DNR and their source of information	**n (%)**
Are you familiar with the term DNR?	
Yes	211 (84.4)
No	39 (15.6)
Section B2: Have you ever had a formal lecture or other session on obtaining DNR orders?	
Yes	212 (84.8)
Lecture or formal discussion sessions	95 (38)
Medical articles or journals	21 (8.4)
Internet and social media	68 (27.2)
Newspaper and books	7 (2.8)
Family members or friends	17 (6.8)
Others	4 (1.6)
No	38 (15.2)

Meanwhile, the knowledge specifically to DNR policy in HUSM were assessed using questions in Section B (Table III). Majority of participants (46.4%) thought that if a formal lecture or discussion of DNR orders was conducted, they would be able to discuss the orders with patients or patients' family members in an effective manner. More than half of the proportion of the participants (53.2%) did not aware or know the DNR order in Hospital Universiti Sains Malaysia (HUSM). Most students perceived that lack of patient or family member understanding (48.8%) was the main issue during discussion about DNR order with patients and patients' family members.

Table III: Student's awareness about DNR order and opinion about DNR discussion barriers, (N=250)

Section C1: Student's awareness about DNR order	**n (%)**
Will you able to discuss about DNR order with patients or patient's family members and ensure that they can have a good understanding in DNR order if you have a formal lecture or discussion session of DNR order?	
Yes	116 (46.4)
No	29 (11.6)
Maybe	105 (42.0)
Do you aware or know about the do-not-resuscitate (DNR) order in Hospital Universiti Sains Malaysia (HUSM)?	
Yes	82 (32.8)
No	133 (53.2)
Maybe	35 (14.0)
Section C2: Student's opinion about DNR discussion barriers	**n (%)**
What is the main problem during discussion about DNR order with patient and patient's family member	
Time insufficiency	15 (6.0)
Lack of patient or family member understanding	122 (48.8)
Lack of training on knowledge or communication skill	77 (30.8)
Lack of patient's decision making capacity	36 (14.4)

Regarding factors affecting decision-making in DNR order, majority of participants believed the patient's dignity, poor prognosis and disease severity, religious belief, legal concerns, inadequate palliative care, medical cost and financial problems, and patient's mental status were important factors that will influence the decision to issue a DNR order (Table IV).

Table IV: Student's opinions regarding factors that will affect decision making in DNR order, (N=250)

Section D1: Regarding factors that will affect decision making in DNR order	**Strongly Disagree, n (%)**	**Disagree, n (%)**	**Natural, n (%)**	**Agree, n (%)**	**Strongly Agree, n (%)**
Patient's dignity	11 (4.4)	17 (6.8)	76 (30.4)	89 (35.6)	57 (22.8)
Poor prognosis and disease severity	2 (0.8)	6 (2.4)	25 (10)	84 (33.6)	133 (53.2)
Religious belief	9 (3.6)	6 (2.4)	59 (23.6)	87 (34.8)	89 (35.6)
Legal concerns	2 (0.8)	5 (2)	48 (19.2)	99 (39.6)	96 (38.4)
Weak palliative care	1 (0.4)	16 (6.4)	68 (27.2)	101 (40.4)	64 (25.6)
Medical cost and financial problems	8 (3.2)	23 (9.2)	49 (19.6)	81 (32.4)	89 (35.6)
Patient's mental status	2 (0.8)	13 (5.2)	55 (22)	81 (32.4)	99 (39.6)

Regarding patient involvement in DNR order decision making, largest percentage of participants firmly believe that patients should be involved in the decision-making process for DNR orders and should have the option to express their DNR status in an advanced directive. Besides, the patients should decide on their DNR order under right state of mind and should be made aware of DNR status (Table V).

In terms of DNR patient management, majority of participants strongly agreed that daily round and management or additional therapy for DNR patients should be maintained. However, most of the participants adopted neutral stance for removal life sustaining therapy and using analgesia at higher dose in DNR patients (Table VI).

Whereas, in the context of organ donation among DNR patients, more than half of the participants believed that organ donation should be talked about with DNR patients or family members and should be properly documented. The discussion should be approached with great degree of sensitivity (Table VII).

Table V: Student's opinions regarding involvement of patient in decisions making of DNR order, (N=250)

Section D2: Regarding involvement of patient in decisions making of DNR order	Strongly Disagree, n (%)	Disagree, n (%)	Natural, n (%)	Agree, n (%)	Strongly Agree, n (%)
Patients must be included in decision making of DNR order and have the right to request or refuse DNR order.	1 (0.4)	3 (1.2)	24 (9.6)	60 (24)	162 (64.8)
Patients have the right to state an advanced directive regarding their DNR status.	0 (0)	1 (0.4)	19 (7.6)	85 (34)	145 (58)
Patients should not be made aware about their DNR status.	129 (51.6)	54 (21.6)	33 (13.2)	19 (7.6)	15 (6)
Patients should make their decision regarding DNR order under right state of mind.	1 (0.4)	7 (2.8)	19 (7.6)	68 (27.2)	155 (62)

Table VI: Student's opinions regarding management for DNR patients, (N=250)

Section D3: Regarding management for do-not- resuscitate (DNR) patients	Strongly Disagree, n (%)	Disagree, n (%)	Natural, n (%)	Agree, n (%)	Strongly Agree, n (%)
Reducing daily round for DNR patients	93 (37.2)	53 (21.2)	70 (28)	28 (11.2)	6 (2.4)
Removal life-sustaining therapy for DNR patients	63 (25.2)	51 (20.4)	69 (27.6)	53 (21.2)	14 (5.6)
Using analgesia at higher dose in DNR patients in spite of the risk of complications	64 (25.6)	69 (27.6)	72 (28.2)	37 (14.8)	8 (3.2)
Limiting the management and additional therapy in DNR patient	75 (30)	50 (20)	70 (28)	41 (16.4)	14 (5.6)

Table VII: Student's opinions regarding organ donation among do-not-resuscitate (DNR) patients, (N=250)

Section D4: Regarding organ donation among do-not-resuscitate (DNR) patients	Strongly Disagree, n (%)	Disagree, n (%)	Natural, n (%)	Agree, n (%)	Strongly Agree, n (%)
Discussion of willingness to donate organ should be done with DNR patients or patients' family member.	2 (0.8)	1 (0.4)	24 (9.6)	78 (31.2)	145 (58)
A decision regarding organ donation should be clearly documented.	0 (0)	4 (1.6)	15 (6)	66 (26.4)	165 (66)
Discussion about organ donation should be approached with great degree of sensitivity.	0 (0)	3 (1.2)	14 (5.6)	59 (23.6)	174 (69.6)

DISCUSSION

Familiarity with DNR order is essential in DNR decision making (11). In this study, 84.4% of USM medical students were familiar with DNR order, where lecture or formal discussion sessions were the primary source of information. This finding indicated that in general, most medical students have good exposure and background knowledge in DNR order, consistent with an earlier study performed in Saudi Arabia (9). On the other hand, Alsaati et al. discovered that most medical students and interns (73.2%) were familiar with DNR orders, despite majority (58.3%) not attending any DNR lectures or discussions prior to the study (10). Furthermore, residents with greater medical experience had higher awareness concerning DNR order (9). Therefore, lecture or formal discussion may not be compulsory to familiarize medical students to DNR, but medical experience is essential in improving their awareness on this matter.

Majority of medical students believed that attending a DNR lecture or discussion would contribute to their skills when bringing up this issue with the patients and their relatives. This finding concurs with a study conducted in Saudi Arabia, which found that as participants (medical students and interns) advanced through the medical year, they believed they would be able to talk about DNR effectively when taking lessons or sessions in DNR (10). Similarly, another study highlighted that medical professionals were more informed and confident in DNR decision-making when attending additional lectures and training (12). Therefore, it has been demonstrated that providing adequate training and lessons in DNR can improve students' comprehension and competency when dealing with DNR orders. Furthermore, education, additional courses, experiences, self-reflection and a good ethical climate could help develop competency and awareness in dealing with difficult ethical dilemmas (4).

Despite their general awareness concerning DNR, medical students were unfamiliar with the DNR order policies in HUSM (53.2%), thus, unfit to issue DNR. Similarly, medical students and interns in Saudi Arabia were unsure about a clear DNR policy in their hospital (10). In addition, healthcare facilities in various countries lack a clear guideline and policies for DNR orders (13). Osman et al. (2022) reported that ethical committees in hospitals did not contribute significantly to the DNR policy-making, which may lead to the lack of quality practice and medical decision making of healthcare providers (14). Resultantly, most doctors in the healthcare facility lacked sufficient knowledge of DNR policy (15).

DNR decision-making may be hampered by obstacles encountered during DNR discussions, leading to poor patient management, particularly poor understanding concerning DNR among patients or family members, which aligned with a previous study in Saudi Arabia (10). Patient and family members understanding concerning DNR is crucial in improving patient management, particularly in unprecedented situations such as COVID-19. Physicians could adopt the "unilateral DNR" when CPR is unlikely to result in a patient's successful return to their previous quality of life (16). Furthermore, insufficient time, lack of patient decision-making capacity, have been noted as barriers to DNR discussions in this study.

This study also revealed poor knowledge and lack of communication skills training as barriers to DNR decision

making, consistent with findings reported in the UK (17). This finding implied the need of educational trainings in building rapport with patients and their families, solving obstacles, disseminating knowledge, and handling emotional responses (18). For example, Cheng et al. (2019) reported that the SHARE communication course in Taiwan focuses on effective communication to give psychological support to patients who receive bad news about their health (19). Physicians can benefit from the course to enhance their communication skills and improve the patient-doctor relationship, especially when delivering critical news or discussing DNR orders with patients and their families (19).

Medical students in this study have similar patterns in knowledge and awareness about DNR, despite living in mulltiracial and multi-religion country. Alsaati et al. (2019), on the other hand, stated that the level of knowledge differs between medical students and interns (10). Second-year medical students were less accustomed with DNR orders than interns, indicating that the practical training years in the latter helped develop their skills in handling delicate medical issues and orders (10). On the contrary, this pattern was not observed in the present study, suggesting the lack of training among medical undergraduates in HUSM on DNR awareness.

Based on the current curriculum, students are exposed to patients with DNR orders and gain first-hand experience in providing end-of-life care during their scheduled clinical rotations. Furthermore, the topic of DNR order was discussed briefly with lecturers if there were scenario-based questions related to DNR order during the bioethics classes. Therefore, the medical students receive limited exposure to DNR order policies and procedures. Medical schools should incorporate DNR order lessons into the curriculum to provide medical students with a solid foundation in healthcare. Moreover, medical students require in-depth training on the legal and ethical implications of DNR orders and how to communicate with patients and their families about end-of-life care decisions.

The first question in the Likert-scale addressed factors that potentially affects decision making in DNR order. The majority of medical students in this study agreed that patient's dignity, poor prognosis and disease severity, religious belief, legal concerns, weak palliative care, medical cost and financial problems, and patient's mental status must be considered when making a DNR decision, aligned with a previous study (10). Interestingly, while the students' religious background did not influence their DNR awareness, they agreed that religious belief should be considered in DNR decision-making. Lin et al. (2016) stated that different religious backgrounds may influence the decision-making of DNR orders, resulting in different opinions and dilemmas (20). For example, breaking the bad news to family members is a traumatic event among the Chinese community (21). A discussion about a DNR order is deemed acceptable only when the patients or the patients' family members realise that death is imminent (21). Moreover, the DNR issue is particularly sensitive for Muslims. In order to help a Muslim patient and family make informed decision, it is crucial to provide them with a thorough understanding of DNR that is based on Islamic teachings (22).

The second question in the Likert-scale indicated patient's participation in DNR decision making. The study findings highlighted that most medical students valued patient's opinion/rights when making DNR decisions, consistent with previous studies (9,10). Nevertheless, a study conducted among healthcare practitioners (doctors and nurses) in Singapore demonstrated that the participants agreed DNR orders are ultimately decided by the doctor, despite concurring that patients must be consulted when making DNR decisions (23). Furthermore, a study conducted in the UAE contradicted the current study findings where participants agreed that physicians' recommendations take precedence over patient and family preferences in DNR decision-making (15). The discrepancies indicated that the medical undergraduates lack exposure to the reality and management of DNR cases, thus, require further training to learn from more experienced healthcare professionals.

Despite the study consensus that patient autonomy is essential in DNR order, the implementation remains premature in the current medical practice. In Malaysia, patients are entitled to an advanced medical directive according to Study 17 and 18 of the Consent for Treatment of Patients by Registered Medical Practitioners, Malaysian Medical Council (MMC), and their healthcare providers must abide by this order as long as the instructions do not contain illegal activities (24). Nonetheless, clarification and improvements in the regulations and legal provisions pertaining to DNR orders are crucial to safeguard patient rights, ease the burden of end-of-life situations for patients, family members, and healthcare providers, while still maintaining a positive doctor-patient relationship in the Malaysian clinical setting (3).

The third question concerns the management of DNR patients. The majority of medical students agreed to maintain daily rounds for DNR patients, consistent with a previous study among medical students and interns (10). However, Amoudi et al. (2016) reported contrasting finding among residents and interns (9). In addition, the current study found that most medical students had a neutral stance towards life-sustaining removal and that they agreed to maintain management and additional therapy in DNR patients. Moreover, another study conducted in Saudi Arabia reported that most interns and residents disagreed in withdrawal of life sustaining treatments (9). Conversely, a previous

study highlighted that most of their participants believed limiting management and withdrawing life-sustaining treatment from DNR patients were necessary (10). Furthermore, most medical students had a neutral stance towards the use of analgesia at higher doses, suggesting lack of understanding in palliative care management. Meanwhile, a previous study highlighted that most of their participants believed that being generous with analgesia in DNR patients were necessary (9,10). In summary, the difference in agreements among medical students' could be due to students' lack of knowledge and working experience in hospital patient management policy, especially among DNR cases.

The fourth question addressed the issue of organ donation among DNR patients. The study found that medical students generally agreed with bringing up the topic of organ donation during DNR discussion, consistent with previous studies that reported majority of their participants encourage organ donation dicussion with DNR patient or family (9, 10). Currently, there is poor understanding and consent regarding donation of organ in Malaysia (25). These facts are reflected by figures recorded in Global Observatory on Donation and Transplantation (GODT), where Malaysia recorded a much lower rate of actual deceased donors (dd) (0.21 donors per million population) in comparison to global rate (6.37 per million opulation) (26). Hence, a discussion session about organ donation with DNR patients and family members may help to raise awareness and exposure.

This study has several limitations. This study was performed in a single centre and utilized non-probability sampling, thus, the findings may not be generalizable to a wider context. However, the study highlighted the importance of formal teachings on DNR orders to expose and equip students on DNR issues. For instance, Day et al. (2022) concluded that goals of care (GoC) conversation-focused e-learning module encourages a change in residents' perspectives and methods that might help counteract the effects of the hidden curriculum and potentially enhance their quality of care and communication (27).

Given that most medical students are unaware of the DNR guidelines and policies in HUSM, lectures and discussions on this subject would expose and familiarise students to the relevant information. Additionally, poor knowledge and training in communication skills among students could be overcome with ample training and practical sessions in DNR orders to enhance students' exposure, experience, and skills when dealing with DNR patients in the clinical setting. Future studies could investigate the level of patient involvement in DNR order decision-making and management, and organ donation issues. In addition, future studies could examine the religion and culture influence in DNR decision-making.

CONCLUSION

Generally, the medical students in this study context have good knowledge and exposure in DNR orders, but lack of knowledge in terms of DNR policy in HUSM. There was no significant differences between level of awareness in DNR orders and year of study, gender, race and religion, suggesting that being a multiracial and multi-religion community did not influence the medical students' knowledge and awareness about DNR. In addition, there is a lack of literature concerning the decision-making in discontinuing life-sustaining treatment or deal with end-of-life issues in Malaysia. Therefore, further studies related to DNR is imperative and an evidence-based policies should be implemented to consolidate medical training and support patients and relatives in this matter.

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