Assessment of the knowledge, attitude, readiness, and willingness to volunteer in disasters amongst medical students in Singapore

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INTRODUCTION

Disaster medicine is a systems-oriented specialty dealing with medical response to disasters, ranging from man-made or natural disasters to infectious disease outbreaks.[1] Disasters place considerable stress on national healthcare resources and increase the demand for human and material resources. This is evident in the COVID-19 pandemic, which exposed deficits in disaster preparation worldwide. It is apparent that disaster planning, including the recruitment of public health volunteers, is vital to ensure that the healthcare system is able to cope during disasters.

In Singapore, natural disasters like earthquakes, tornadoes, and tsunamis are rare. However, the urbanised setting with high population density has potential to compound likely disasters such as fires, bombings, toxin exposure, infrastructural collapse, and infectious disease outbreaks resulting in mass casualties, a recipe for overwhelming healthcare systems.[2,3] In these unprecedented times, COVID-19 has strained the healthcare workforce as they attempt to contain community spread. In this light, Singapore's Ministry of Health set up the SG Healthcare Corps for current and former healthcare professionals to volunteer in the fight against COVID-19. However, not included in the recruitment of volunteers are medical students who remain an untapped reserve during this time of crisis. Medical students are a ready source of manpower to help ease capacity strains during periods of high medical demand. In addition, volunteering in disasters serves to educate students in disaster preparedness, and therefore prepare the workforce for successful disaster response in the future.[4]

Historically, medical students have been involved in various capacities during natural disasters, such as the 1918 Spanish Flu pandemic and 1952 Copenhagen polio epidemic.[5,6] Recently, with clinical postings suspended in view of COVID-19, medical students in Vietnam, UK, USA, and Australia have been tasked to support national efforts against the outbreak.[7-11]

Furthermore, the American Medical Association and the Medical Schools Council (UK) released guidelines for medical students to volunteer during COVID-19, acknowledging that there is immense learning potential besides the obvious benefit in easing manpower needs.[12-14] Worldwide, medical students are stepping up to serve their communities, be it through telehealth initiatives, public education campaigns or joining the frontlines, demonstrating their willingness to serve during a public health emergency.

Generally, medical students believe that they have a moral, ethical, and professional obligation to volunteer during a disaster, and are encouraged to volunteer if there is a healthcare worker shortage.[15-18] However, the willingness to volunteer is an important limiting factor, and there are various motivators and barriers to it.[18,19] As there are no studies reported on this important area in the local context, our study aims to assess: (1) the willingness of medical students to volunteer in disaster response, (2) knowledge, attitudes, and readiness on volunteering during disasters, (3) barriers and motivators to volunteering, and (4) how these factors would influence willingness to volunteer.

METHODS

A survey-based cross-sectional study was conducted amongst medical students attending Duke-NUS Medical School, a graduate entry medical school, between August and September 2020. Students included individuals who were MD or MD/PhD students. There were a total of 239 students registered during the study period. This study was approved by the National University of Singapore Institutional Review Board (NUS-IRB) on July 27, 2020 (NUS-IRB-2020-151). The study protocol was also approved and supported by Duke-NUS Medical School.

Due to COVID-19 safe-distancing measures, recruitment was conducted by email delivered through the school mailing list. Participants were shown the NUS-IRB compliant Participant Information Sheet and were informed that consent is implied if they completed the survey. Participants were assured that participation was voluntary and no identifying information would be collected for use in the study. In total, 3 emails were sent to encourage participation.

The survey consisted of questions aimed at assessing willingness (W), knowledge (K), attitude (A), and readiness (R) towards volunteering during disasters. Survey questions for each domain were based on validated survey-studies[20-23] and modified to fit the cultural context of Singapore. Previously studied barriers and motivators to volunteering were also assessed.[13,15,16,18] Information such as age, gender, ethnicity, year of study, previous volunteering experience, and exposure to public emergencies were collected to stratify findings.

Willingness to volunteer was assessed in 4 different types of disasters – natural, chemical, radiological and infectious disease – using a 5-point Likert scale (very unwilling, unwilling, neutral, willing, very willing). Those who responded with 1-3 were considered unwilling, while those who responded with 4-5 were considered willing.[18,23] Well-known local and international disasters were provided as examples so that respondents would have a better idea of each type of disaster when rating their willingness to volunteer. The knowledge domain was assessed by 18 YES/NO statements, where 'YES' was given a score of 1 for a possible total of 18 points. The attitude domain consisted of 12 statements assessed on a 5-point Likert scale (strongly disagree, disagree, neutral, agree, strongly agree), for a possible total of 60 points and the readiness domain consisted of 8 questions assessed on a 5-point Likert scale for a possible total of 40 points. The scores for each domain of knowledge, attitude and readiness were categorized into low (25th quartile), moderate (26–75th quartiles), and high (> 75th quartile).[10] The barriers and motivators

section consisted of 13 factors assessed on a 5-point Likert scale (not important, less important, neutral, important, very important) which were collapsed into two categories (1-3 as not important, 4-5 as important).

Data was analysed using IBM SPSS Statistics version 25. The results of the descriptive analysis were reported as the frequency (%) for non-continuous variables and mean (±SD) for continuous variables. Chi-squared test was used to assess if the proportion of high scores and willingness to volunteer for each disaster type were associated with the demographics and background of the respondents. Spearman rho test was used to assess if willingness to volunteer was associated with K, A and R scores. All tests were carried out at a statistical significance of 0.05.

RESULTS

104 out of 293 students (35.5%) responded to the survey and 99 (33.8%) students attempted the survey to completion. The demographics of the respondents are presented in Table 1. Notably, 32 (32.7%) of the respondents were in their first year of study in the MD programme, and a small proportion of respondents were in the MD-PhD programme (n = 6, 5.8%). 100 (96.2%) respondents had prior volunteering experiences in any field, 21 (20.2%) had prior disaster preparedness training.

A majority of responders had moderate scores across all domains of knowledge, attitude and readiness (Fig. 1). The demographics of respondents who had high knowledge, attitude and readiness scores is presented in Table 1.

A significantly higher proportion of respondents who had prior experience in public health emergencies had high knowledge scores compared to those who never had such experiences

(23.1% and 5.5% respectively, p = 0.026). Additionally, a higher proportion of respondents who had prior disaster preparedness training had high knowledge scores (3.6% and 23.8% respectively, p = 0.002) and attitude scores (13.3% and 33.3% respectively, p = 0.030) compared to those with no training.

Respondents were most willing to volunteer for conventional disasters (84.6%), followed by infectious disease outbreaks (79.8%). However, most respondents were unwilling to volunteer during chemical or radiological disasters (48.1% and 36.5% respectively).

The demographics of respondents who were willing to volunteer in each type of disaster is presented in Table 1. Compared to Singapore citizens and permanent residents (PR), a significantly lower proportion of non-citizens and non-PRs were willing to volunteer for radiological disasters (41.5% and 18.2% respectively, p= 0.044). Furthermore, a significantly higher proportion of respondents with prior National Service (NS) experience and a higher proportion of those with prior disaster preparedness training were willing to volunteer in chemical disasters compared to those who did not undergo NS (64.3% and 42.1% respectively, p= 0.045) or prior disaster preparedness training (71.4% and 42.2% respectively, p= 0.017).

However, those with previous volunteering experience in healthcare settings were less willing to volunteer in chemical disasters (40.6% and 62.9% respectively, p= 0.032) and radiological disasters (29.0% and 51.4% respectively, p= 0.025).

A higher proportion of those with 'High' attitude scores were willing to volunteer for conventional disasters (p= 0.032) and infectious disease outbreaks (p= 0.011) than those with moderate scores (Table 2). Furthermore, a higher proportion of those with 'High' readiness scores were willing to volunteer for infectious disease outbreaks (p= 0.005) (Table 2). Willingness to volunteer in chemical and radiological disasters was not associated with K, A, R scores.

Competency in volunteering role (87.9%), altruism (86.9%), the need for volunteers (83.8%), and time commitment (80.8%) were important factors when deciding to volunteer (Supplementary Table 1). Interestingly, compensation (6.0%) and career advancement (27.3%) were not important factors when deciding to volunteer.

A higher proportion of those who were unwilling to volunteer for chemical and radiological disasters rated personal safety, type of disaster and severity of disaster as important factors when considering to volunteer in these type of disasters (Supplementary Table 1). In addition, a higher proportion of those who were willing to volunteer for infectious disease outbreaks (91.1%) rated competency in volunteer role as an important factor compared to those who were unwilling (75.0%) (p= 0.048).

DISCUSSION

The study found that most medical students had moderate knowledge, attitude and readiness scores despite the lack of a formal disaster medicine curriculum and exposure to disasters. It was also found that medical students are willing to volunteer for conventional disasters and infectious disease outbreaks but not radiological and chemical disasters. This finding is consistent with studies published in Ireland and the US.[15,16] Also, while medical students are more willing to volunteer during infectious disease outbreaks compared to other healthcare professionals,[17] they are less likely to volunteer during outbreaks with respiratory transmission.[24] However, the current study found that participants with prior national service (NS) experience, probably with exposure to chemical defence and disaster preparedness training were more willing to volunteer for chemical disasters. Furthermore, prior disaster training was associated with higher knowledge and attitude scores, and prior volunteering experience was associated with higher attitude and readiness score.

As such, disaster medicine training and volunteering in medical school may improve willingness to participate during disasters.

Taken together, these findings suggest that the school curriculum plays an active role in preparing students for emergency response and equipping them with the necessary skills required for deployment.

Overall, time commitment was a significant barrier for volunteering while altruism and opportunities for improving future job prospects were strong motivating factors. Competency for the volunteering role was the most significant factor that respondents considered when deciding to volunteer, particularly for infectious disease outbreaks. Furthermore, only 41.4% of respondents indicated that they are confident in their ability to provide quality care during volunteering and 93.2% indicated that they would be willing to attend workshops, simulated training and participate in disaster exercises to be ready for dealing with disaster scenarios as part of the formal school curriculum. Those who were unwilling to volunteer for conventional and radiological disasters considered compensation for volunteer works as an important motivating factor, which was not the case for chemical disasters and infectious disease outbreaks. Additionally, risk to personal safety, type of disaster and severity were significant barriers to volunteering in chemical and radiological disasters. These limitations and barriers should be taken into consideration for future policies on volunteer recruitment to meet manpower needs.

Furthermore, several aspects of medical student volunteerism in disasters need to be addressed. Experience, skills and knowledge vary at different stages in medical training and the need for heightened supervision may be considered more of a liability and burden than help.[25] Even though our study did not show any difference in the knowledge scores of different student seniorities, perceived knowledge and experience would not be best measured with a survey. Other

issues include liability issues and medico-legal aspects of care delivered by students during in their volunteer role, and shortage of resources such as personal protective equipment (PPE).

Despite this, medical students have acquired skills and experiences that could be useful in disaster settings.[12,26] The issue with varying skillsets and stages of training can be planned for and coordinated between the schools and deployment agencies by matching needs with the abilities of students in each year.[27] In cases where deployment in healthcare-settings is not possible or appropriate to their level of training, students can be involved in logistical or administrative work such as contact tracing efforts during infectious disease outbreaks. With appropriate training, medical students can be a reliable source of manpower to complement national efforts in disaster response.

There are a few limitations in the study. Firstly, participation was voluntary and the results might be influenced by response bias. Additionally, since only 33.8% of students completed the entire survey, the choices and perspectives of the remaining 66.2% could significantly alter the results. Secondly, as the survey was conducted in a single graduate-entry medical school, it would be difficult to generalise the results to the 2 other local medical schools which offer undergraduate programmes. It will be worthwhile to study if undergraduates who are generally younger, at different life stages, and have not undergone national service have differing levels of willingness or perceptions regarding volunteering in disasters. Lastly, although the survey consisted of many questions that were adapted from other validated surveys, the study survey was modified for the local context and thus not formally validated.

In conclusion, medical students in Singapore are willing to volunteer in conventional and infectious disease disasters, and their willingness is influenced by their attitude and readiness for volunteering. A disaster response curriculum would improve competence and confidence in

disaster response. Future studies could focus on understanding and addressing the attitudes and perceptions of medical student volunteers from the perspectives of stakeholders such as other medical professionals and policy makers to facilitate volunteering during disasters.

REFERENCES

1. Ciottone GR. Introduction to disaster medicine. In: Ciottone GR. Ciottone's Disaster Medicine. 2nd ed. Elsevier Inc, 2016: 2-5.

2. Asian Disaster Reduction Center. Republic of Singapore country report on disaster reduction measures. Available at: https://www.adrc.asia/countryreport/SGP/SGPeng98/index.pdf. Accessed September 21, 2020.

3. Ministry of Health, Singapore. MOH pandemic readiness and response plan for influenza and other acute respiratory diseases (revised April 2014). Available at: www.moh.gov.sg/docs/librariesprovider5/diseases-updates/interim-pandemic-plan-public-ver-_april-2014.pdf. Accessed September 21, 2020.

4. Alrazeeni D. Saudi EMS students' perception of and attitudes toward their preparedness for disaster management. J Educ Prac 2015; 6:110-6.

5. Starr I. Influenza in 1918: recollections of the epidemic in Philadelphia. Ann Intern Med 2006; 145:138-40.

6. Trubuhovich RV. In the beginning. The 1952-1953 Danish epidemic of poliomyelitis and Bjørn Ibsen. Crit Care Resusc 2003; 5:227-30.

7. Khanh V. Vietnam calls up medical students, retired doctors in coronavirus fight. In: London Free Press [online]. Available at: https://lfpress.com/pmn/health-pmn/vietnam-calls-up-medical-students-retired-doctors-in-coronavirus-fight/wcm/d9bd4840-70a7-4689-b993-0749800dbeca/. Accessed September 21, 2020.

8. Mahase E. Covid-19: medical students to be employed by NHS as part of epidemic response. BMJ 2020; 368:m1156.

9. Buckley MRF. HMS students mobilize. In: Harvard Medical School [online]. Available at https://hms.harvard.edu/news/hms-students-mobilize. 21 Accessed September 21, 2020.

10. Le Lievre K. ANU and UC step up to help in coronavirus response. In: The Canberra Times [online]. Available at https://www.canberratimes.com.au/story/6711533/anu-and-uc-step-up-to-help-in-coronavirus-response/. Accessed September 21, 2020.

11. Amante A, Balmer C. Italy rushes new doctors into service as coronavirus deaths rise above 2,500. In: Reuters [online]. Available at: https://www.reuters.com/article/us-health-coronavirus-italy-idUSKBN214245. Accessed September 21, 2020.

12. American Medical Association. AMA guiding principles to protect learners responding to COVID-19. Available at: https://www.ama-assn.org/delivering-care/public-health/ama-guiding-principles-protect-learners-responding-covid-19. Accessed September 21, 2020.

13. Miller DG, Pierson L, Doernberg S. The role of medical students during the COVID-19 pandemic. Ann Intern Med 2020; 173:859.

14. Medical Schools Council. Statement of expectation: medical student volunteers in the NHS. Available at: https://www.medschools.ac.uk/media/2641/updated-volunteering-guidance-020420.pdf. Accessed September 21, 2020.

15. Gouda P, Kirk A, Sweeney AM, O'Donovan D. Attitudes of medical students toward volunteering in emergency situations. Disaster Med Public Health Prep 2020; 14:308-11.

16. Kaiser HE, Barnett DJ, Hsu EB, et al. Perspectives of future physicians on disaster medicine and public health preparedness: challenges of building a capable and sustainable auxiliary medical workforce. Disaster Med Public Health Prep 2009; 3:210-6.

17. Tebruegge M, Pantazidou A, Ritz N, et al. Perception, attitudes and knowledge regarding the 2009 swine-origin influenza A (H1N1) virus pandemic among health-care workers in Australia. J Paediatr Child Health 2010; 46:673-9.

18. Rosychuk RJ, Bailey T, Haines C, et al. Willingness to volunteer during an influenza pandemic: perspectives from students and staff at a large Canadian university. Influenza Other Respir Viruses 2008; 2:71-9.

19. Yonge O, Rosychuk RJ, Bailey TM, Lake R, Marrie TJ. Willingness of university nursing students to volunteer during a pandemic. Public Health Nurs 2010; 27:174-80.

20. Al-Ziftawi NH, Elamin FM, Mohamed Ibrahim MI. Assessment of knowledge, attitudes, and readiness to practice regarding disaster medicine and preparedness among university health students. Disaster Med Public Health Prep 2020 Mar 2. https://doi.org/10.1017/dmp.2019.157. [Epub ahead of print]

21. Zagelbaum NK, Heslin KC, Stein JA, et al. Factors influencing readiness to deploy in disaster response: findings from a cross-sectional survey of the Department of Veterans Affairs Disaster Emergency Medical Personnel System. BMC Emerg Med 2014; 14:16.

22. Herman B, Rosychuk RJ, Bailey T, et al. Medical students and pandemic influenza. Emerg Infect Dis 2007; 13:1781-3.

23. Goodhue CJ, Burke RV, Ferrer RR, et al. Willingness to respond in a disaster: a pediatric nurse practitioner national survey. J Pediatr Health Care 2012; 26:e7-20.

24. Patel R, Wattamwar K, Kanduri J, et al. Health care student knowledge and willingness to work in infectious disease outbreaks. Disaster Med Public Health Prep 2017; 11:694-700.

25. O'Byrne L, Gavin B, McNicholas F. Medical students and COVID-19: the need for pandemic preparedness. J Med Ethics 2020; 46:623-6.

26. Krieger P, Goodnough A. Medical students, sidelined for now, find new ways to fight coronavirus. In: The New York Times [online]. Available at: www.nytimes.com/2020/03/23/health/medical-students-coronavirus.html. Accessed September 10, 2020.

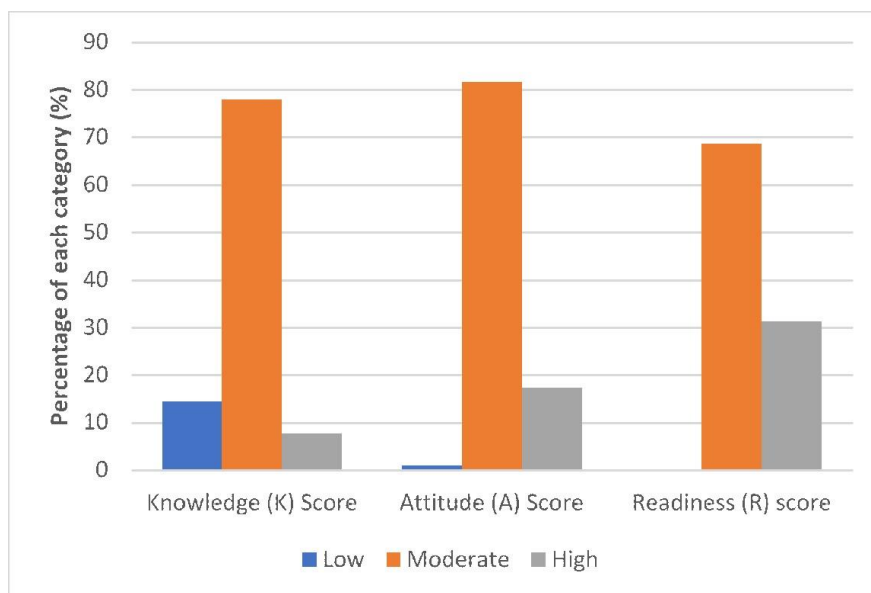27. Keil M. H5N1 influenza pandemic planning: should medical students be left out? Clin Teach 2007; 4:124-7.

Fig 1: Knowledge, attitude, readiness levels

Table 1: Demographics of Survey respondents, N= 104

	All respondents	Total school population	High knowledge score, n (%)	High attitude score, n (%)	High readiness score, n (%)***	Willing to volunteer in conventional disasters, n (%)	Willing to volunteer in chemical disasters, n (%)	Willing to volunteer in radiological disasters, n (%)	Willing to volunteer in infectious disease outbreaks, n (%)
Age, Mean (standard deviation)	26.98 (3.17)	25.87 (3.01)	28.00 (4.81)	27.61 (2.95)	27.23 (2.91)	27.16 (3.16)	27.62 (3.36)	27.74 (3.53)	27.18 (3.21)
Gender									
Male	43 (41.3)	137 (46.1)	5 (11.6)	8 (18.6)	13 (22.4)	37 (86.0)	21 (48.8)	16 (37.2)	31 (72.1)
Female	61 (58.7)	160 (53.9)	3 (4.9)	10 (16.4)	18 (31.0)	51 (83.6)	29 (47.5)	22 (36.1)	52 (85.2)
Race									
Chinese	82 (78.8)	*Not available*	7 (8.5)	16 (19.5)	25 (31.6)	73 (89.0)	42 (51.2)	33 (40.2)	69 (84.1)
Indian	10 (9.6)		0 (0.0)	2 (20.0)	5 (50.0)	8 (80.0)	5 (50.0)	3 (30.0)	8 (80.0)
Malay	2 (1.9)		1 (50.0)	0 (0.0)	0 (0.0)	1 (50.0)	1 (50.0)	1 (50.0)	2 (100.0)
Others	10 (9.6)		0 (0.0)	0 (0.0)	1 (11.1)	6 (60.0)	2 (20.0)	1 (10.0)	4 (40.0)
Citizenship Status									
Singapore Citizen or PR	82 (82.8)	*Not available*	8 (9.8)	15 (18.3)	26 (33.3)	70 (85.4)	43 (52.4)	34 (41.5)	68 (82.9)
Non-PR/non-citizen	22 (21.2)		0 (0.0)	3 (13.6)	5 (23.8)	18 (81.8)	7 (31.8)	**4 (18.2)****	15 (68.2)
Year of Study									
MS1	34 (32.7)	72 (24.2)	2 (5.9)	6 (17.6)	8 (24.2)	31 (91.2)	13 (38.2)	12 (35.3)	27 (79.4)
MS2	21 (20.2)	72 (24.2)	4 (19.0)	5 (23.8)	8 (44.4)	17 (81.0)	14 (66.7)	11 (52.4)	18 (85.7)
MS3	20 (19.2)	51 (17.2)	1 (5.0)	5 (25.0)	5 (25.0)	14 (70.0)	6 (30.0)	3 (15.0)	15 (75.0)
MS4	23 (22.1)	65 (21.9)	1 (4.3)	2 (8.7)	7 (31.8)	21 (91.3)	14 (60.9)	11 (47.8)	18 (78.3)
MD-PhD	6 (5.8)	37 (12.5)	0 (0.0)	0 (0.0)	3 (50.0)	5 (83.3)	3 (50.0)	1 (16.7)	5 (83.3)
National Service ^									
Yes	28 (26.9)	*Not available*	4 (14.3)	6 (21.4)	10 (37.0)	26 (92.9)	18 (64.3)	14 (50.0)	22 (78.6)
No	76 (73.1)		4 (5.3)	12 (15.8)	21 (29.2)	62 (81.6)	**32 (42.1)****	24 (31.6)	61 (80.3)

Previous disaster preparedness training									
Yes	21 (20.2)	*Not*	**5 (23.8)**	**7 (33.3)**	8 (40.0)	19 (90.5)	**15 (71.4)**	8 (38.1)	17 (81.0)
No	83 (79.8)	*available*	**3 (3.6)****	**11 (13.3)****	23 (29.1)	69 (83.1)	**35 (42.2)****	30 (36.1)	66 (76.7)
Involvement in planning for, response to, or recovery from a public health emergency, as a professional* or volunteer									
Yes	13 (12.5)	*Not*	**3 (23.1)**	4 (30.8)	6 (54.5)	11 (84.6)	7 (53.8)	4 (30.8)	10 (76.9)
No	91 (87.5)	*available*	**5 (5.5)****	14 (15.4)	25 (28.4)	77 (84.6)	43 (47.3)	34 (37.4)	73 (80.2)
Previous volunteering experience #									
Yes	100 (96.2)	*Not*	8 (8.0)	16 (16.0)	31 (32.3)	85 (85.0)	49 (49.0)	37 (37.0)	81 (81.0)
No	4 (3.8)	*available*	0 (0.0)	2 (50.0)	0 (0.0)	3 (75.0)	1 (25.0)	1 (25.0)	2 (50.0)

^ Singapore Armed Forces (SAF), Singapore Civil Defense Force (SCDF), Singapore Police Force (SPF)

 # Hospital/ Healthcare, Public Health, Sports and Recreation, Religious Institutions, School co-curricular activities (eg. uniformed groups, sports group, others (clubs and societies)

*Professional experience (e.g. emergency medical services, firefighter)

**Significant difference at p<0.05

***N= 99 due to 5 respondents not attempting survey to completion

Table 2: Association between high, moderate and low K, A and R scores with willingness to volunteer using Chi-square test

	Total	Willing to volunteer in a conventional disaster	Willing to volunteer in a chemical disaster	Willing to volunteer in a radiological disaster	Willing to volunteer in an infectious disease outbreak
Knowledge (K) score					
Low	15 (14.4)	11 (73.3)	5 (33.3)	5 (33.3)	9 (60.0)
Moderate	81 (77.9)	72 (88.9)	40 (49.4)	30 (37.0)	68 (84.0)
High	8 (7.7)	5 (62.5)	5 (62.5)	3 (37.5)	6 (75.0)
Attitude (A) score					
Low	1 (1.0)	**0 (0.0)**	0 (0.0)	0 (0.0)	**0 (0.0)**
Moderate	85 (81.7)	**71 (83.5)**	43 (50.6)	31 (36.5)	**65 (76.5)**
High	18 (17.3)	**17 (94.4)***	7 (38.9)	7 (38.9)	**18 (100.0)***
Readiness (R) score					
Low	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	**0 (0.0)**
Moderate	68 (68.7)	56 (82.4)	29 (42.6)	20 (29.4)	**49 (72.1)**
High	31 (31.3)	29 (93.5)	17 (54.8)	14 (45.2)	**30 (96.8)***

Significant difference at p<0.05

APPENDIX

Supplementary Table 1: Factors affecting willingness to volunteer, N= 99

Factor	Median score (1= not important, 5= very important)	Number of respondents rating it as important with score of 4 or 5, N (%)								
		Overall	Conventional disaster		Chemical disaster		Radiological disaster		Infectious disease outbreak	
			Willing, N =85	Unwilling, N=14	Willing, N =46	Unwilling, N=53	Willing, N =34	Unwilling, N=65	Willing, N =79	Unwilling, N=20
Disruption to education	4	73 (73.7)	61 (71.8)	12 (85.7)	36 (78.3)	37 (69.8)	26 (76.5)	47 (72.3)	58 (73.4)	15 (75.0)
Personal safety and exposure to dangerous elements	4	73 (73.7)	60 (70.6)	13 (92.9)	**28 (60.9)***	**45 (84.9)***	**18 (52.9)***	**55 (84.6)***	56 (70.9)	17 (85.0)
Competency in volunteering role	4	87 (87.9)	75 (88.2)	12 (85.7)	40 (87.0)	47 (88.7)	29 (85.3)	58 (89.2)	**72 (91.1)***	**15 (75.0)***
Need for volunteers	4	83 (83.8)	72 (84.7)	11 (78.6)	38 (82.6)	45 (84.9)	30 (88.2)	53 (81.5)	67 (84.8)	16 (80.0)
Approval by school	4	57 (57.6)	47 (55.3)	10 (71.4)	25 (54.3)	32 (60.4)	19 (55.9)	38 (58.5)	46 (58.2)	11 (55.0)
Type of disaster	4	64 (64.6)	54 (63.5)	10 (71.4)	**25 (54.3)***	**39 (73.6)***	**15 (44.1)***	**49 (75.4)***	51 (64.6)	13 (65.0)
Compensation for volunteer work	2	6 (6.0)	**3 (3.5)***	**3 (21.4)***	**0 (0.0)***	**6 (11.3)***	0 (0.0)	6 (9.2)	3 (3.8)	3 (15.0)
Availability of faculty supervision	4	61 (61.6)	51 (60.0)	10 (71.4)	30 (65.2)	31 (58.5)	23 (67.6)	38 (58.5)	51 (64.6)	10 (50.0)
Volunteer roles specifically created for medical students	4	63 (63.6)	52 (61.2)	11 (78.6)	26 (56.5)	37 (69.8)	20 (58.8)	43 (66.2)	51 (64.6)	12 (60.0)
Severity of disaster	4	59 (59.6)	48 (56.5)	11 (78.6)	**21 (45.7)***	**38 (71.7)***	**14 (41.2)***	**45 (69.2)***	44 (55.7)	15 (75.0)

Altruism (concern for welfare of others or helping those in need)	4	86 (86.9)	75 (88.2)	11 (78.6)	39 (84.8)	47 (88.7)	27 (79.4)	59 (90.8)	69 (87.3)	17 (85.0)
Professional development (opportunity to learn new skills, get more training in emergency response and work in a new environment)	4	69 (69.7)	57 (57.6)	12 (85.7)	33 (71.7)	36 (67.9)	23 (67.6)	46 (70.8)	55 (69.6)	14 (70.0)
Career (chance to improve CV, increase job opportunities, and network)	4	27 (27.3)	**20 (23.5)***	**7 (50.0)***	**8 (17.4)***	**19 (35.8)***	**5 (14.7)***	**22 (33.8)***	19 (24.1)	8 (40.0)
Family/Parental support for volunteering	4	57 (57.6)	47 (55.3)	10 (71.4)	25 (54.3)	32 (60.4)	19 (55.9)	38 (58.5)	45 (57.0)	12 (60.0)
Psychological/ mental stress (eg fear of doing the wrong thing)	4	64 (64.6)	52 (61.2)	12 (85.7)	28 (60.9)	36 (67.9)	20 (58.8)	44 (67.7)	50 (63.3)	14 (70.0)
Time commitment for volunteering	4	80 (80.8)	**66 (77.6)***	**14 (100.0)***	38 (82.6)	42 (79.2)	27 (79.4)	53 (81.5)	62 (78.5)	18 (90.0)
Concerns for dependents their safety and livelihood	4	73 (73.7)	61 (61.6)	12 (85.7)	32 (69.6)	41 (77.4)	23 (67.6)	50 (76.9)	57 (82.6)	16 (80.0)

*Significant difference at $p<0.05$