


# Assessment of Knowledge, Attitudes, and Readiness to Practice Regarding Disaster Medicine and Preparedness Among University Health Students

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## ABSTRACT

**Objectives:** The aim of this study is to assess the knowledge (K), attitude (A), and readiness to practice (rP) levels regarding disaster medicine and preparedness among health profession students at Qatar University.

**Methods:** A survey-based study was carried out to assess medical, pharmacy, and health sciences students' KArP levels using pretested and validated questionnaire. Student's t-test, analysis of variance, correlation, and linear regression were used with an alpha level of 0.05.

**Results:** The difference in the mean KArP level between genders was not significant ( $P > 0.05$ ). Students from the College of Health Sciences had significantly higher KArP levels than those from the College of Pharmacy (101.5 vs 90.0;  $P = 0.033$ ). Overall, Qatari students had better knowledge, attitude, and readiness to practice scores and total KArP scores than non-Qatari students. Moreover, students who were born in Qatar also had better knowledge, attitude, and readiness to practice scores and total KArP scores than students who were born outside Qatar. Significant direct moderate correlations were found among the 3 KArP parameters ( $P < 0.001$ ). Knowledge and attitudes were indicated to be significant predictors of readiness to practice ( $P < 0.001$ ).

**Conclusions:** Students from the health colleges at Qatar University have moderate disaster medicine preparedness

**Key Words:** crisis, conflict, disaster management, disaster medicine, disaster preparedness

Access to medication is an essential pillar of human rights to health.<sup>1</sup> Therefore, medication accessibility should be secured throughout the medication supply chain. This aim can mainly be achieved by tackling the issues of rational selection of medication, affordable prices, reliable health and supply systems, and sustainable medication supply.<sup>1,2</sup> Nonetheless, the security of the medication supply chain and the functionality of health-care systems are affected by the occurrence of both human-made disasters, such as wars, embargos, and terrorism, as well as natural disasters, including earthquakes, floods, hurricanes, and fires.<sup>3,4</sup> Unfortunately, disasters can happen at any time, impairing health-care delivery and the country's economy.<sup>5</sup>

The success of disaster responses mainly depends on the degree of successful disaster preparedness.<sup>5</sup> Disaster preparedness is defined as "measures taken to prepare for and reduce the effects of disasters. That is, to predict and, where possible, prevent disasters, mitigate their impact on vulnerable populations, and respond to and effectively cope with their consequences".<sup>6</sup> Therefore, it is apparent that disaster preparedness is an organizational process and

that knowledge (K), attitude (A), and practice (P) are the main components of such a process.<sup>7</sup> In the context of health systems, health-care professionals should have high levels of KAP to ensure a high level of disaster medicine preparedness. Therefore, their KAP should be evaluated and improved if required. KAP and skills need to be acquired at the university level.

However, in some of the countries where health-care professionals' disaster preparedness has been assessed, the levels of preparedness were not sufficient. For instance, in a study that assessed the knowledge of, preparedness for, and willingness to respond to a disaster among hospital staff in an urban center in Australia, the staff level of preparedness was low because of a lack of education, insufficient training, and limited disaster experience,<sup>8-10</sup>

Similarly, some studies conducted in low- and middle-income countries (LMICs), such as China, Yemen, Saudi Arabia, Ethiopia, and Malaysia, to evaluate disaster medicine preparedness among health-care professionals revealed under-preparedness, with knowledge levels ranging from inadequate to somewhat satisfactory.<sup>9-14</sup>

Naser and Saleem (2018) determined that the absence of teaching programs is a major issue in health professionals' lack of knowledge regarding disaster preparedness<sup>11</sup>; in Ethiopia, the respondents felt the need for training in disaster, but unfortunately, opportunities were lacking.<sup>12</sup>

On the other hand, some studies that have addressed the same topic but among health students, taking into consideration that such students are future health-care professionals, had different findings. In 1 study conducted in the United States of America (US) to evaluate medicine, nursing, and dental students' knowledge, attitude, and confidence to practice levels in case of a disaster, students had good knowledge levels and were able to use the existing curricula, with only minor modifications; thus, the addition of a few focused subjects could be made to improve knowledge.<sup>15</sup> However, some other studies also based on student responses have revealed different outcomes. For instance, studies from European countries, such as Germany, Italy, and the Netherlands, have revealed that medical students have low knowledge and confidence regarding disaster medicine.<sup>16-18</sup> Similarly, in a study in Shanghai, China, the authors reported negative findings regarding students' knowledge and concluded that the students' current education did not match the required knowledge level and needs for disaster preparedness.<sup>19</sup> In the Gulf region, 2 studies at different universities in Saudi Arabia that evaluated health students' knowledge and attitudes showed that students were under-prepared to respond to disasters and that integration of disaster knowledge into the undergraduate curriculum was needed.<sup>5,20</sup>

Disaster preparedness training for future health-care professionals has been recognized as a main component of medical education. Previous studies have documented that medical students do not believe that they have received adequate training for responding to disasters. Health profession students in LMICs are speculated to receive relatively limited exposure to these topics. Courses in disaster preparedness would help to increase the workforce available in the health-care system to deal with disaster events. To date, only a few studies have examined the perspectives of future health-care professionals on disaster medicine preparedness issues. With the increase in the risk of disasters in the region, a study is crucially needed.

Of note, although Qatar is subjected to different types of disasters, including human-made disasters such as blockages and wars, studies evaluating the level of disaster medicine preparedness among health-care professionals and students, as future professionals, are lacking.

A blockade has been imposed against Qatar by its neighboring countries, ie, Saudi Arabia, Bahrain, the United Arab Emirates and Egypt, for almost 24 months.<sup>21</sup> No one knows what will happen in the near future. Therefore, the aim of this study

is to assess the level of disaster medicine preparedness among health-care students at Qatar University by assessing and evaluating their knowledge (K), attitude (A), and readiness to practice (rP) regarding disaster medicine and preparedness.

## METHODS

### Study Design

A cross-sectional quantitative observational survey-based study was conducted to assess students' KArP levels. The study was conducted at Qatar University, the only public university in the country.

### Ethical Considerations

This study was approved by the Qatar University Institutional Review Board (QU-IRB) on April 7, 2018 (QU-IRB 918-E/18). In addition, the administration department of each college agreed to participate in the study. The consent form was attached to the distributed surveys, and a respondent returning the survey indicated his or her agreement to participate in the study.

### Study Participants and Sample Size

The targeted population was undergraduate students from the College of Pharmacy (CPH), College of Medicine (CMED), and College of Health Sciences (CHS). Of a total population of 774 students, a sample size of 187 students was needed. The required sample size was calculated based on a margin of error of 5%, a 95% confidence level, and an 80% response distribution. Raosoft<sup>®</sup> was used to perform this calculation.<sup>22</sup> Students were recruited based on convenience sampling through the stratification of the colleges. Undergraduate students from the CPH, CMED, and CHS were included in the study with no restrictions on age, gender, or study level/academic year. Postgraduate students and students who participated in the pilot phase were excluded.

### Outcome Measures

The primary outcome of the study was the assessment of KArP levels among health students at Qatar University. In our study, *Knowledge* is defined as the fact or condition of knowing about disaster preparedness with familiarity gained through experience<sup>23</sup>; *Attitude* is defined as a way of behaving that is caused by experiences of or opinions about disaster<sup>24</sup>; and *Readiness* is defined as a state of preparation and willingness to practice if a disaster were to occur.<sup>25</sup>

### Tool Development

The questionnaire was developed from review of literature of previous studies and was adopted with a few modifications to fit the context of this study.<sup>7,11,15,26</sup> The questionnaire was composed of 3 main domains assessing knowledge, attitude,

TABLE 1

Respondents' Demographics and Educational Profiles			
Characteristics		Frequency	(%)
Age (year)			20.27 (1.66)
Gender	Male	16	12.5
	Female	112	87.5
Study major	Medicine	34	26.6
	Pharmacy	37	28.8
	Health sciences	57	44.5
Academic year	Freshman	24	20.0
	Sophomore	41	34.2
	Junior	26	21.7
	Senior	29	24.2
Nationality	Qatari	21	16.4
	Non-Qatari	107	83.6
Place of birth	Qatar	60	46.9
	Outside Qatar	67	52.3

The total percentage is not equal to 100% due to missing values.

and readiness to practice, as well as an additional domain to collect the participants' demographics. The knowledge section consisted of a total of 22 yes/no questions and had a maximum value of 22 points. To categorize the scores, cut-off points were set as follows: below 7 points was considered low (25th quartile), 7-12 points was moderate (more than the 25th quartile and less than the 75th quartile), and above 12 points was high (75th quartile). The attitude section had a total of 16 scale questions (strongly agree, agree, neither agree nor disagree, disagree, strongly disagree) and a maximum of 80 possible points. Similar to the knowledge domain, a score between 42 points and 56 points was considered moderate (25th-75th quartiles), a score below 42 points was low, and a score above 56 points was high. The readiness to practice section consisted of 11 scale questions (strongly agree, agree, neither agree nor disagree, disagree, strongly disagree, and not applicable) that were worth a maximum of 55 points. A score below 31 points was considered low (25th quartile), a score between 31 and 38 points was moderate (above the 25th quartile and less than the 75th), and a score above 38 points was high (75th quartile).

After developing the questionnaire, a pilot study involving 5 students was conducted. The questionnaire was then validated and adjusted based on the feedback provided by the respondents during the pilot phase. Cronbach's alpha for the final tool was K = 0.627, A = 0.897, rP = 0.734, and overall KArP = 0.909 (total of 49 items). Deleting any of the items would not have further improved the measures. Thus, all items for each domain were maintained.

**Data Collection**

The data were collected through a self-administered survey that was manually distributed to students from the 3 colleges. One representative from each college was identified to assist in reaching the respondents.

**Data Analysis**

The collected data were analyzed using SPSS V-24.<sup>27</sup> To test for the normality of the results, the Shapiro-Wilk test was used. The results of the descriptive analysis were reported as the frequency (%) or mean (±SD). Independent Student's t-test was used to compare the differences in gender and KArP scores. One-way analysis of variance was conducted to compare students' majors and their effect on readiness to practice, followed by post hoc analysis using Tukey's test. Pearson's correlation was used to establish the strength of the relationship among the 3 parameters (K, A, and rP). Linear regression was performed to predict readiness to practice (dependent variable) from knowledge and attitude (independent variables).

**RESULTS**

Table 1 shows that more students were female, from the CHS, and Qatari than were male, from the CHP or CMED, or non-Qatari, respectively. In terms of nationality, among the non-Qatari students, many of the students were Egyptian (n = 28; 21.9%), Jordanian (n = 13; 10.2%), and Syrian (n = 13; 10.2%).

Table 2 illustrates the association between the respondents' attitude, knowledge, and readiness scores based on the respondents' demographics and educational profiles. Respondent age was significantly inversely correlated with the knowledge score and the total KArP score. This result indicated that the younger respondents had higher knowledge scores and higher total KArP scores than older respondents. The findings showed no significant differences in knowledge, attitudes, and readiness to practice based on gender. Both males and females had moderate knowledge, attitude, and readiness to practice scores. Further analysis indicated that there were significant differences between the colleges in terms of the knowledge

TABLE 2

## K, A, and rP Scores Based on the Respondents' Demographics and Educational Profiles

Characteristic	K (n = 111) Mean (SD)	A (n = 124) Mean (SD)	rP (n = 120) Mean (SD)	KArP (total score) (n = 100) Mean (SD)
KArP score	9.82 (3.33)	50.23 (11.27)	34.41 (7.35)	95.6 (20.0)
Age (year)	r = -0.233	r = -0.136	r = -0.155	r = -0.283
	<b>P-Value</b>			<b>P-Value</b>
Gender	<b>0.025</b>	0.169	0.122	<b>0.010</b>
Male	9.9 (3.7)	50.8 (7.9)	34.3 (11.4)	95.43 (21.70)
Female	9.8 (3.3)	50.1 (11.7)	34.4 (6.6)	95.63 (19.89)
	<b>P-Value</b>			<b>P-Value</b>
Study major	0.897	0.843	0.927	0.973
Medicine	10.26 (3.41)	47.68 (10.03)	33.70 (8.99)	92.58 (20.16)
Pharmacy	8.58 (2.55)	48.73 (8.58)	32.77 (4.58)	90.00 (13.81)
Health sciences	10.39 (3.56)	52.91 (13.14)	35.96 (7.52)	101.47 (22.45)
	<b>P-Value</b>			<b>P-Value</b>
Academic year	<b>0.035</b>	0.067	0.112	<b>0.033</b>
Freshman	11.05 (3.20)	56.08 (10.55)	37.70 (7.45)	107.74 (20.19)
Sophomore	10.45 (3.28)	49.74 (12.03)	34.87 (5.14)	97.19 (18.69)
Junior	9.10 (3.49)	50.92 (9.03)	35.25 (6.43)	95.83 (13.77)
Senior	8.62 (2.91)	45.69 (11.12)	30.11 (8.92)	83.60 (19.88)
	<b>P-Value</b>			<b>P-Value</b>
Nationality	<b>0.034</b>	<b>0.009</b>	<b>0.002</b>	<b>0.001</b>
Qatari	12.05 (3.57)	57.48 (12.44)	38.65 (6.90)	109.44 (22.59)
Non-Qatari	9.10 (3.04)	48.22 (10.53)	33.25 (7.17)	91.30 (18.17)
	<b>P-Value</b>			<b>P-Value</b>
Place of birth	<b>0.000</b>	<b>0.001</b>	<b>0.003</b>	<b>0.000</b>
Qatar	10.9 (3.2)	54.1 (11.3)	36.2 (7.2)	103.54 (19.28)
Outside Qatar	8.8 (3.1)	47.1 (10.3)	33.0 (7.1)	88.27 (17.96)
	<b>P-Value</b>			<b>P-Value</b>
	<b>0.001</b>	<b>0.000</b>	<b>0.016</b>	<b>0.000</b>

Values in boldface type are statistically significant.

Abbreviations: A, attitude; K, knowledge; KArP, knowledge, attitude, and readiness to practice; rP, readiness to practice.

scores and total KArP scores. All the students in the 3 colleges had moderate knowledge, attitude, and readiness to practice scores.

The analysis also demonstrated significant differences in the knowledge, attitude, and readiness to practice scores and the total KArP scores between respondents of different academic years. The freshmen had high attitude scores, but otherwise all students in the different academic years had moderate knowledge, attitude, and readiness to practice scores. When comparing the knowledge, attitude, readiness to practice scores and total KArP scores based on the nationality and place of birth of the respondents, the results for each comparison were significant. Qatari students had higher scores in all domains, including the total KArP scores, than non-Qatari students. Qatari students had high scores in all domains, while the non-Qatari students had moderate knowledge, attitude, and readiness to practice scores. The respondents who were born in Qatar also had higher scores in all domains, including total KArP scores, than students who were not born in Qatar. Both categories of students had moderate knowledge, attitude, and readiness to practice scores.

The findings indicated that the respondents' knowledge scores were positively correlated with their attitude scores (moderate), readiness to practice scores (moderate), and overall KArP scores (high) (Table 3). Moreover, their attitude scores were moderately positively correlated with their readiness to practice scores and highly positively correlated with

their overall KArP scores. The readiness to practice scores were also correlated with the overall KArP scores (high).

There were significant direct moderate correlations among the 3 KArP parameters ( $P < 0.001$ )

The students had moderate KArP scores (Figure 1). Further analysis using multiple linear regression analysis illustrated direct moderate effects of knowledge and attitude on readiness to practice, as shown in Equation 1 ( $P < 0.001$ ). The regression equation estimated the level of readiness to practice based on the knowledge and attitude levels.

$$rP = 0.892 K + 0.217 A + 14.371 \quad [1]$$

## DISCUSSION

According to the United Nations Office for Disaster Risk Reduction (UNISDR), disasters have caused economic losses to low- and lower-middle-income countries.<sup>28</sup> Between 1998 and 2017, approximately 1.3 million people were killed due to disasters. Moreover, disasters caused 4.4 billion people to be injured, homeless, or in need of emergency assistance. The Insurance Information Institute<sup>29</sup> reported that in 2016, there were 327 disaster events, of which 136 (42%) were human-made disasters. According to the INFORM 2018 Risk Index,<sup>30</sup> which provides the level of vulnerability of a country, Qatar has an index of 1.3 (vs Saudi Arabia = 3.0, United Arab Emirates = 2.0, and Bahrain = 0.9). Physical

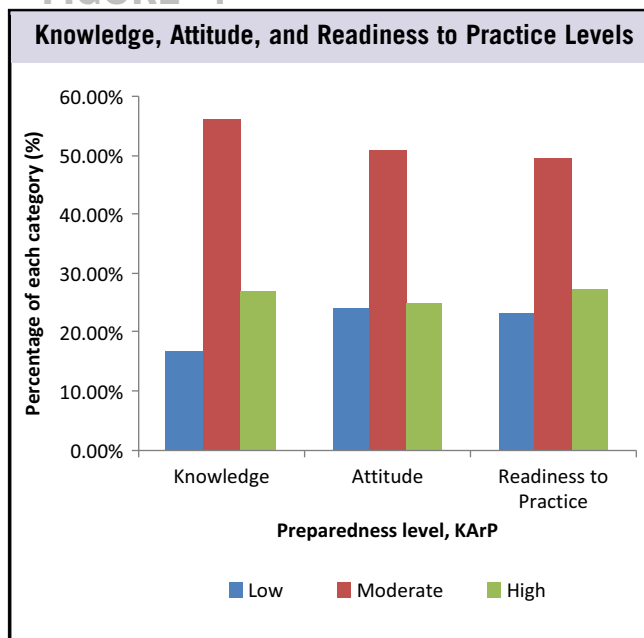
TABLE 3

		Knowledge	Attitude	Readiness	KArP
Knowledge	Pearson correlation		.577*	.624*	.757*
	P-Value		<b>0.000</b>	<b>0.000</b>	<b>0.000</b>
	n		107	103	100
Attitude	Pearson correlation			.634*	.931*
	P-Value			<b>0.000</b>	<b>0.000</b>
	n			117	100
Readiness	Pearson correlation				.861*
	P-Value				<b>0.000</b>
	n				100
KArP	Pearson correlation	.757*	.931*	.861*	
	P-Value	<b>0.000</b>	<b>0.000</b>	<b>0.000</b>	
	n	100	100	100	

Abbreviation: KArP, knowledge, attitude, and readiness to practice.

\*Correlation is significant at the 0.01 level (2-tailed).

FIGURE 1



exposure and physical vulnerability are integrated in the hazard and exposure dimension, the fragility of the socio-economic system represents the INFORM vulnerability dimension, and the lack of resilience to cope and recover is categorized under the lack of coping capacity dimension.

Disaster medicine provides care for the victims of natural and human-made disasters. It is concerned with the health, medical, and emotional aspects of disasters and also includes disaster management. Health-care professionals need to be competent and willing to respond to disasters and need to be involved in the areas of preparedness, recovery, and mitigation.<sup>31</sup>

Preparedness is 1 of the 4 phases of the disaster medicine cycle. The other phases include planning and mitigation, response,

and recovery. For health-care professionals to be competent and willing to respond to disasters, disaster medicine preparedness should be the central component of the curriculum for health-care profession students.

This study showed that the difference in the mean KArP level between genders was not significant. Students from the CHS had significantly higher KArP levels than those from the CHP, but no other significant differences were found in the other comparisons. Nationality was another important parameter that we addressed in this questionnaire. Qatar University is multi-cultural environment that comprise of students of different nationalities. One's nationality can affect his/her background about disaster medicine and preparedness. We assumed that people who come from countries with multiple disaster experiences, eg, Syria, Iraq, would have higher knowledge for example, and those who are long-term residents in Qatar or Qatari would have higher attitude and readiness to practice under disastrous situations in Qatar. Therefore, we sought to analyze the students' KArP levels based on their nationalities.

Overall, the Qatari students and the students who were born in Qatar had better knowledge, attitude, readiness to practice scores and total KArP scores than the non-Qatari students and the students who were born outside Qatar, respectively. Regardless of where the students hail, they should share a sense of belonging to the local community. The knowledge of disaster medicine should not be able to be demarcated by country of origin by a survey, because the students should have been accepted to their respective programs based on a similar foundation of knowledge. A student's attitude and readiness to practice should not be based on country of origin too. Students who live in this country and have been accepted to these programs should share a bond to their host country. Nevertheless, our study is not able to assess the sense of belonging level of the students, which may be an explanatory factor for the attitude and the overall preparedness for disaster



medicine. This aspect needs to be studied further. One study that looked at the Chinese students who study in the United States has deduced that the sense of belonging among the students could vary because of the differences across gender, race, culture, and identity among students.<sup>31</sup> It was also shown that international students who grew up in another culture usually have different personal interests, ways of communication, daily routines, and perceptions on many things, which can affect their belonging in a specific community.<sup>32</sup>

These findings indicate a sense of belonging shared by the local population and immigrants that needs to be studied further. Significant direct moderate correlations were found among the 3 KArP parameters. Knowledge and attitudes were proven to be significant predictors of readiness to practice. The knowledge, attitude, and readiness to practice levels of the respondents were mostly moderate.

### Knowledge Level and Importance of Curriculum Development

Several studies have indicated that disaster medicine knowledge levels among students are not satisfactory. A national survey was conducted in the Netherlands to evaluate the disaster medicine knowledge of Dutch senior medical students. The study concluded that students were not educated on disaster situations, despite showing a high willingness to respond.<sup>18</sup> A study was conducted in Germany to assess medical students' self-perceptions of their knowledge and interest in disaster medicine 9 years after the implementation of a standardized disaster medicine curriculum in German medical schools. The study found that the number of trained students was still low.<sup>16</sup> Eighteen percent of the respondents stated having some knowledge of disaster management for chemical, biological and radio-nuclear cases.<sup>33</sup> Their study illustrated that the knowledge levels of our respondents, generally, was no better than those reported in the above studies.

Based on the study findings, should we incorporate disaster-related courses into the curriculum? Many studies have shown the importance of having structured courses and syllabi in colleges. A study was conducted to develop an introductory disaster curriculum for medical students. The objective also focused on measuring students' knowledge and satisfaction with the course. The disaster elective course was evaluated highly by medical students.<sup>34</sup> A pre-post study measured the extent to which 4th-year medical students perceived, learned, and applied basic concepts of disaster medicine through a curriculum. The curriculum had a significant impact on the students' overall knowledge and willingness to learn.<sup>35</sup>

Smith et al. reviewed the inclusion of disaster medicine in medical curricula in the United States. They also studied the content areas addressed. The study indicated that only a small percentage of US medical colleges include disaster

medicine in their core curriculum. In addition, there is a lack of competency-based training within the topics.<sup>36</sup> Woodard et al. called for pharmacy colleges to prepare students for disasters and incorporate emergency preparedness training into curricula. They also encouraged community pharmacists to develop their knowledge and skills through continuing education programs.<sup>37</sup> Bajow et al. focused on the development of a curriculum to promote learning in disaster medicine. The course consists of 2 weeks of classroom activities followed by 8 weeks of e-learning structured within 5 domains of disaster medicine. The curriculum introduces core principles in emergency medicine, public health, and disaster management.<sup>38</sup>

In addition, Bajow and colleagues evaluated the efficacy of a disaster medicine curriculum designed for medical students. The findings indicated that it was effective for teaching undergraduate medical students disaster medicine.<sup>39</sup> An American study at a US allopathic medical school evaluated the effectiveness of a voluntary training program in increasing the knowledge of medical students to respond to disasters. A pre-post study of student knowledge proved that the disaster curriculum improved students' knowledge of emergency preparedness. The intervention is low cost, and it had a high impact on public health emergencies.<sup>40</sup> A Web-based study was carried out among U.S. medical students to evaluate perceptions of and the likelihood of responding to disaster scenarios. The study concluded that education and training in disaster medicine preparedness is lacking.<sup>41</sup>

Due to the increased number of disasters, many Italian government and scientific institutions have agreed to include disaster medicine education in the medical curriculum. A survey was conducted among medical students. Approximately 40% had never heard about disaster medicine, 91% had never attended elective academic courses on disaster medicine, and 87.6% had never attended nonacademic courses on disaster medicine.<sup>17</sup> An online survey was conducted in Belgium to assess the extent of military training in disaster education in medical science students and to compare the education of military students with that of civilian medical students. The military students' scores improved with the educational level attained, and the military students scored higher on knowledge and capability than civilian medical students. The study concluded that the military background and training of the military students made them better prepared for disaster situations than their civilian counterparts.<sup>42</sup>

Most of the Belgian students surveyed had never attended courses on disaster medicine during their medical school program.<sup>17</sup> Nakura shared his experience in handling medicines and ensuring the effective use of medicines during the earthquake in Japan. Several important characteristics, such as effective decision-making and clinical reasoning and good teamwork, are crucial during emergency events. He also recommended the inclusion of disaster management in pharmacy education.<sup>43</sup>

Gowing and colleagues conducted an integrative literature review and found that all types of disaster preparedness activities lead to improvements in knowledge, skills, and attitudes regarding preparedness for disasters.<sup>44</sup> Importantly, the development of preparedness activities should involve interdisciplinary personnel, be comprehensive, and include instructive design.<sup>45</sup> The 13th World Congress on Disaster and Emergency Medicine, convened in Melbourne, Australia, in May 2003, requested the World Association for Disaster and Emergency Medicine (WADEM) to lead the development of “International Standards and Guidelines on Education and Training for Disaster Medicine”. The main focus of the Working Group is to “develop standards and guidelines for education and training in the multi-disciplinary health response to major events that threaten the health status of a community. The contemporary view is that of a multi-disciplinary health response to major events that threaten the health status of a community, including the prevention and mitigation of future events”.<sup>46</sup>

### Attitudes and Readiness to Practice

Our study showed that generally, the attitude scores among our respondents (in terms of gender, study major, academic year, nationality, and place of birth) were moderate, except for those of Qataris, who had higher attitude scores. Our study also showed that all 3 domains were correlated; knowledge was moderately correlated with attitude and readiness to practice, and attitude was correlated with readiness to practice. Kaiser et al. noted that medical students are willing to respond to disaster scenarios. The study recommended that medical students should be equipped with adequate relevant knowledge, skills, and direction.<sup>41</sup> Sauser and co-workers conducted a survey in the United States among allopathic medical students to understand their levels of preparedness and willingness to perform medical procedures in the event of a disaster. The students did have skills that could be useful in a disaster response.<sup>47</sup>

More than four-fifths (91.4%) of Italian medical students reported that they would welcome the introduction of a course on disaster medicine in their core curriculum, and almost all the respondents (94.1%) considered knowledge of disaster medicine important for their future careers.<sup>17</sup> Although German students were highly motivated, the majority of them were not well educated regarding disaster medicine.<sup>16</sup> A Belgian study indicated that the respondents would like to increase their knowledge in this area and would welcome the introduction of specific courses into the standard medical curriculum.<sup>17</sup>

### Study Recommendations

During crisis, health-care professionals are in a strategic position to determine patients' medication needs. Patients might require no medication or they may have prescriptions for chronic diseases that need to be refilled.<sup>48</sup> Examples of colleges involved in disaster preparedness plans and relief are scarce.<sup>49</sup>

Monk et al. called for more initiatives from colleges to be involved/engaged in disaster preparedness planning. Students should also be educated about disaster preparedness, for example, through an elective course.<sup>48</sup> We recommend expanding the study to other universities in the country and conducting a study among health-care professionals. Based on the location of Qatar within the middle-eastern region of conflict and crisis, the 3 health colleges at Qatar University should consider incorporating disaster medicine preparedness topics into their curricula. It will also be interesting to assess the level of sense of belonging among students especially in countries like Qatar, where the majority of the people and residents are foreigners, and its relationship with attitude and readiness to practice, for example through a mixed-method approach.

### Study Limitations

The method of recruitment of the students from the 3 colleges was a major limitation, as we did not have an email list. Volunteers from each college were identified to reach the respondents and to recruit as many as possible. In addition, the sample size was lower than expected. As a result, the study's conclusions are not easily generalized. Some respondents refused to participate due to their busy schedules and survey fatigue. The study involved only health profession students in 1 university. More universities need to be involved in the future to better represent health profession students in the country. Lastly, as the study relied on a survey, self-reported data might have caused bias. Another important aspect that this study is not able to measure is the level of sense of belonging of the students, especially among the nonlocals, which may be 1 of the explanatory factors of the different levels of KArP that we obtained among Qataris and non-Qataris. Despite these limitations, our study had produced important findings, which warrant for further investigation.

### CONCLUSIONS

Students from the 3 health colleges at Qatar University have moderate disaster medicine preparedness and may benefit from disaster medicine education and awareness. Significant direct moderate correlations were found among the 3 KArP parameters. Knowledge and attitudes were proven to be significant predictors of readiness to practice. The knowledge, attitude, and readiness to practice levels of the respondents were mostly moderate.

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## Conflict of interest

None to declare

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