



Nursing Students' Knowledge, Attitude, and Practice Regarding Disaster Preparedness: A Cross-Sectional Study

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Background: Nations are considered to be within at hazard of crises, which create greater challenges for healthcare systems and healthcare workers. Nursing staff and student nurse play a critical role in responding to disasters, and having knowledge and a skill on disasters preparedness is crucial. The aim of the current study was to investigate the nursing students' knowledge, attitude, and practice regarding disaster preparedness.

Methods: A cross-sectional study included a sample of 206 nursing students at College of Applied Medical Sciences in Al-Kharj, Saudi Arabia. Undergraduate students from all years were asked to complete an online questionnaire on knowledge, attitude, and practices regarding disaster preparedness.

Results: The results/findings showed that more than two thirds of the participants had adequate knowledge (69%) and positive attitude (72%) regarding disaster preparedness; however, most of them had inadequate practice (84%). There were statistically significant relations between nursing students' knowledge and their GPA ($p = 0.003$), students' attitude and their gender ($p = 0.014$), and students' practice and their age ($p = 0.008$). Moreover, nursing students' knowledge was positively correlated with their attitude ($r = 0.194$).

Conclusion and Recommendations: Most of participated students had adequate knowledge and a positive attitude toward disaster preparedness; most of them had inadequate practice. Continuing education and training of student nurse on disaster preparedness is critical to enhance their knowledge and practices; and to be proficient in preparation for and management of any potential disasters or risks. The findings of the current study offer data that would help in the creation of educational policies for student nurse about disaster preparedness.

Keywords: students nurse, knowledge, attitude, practices, disaster preparedness

Introduction

In recent years, both natural and man-made disasters have occurred more often around the world. Since disasters often occur suddenly, all medical professionals, especially nurses, must be prepared with the necessary knowledge, tools, and resources to treat emergencies in all three of their stages: pre-, during, and post-disaster.¹ The developing countries are frequently impacted by disasters as they are occurring more frequently and are larger in scope. A disaster is typically well defined as harm, damage, or demolition to a community and economy as a result of dangerous occasions and having negative effects on people's physical and mental health as well as their environment and economy.²

Because of their incubation durations, bioterrorism agents are produced, concealed, transported, and released. They are also simple to make, conceal, transport, and unleash. Global terrorism poses an increasingly serious danger to international security and raises the possibility of bioterrorism.³ In Asia, disasters are the main source of fatalities and injuries, and they are also "a major interruption of society's functioning, producing extensive human, material, or environmental losses that surpass the affected society's ability to adapt using only its resources", according to the Asian

Disaster Reduction Center.⁴ For effective performance in the face of calamities, seven talents are required. Evaluation of personnel knowledge and talent is the first necessary skill.⁵

As the largest group of healthcare professionals, nurses are at the forefront of treatment in the face of bioterrorism as they are crucial in the reaction to disasters. However, they represent a segment of the healthcare sector that usually lacks emergency preparedness. Data on how nurses perceive disaster education and preparedness information are also lacking. Before considering the nursing curriculum, it is critical to evaluate nurses' current levels of preparation, even though nurses should have sufficient knowledge and skills in crisis management. Despite the fact that there are few ways to gauge how well nurses are prepared for emergencies.⁶ Also give students opportunities for critical thinking can occur across the spectrum in response to disaster. In another study, many studied reported that currently students are tomorrow's practitioners.⁷

Having nursing skills is essential and helpful for nurses in a crisis. Nurses are constantly present and play a crucial part in disaster response. As vital members of the medical team, nurses need to be equipped to handle these circumstances and improve the community's efficacy. Health promotion system by developing greater knowledge and proficiency in handling important issues. It is anticipated that nurses who have received disaster education and training will be more effective and resilient. Particularly nurses should be taught in disaster prevention, and contingency plans should be devised to provide faster access to services in the event of a disaster.⁸

Plans for catastrophe management in Saudi Arabia were established 80 years ago. Since then, they have continued to advance in order to handle natural disasters that have traditionally occurred, particularly during the Hajj (the largest religious gathering in the world). The General Directorate of Civil Defense (GDCD) organizes and oversees the national emergency management plan. The GDCD's mandate includes managing critical infrastructure, coordinating between organizations with varying resources and specialties to improve disaster response, protecting victims and providing life-saving assistance in disaster-affected areas, and controlling hazardous areas.⁹ Also the COVID-19 epidemic over the past two years highlights the need for more funding and preparedness to handle a variety of emergency scenarios. The management of the any country responded to this pandemic in a proactive manner, according to the Global Response to Infectious Diseases Index.¹⁰

The current study aimed to investigate the nursing students' knowledge, attitude, and practice regarding disaster preparedness (DP).

Methods

A cross-sectional study was used to examine the knowledge, attitude, and practice of nurse's student regarding DP. As each participant must sign in with their email to access the survey, they are only permitted to respond once. The responses will not be submitted if any of the questionnaire's items are left unanswered.

Subjects and Setting

A convenience sample included 206 nursing students from all years, both males and females recruited from College of Applied Medical Sciences in Al-Kharj (CAMS) at Prince Sattam bin Abdulaziz University; this number reflects the students who agreed the participation in the study as all students from the Nursing department at CAMS in Al-Kharj were asked to complete an online questionnaire on knowledge, attitude, and practice regarding DP.

Procedure and Tool for Data Collection

Data were gathered from nursing students via an online questionnaire created as a Google Form, then a link to this online questionnaire was sent to nursing students from all years via Emails, WhatsApp and Telegram groups of students; which was accessed from April 20, 2023, until June 22, 2023. https://docs.google.com/forms/pYxVlav_gx1KSsXonzM9i/edit drive web.

The questionnaire on knowledge, attitude, and practices regarding DP was developed based on previous studies about preparedness for disasters. The researchers translate the questionnaire into Arabic language, then the validity of the tool was reviewed by three experts in Nursing to assess its clarity, feasibility, and applicability. The questionnaire had four parts as the following;

1. Personal characteristics of the students such as age, gender, living condition, academic year and GPA.
2. Knowledge about disaster preparedness: The questionnaire was (16 items) adapted from Alkalash et al¹¹ “yes or no” questions with one point assigned to each question. Each question categorized as incorrect = 0 and correct = 1. Scoring of knowledge are: Student who scored less than 60% correct answers (up to 9 question) was considered unsatisfactory knowledge, and more than 60% of correct answer (more than 9 question) satisfactory level. Cronbach’s alpha for the knowledge about disaster preparedness in this study was 0.79.
3. Attitudes toward disaster preparedness: There are 11 statements in all for the Likert scale questions. 2 points for agreeing, 1 point for unsure, and 0 points for disagreeing student who scored $\geq 60\%$ was deemed to have a positive attitude, those who fell this percentage were deemed to have a negative attitude. Cronbach’s alpha for the attitude toward disaster preparedness in this study was 0.83.
4. Practice regarding disaster preparedness: It was adapted from Moabi¹² and included three questions about disaster drills done at college of applied medical sciences setting, each one answer yes = 1 and No answer = zero. Student who scored $\geq 60\%$ was considered as having satisfactory practice, whereas those who performed at a lower rate were viewed as having unsatisfactory practice. Cronbach’s alpha for the practice regarding disaster preparedness in this study was 0.74.

Ethical Considerations

With ethical approval, the Prince Sattam bin Abdulaziz University Ethics Committee granted official authority. All subjects provided informed consent in accordance with ethical standards. The students were advised that they might discontinue the study at any moment, and the data obtained was handled in confidence. After finalizing the study tool, the actual data collecting and analysis were carried out during the academic year 2022/2023.

Data Analysis

The survey results were analyzed using SPSS v23. Mean and standard deviation were used to convey quantitative data, and absolute numbers and percentages were used to express qualitative data. When appropriate, the Chi-square test or Fisher’s exact test was used to compare categorical variables. Spearman test of correlation was used to assess the association between the study variables. To evaluate the scales’ internal consistency and reliability, the Cronbach’s alpha coefficient was determined. Statistical significance was considered at $p < 0.05$.

Results

Nursing Students’ General Characteristics

In total, 206 undergraduate nursing students participated in the current study. [Table 1](#) provides information about the participants’ demographics, the mean age of the students was 21.5 (SD = 3.6) years and 53.9% of them their age ranged between 20 to < 23 years old. About 68.9% of the students were females, 89.3% of them were single, and 83.5% of them lived with family. In terms of the educational level and GPA, 36.4% of the students were studying in fourth year, also 43.2% of them had high GPA.

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According to [Table 2](#), more than two thirds of the participants (69%) had adequate knowledge about disaster preparedness. The mean knowledge score of students about disaster preparedness was 11.5 (SD = 3.45). [Table 2](#) also presents the aspects of knowledge of nursing students about disaster preparedness. About 89.8% of the students answered correctly about the meaning of disaster planning and 89.3% of them stated that they had previously heard about the disaster concept. Moreover, 88.8% of the students answered correctly regarding the importance of identifying and dealing with the surrounding hazards. On the other hand, 73.3%, of the students did not know where to find the disaster plan. Additionally, 69.9% of them did not know the most secure location during floods, and 67% of them did not know the meaning of the drills.

Regarding the attitude toward disaster preparedness, [Table 3](#) indicates that two-thirds or more of the students (72%) had positive attitude. The mean attitude score of nursing students toward disaster preparedness was 7.67 (SD = 2.19).

Table 1 General Sociodemographic Characteristics of Study Sample (n = 206)

Items	Sample (n = 206)	
	No	%
Age in Years		
Mean (SD)	21.5 (3.6)	
18-<20 years	65	31.6
20-<23 years	111	53.9
≥23 years	30	14.6
Gender		
Male	64	31.1
Female	142	68.9
Marital status		
Single	184	89.3
Married	21	10.2
Divorced	1	0.5
Year level		
Second year	71	34.5
Third year	60	29.1
Fourth year	75	36.4
Living condition		
Away from family	34	16.5
With family	172	83.5
Academic achievement (GPA)		
Low (less than 3)	39	18.9
Average (3–4)	78	37.9
High (above 4)	89	43.2

Table 2 Knowledge of Nursing Students About Disaster Preparedness (n = 206)

Knowledge Items	Not Correct		Correct	
	No	%	No	%
1. Previously heard about the disaster concept	22	10.7	184	89.3
2. Are you aware of where the plan may be found?	151	73.3	55	26.7
3. Knew about disaster planning	130	63.1	76	36.9
4. Disaster is a mismatch between event-driven needs and the resources that can be met.	37	18.0	169	82.0

(Continued)

Table 2 (Continued).

Knowledge Items	Not Correct		Correct	
	No	%	No	%
5. Natural or man-made disasters are both possible.	28	13.6	178	86.4
6. His or her city could experience a disaster one day.	42	20.4	164	79.6
7. A disaster might one day harm your college.	51	24.8	155	75.2
8. Planning of disaster is the process of preparing for catastrophes by determining what would need to be done and how it should be done.	21	10.2	185	89.8
9. It is important to identify and address the nearby threats that could most likely result in disaster for his or her college or community.	23	11.2	183	88.8
10. Are you familiar with the college's emergency evacuation procedures during disasters?	131	63.6	75	36.4
11. Are you aware of any specific exit doors for use during the evacuation?	68	33.0	138	67.0
12. Do you know what to do when there is an earthquake?	92	44.7	114	55.3
13. Do you know where the safest place to be when a flood is?	114	69.9	62	30.1
14. Personnel from the city's health and non-health professions are involved in disaster management.	24	11.7	182	88.3
15. Do you know what drills are?	138	67.0	68	33.0
16. Do students members understand their functions during a drill?	103	50.0	103	50.0
Knowledge level	Adequate		69%	
	Inadequate		31%	
Knowledge Mean score	Mean (SD)		11.5 (3.45)	

Table 3 also shows the aspects of the attitude of nursing students toward disaster preparedness. About 96.2% of the students agreed with that the college administration, disasters should be appropriately planned for. Furthermore, 86.4% of the students agreed with that, it is important to identify and manage any risks that could lead to disaster, and everyone has to receive training from college personnel. On the other hand, 60.2% of the students disagreed with the question "I don't need to know about plans of disaster". Also, 53.9% of them disagreed with the questions "disaster planning is for a few personnel in the college, and disaster management is for nurses and doctors only". These responses reflect the positive attitude of students regarding disaster preparedness.

By way of nursing students' practice regarding disaster preparedness, Table 4 indicates that the most of student's nurse (84%) had inadequate practice regarding disaster preparedness. The mean practice score of student's nurse regarding disaster preparedness was 1.23 (SD = 0.47). Table 4 also reveals the aspects of nursing students' practice regarding disaster preparedness. The table indicates that most of the participants responded by "No" for all questions of practice regarding disaster preparedness, 84% for "are disaster drills done?", 93.7% for "is there ongoing training?", and 93.7% for "is the disaster plan periodically updated?"; which reflects inadequate practice.

Relations and Correlations Between Knowledge, Attitude, and Practice

Table 5 indicates that statistically significant difference in relation was found between nursing students' knowledge and their GPA ($p = 0.003$); nursing students who had high GPA had adequate knowledge. Also, a statistically significant relation between nursing students' attitude and their gender ($p = 0.014$); females nursing students had positive attitude. Table 5 also revealed that there was a statistically significant relation between student's nurse practice and age range ($p = 0.008$); nursing students who were in age group (18–<20) years had adequate practice; however, this finding is not representative as most students in all age groups had inadequate practice.

Table 3 Nursing Student's Attitude Toward Disaster Preparedness (n = 206)

Attitude Items	Disagree		Unsure		Agree	
	No	%	No	%	No	%
1- I do not require information on disaster planning preparedness.	124	60.2	28	13.6	54	26.2
2- The college administration should be adequately prepared for disasters	4	1.9	4	1.9	198	96.2
3- Disaster planning is for a few personnel in the college	111	53.9	45	21.8	50	24.3
4- Potential disaster-causing risks should be recognized and mitigated.	3	1.5	25	12.1	178	86.4
5-Training is necessary for all college personnel.	6	2.9	22	10.6	178	86.4
6- Is it necessary to have a disaster plan?	5	2.4	33	16.0	168	81.6
7- Disaster preparations must be revised frequently.	3	1.5	26	12.6	177	85.9
8- The likelihood of disasters occurring at our college is low.	73	35.4	76	36.9	57	27.7
9- Only nursing staff and physicians need disaster management.	111	53.9	54	26.2	41	19.9
10- The college should hold frequent disaster simulation exercises.	8	3.9	38	18.4	160	77.7
11-Drills should be conducted in the college.	6	2.9	33	16.0	167	81.1
Attitude level	Positive		72%			
	Negative		28%			
Attitude Mean score	Mean (SD)		7.67 (2.19)			

Table 4 Nursing Students' Practice Regarding Disaster Preparedness (n = 206)

Items	Sample (n = 206)	
	No	%
1. Are disaster drills done?		
Yes	33	16.0
No	173	84.0
2. Is there ongoing training?		
Yes	13	6.3
No	193	93.7
3. Is the disaster plan periodically updated?		
Yes	13	6.3
No	193	93.7
Practice level	Adequate	16%
	Inadequate	84%
Practice Mean score	Mean (SD)	1.23 (0.47)

Table 5 Relationship Between Students' Nursing Knowledge, Attitude, and Practices Regarding Disaster Preparedness and Their Characteristics (n = 206)

Variable	Nursing Students' Academic Achievement (GPA)						χ^2 (P) value
	Low		Average		High		
Knowledge							
Inadequate	18	8.7	29	14.1	17	8.3	11.456 (0.003*)
Adequate	21	10.2	49	23.8	72	35.0	
Attitude							
Negative	13	6.3	23	11.2	21	10.2	1.492 (0.474)
Positive	26	12.6	55	26.7	68	33.0	
Practice							
Inadequate	33	16.0	66	32.0	74	35.9	0.081 (0.960)
Adequate	6	2.9	12	5.8	15	7.3	
Variable	Nursing Students' Gender						χ^2 (P) value
	Female			Male			
Knowledge							
Inadequate	46		22.3	18		8.7	0.375 (0.540)
Adequate	96		46.6	46		22.3	
Attitude							
Negative	32		15.5	25		12.1	6.021 (0.014*)
Positive	110		53.4	39		18.9	
Practice							
Inadequate	122		59.2	51		24.8	1.272 (0.259)
Adequate	20		9.7	13		6.3	
Variable	Nursing Students' Age						χ^2 (P) value
	18-<20 years	20-<23 years		≥23 years			
Knowledge							
Inadequate	16	7.8	37	18.0	11	5.3	1.969 (0.374)
Adequate	49	23.8	74	35.9	19	9.2	
Attitude							
Negative	16	7.8	33	16.9	8	3.9	0.553 (0.758)
Positive	49	23.8	78	37.9	22	10.7	
Practice							
Inadequate	49	22.8	99	48.1	27	13.1	9.630 (0.008*)
Adequate	18	8.7	12	5.8	5	1.5	

Notes: *Significant ($P < 0.05$) χ^2 = chi-square test.

Table 6 Correlation Between Nursing Students' Knowledge, Attitude, and Practice. Regarding Disaster Preparedness (n = 206)

	Knowledge	Practice
Attitude	r = 0.194 p = 0.005*	—
Practice	r = 0.088 p = 0.208	r = 0.035 p = 0.616

Notes: *Significant (P<0.05). Spearman's test for correlation.

In terms of the correlations between knowledge, attitude, and practice, Table 6 indicates that the knowledge of nursing students is statistically significantly positively correlated with their attitude ($r = 0.194$).

Discussion

Nowadays, any community is at risk for disasters associated with many hazards. These disasters put more challenges on the healthcare systems. Nurses have a key role in responding and dealing with disasters.¹³ Nurses are essential members of a healthcare team, so disaster preparedness (DP) for nursing students and nurses is important to work collaboratively in all situations.¹⁴

In our study, we aimed to investigate the nursing students' knowledge, attitude, and practice (KAP) regarding DP at College of Applied Medical Sciences in Al-Kharj. To the best of our knowledge, this is the first study focused on the disaster preparedness of students at a college in Prince Sattam bin Abdulaziz University. The study findings indicated that more than two thirds of the participants had adequate knowledge and a positive attitude toward disaster preparedness, although most of them had inadequate practice. Hence, the results of the current study provide evidence on nursing students' KAP regarding disaster preparedness in a sample of Saudi nursing undergraduate students and would be help in the development of educational policies for disaster preparedness in nursing students.

Concerning nursing students' knowledge about DP, the study findings indicated that more than two thirds of the participants had adequate knowledge about DP. Additionally, the mean knowledge score of nursing students about disaster preparedness was 11.5 out of 16 (SD = 3.45) which reflects adequate knowledge. These finding might be attributed to that some nursing courses or topics and clinical training included basic concepts of risk management and disasters as Nursing administration, Nursing informatics, Community health nursing, and Intensive nursing courses, thereby improving the students' knowledge about disaster preparedness.

Similarly, a recent study by Izquierdo-Condoy et al¹⁵ who conducted their study in Latin America and the Caribbean and found that more than half of medical students have good knowledge about disaster preparedness. In the same line, another recent study conducted by Aurelio et al⁸ focused to determine the nursing students' KAP on disaster preparedness at Nueva Ecija University in Philippines. This study found that the nursing students' knowledge on DP was satisfactory.

On the other hand, a study by Abou Hashish and Banoona¹³ in a sample of Saudi nursing students found that most participants had inadequate knowledge of disaster nursing. Similarly, an interventional study conducted by Abdel Sattar et al¹⁶ on nursing students in Egypt to improve their knowledge and attitude toward disaster preparedness. This study found that most of the nursing students' knowledge about DP was inadequate before conducting the study educational intervention and only less than 20% of the students had adequate knowledge. Furthermore, a study conducted by Alrazeeni¹⁷ in Saudi Arabia on medical students demonstrated that Saudi EMS students reported weak to moderate knowledge about DP. Moreover, a study conducted by Mariappan and Philip¹⁸ found that most of the participated students had inadequate disaster management knowledge. Additionally, Indian study by Singhal et al¹⁹ included medical students and a study conducted by Kaviani et al¹⁴ included nursing students in Iran have found limitations in knowledge of disaster situations.

Despite adequate knowledge of our study participants about DP, especially in items about disaster meaning, hearing previously about the disaster concept, and the importance of identifying and dealing with the surrounding hazards. Many

students did not know where to find the disaster plan, the safest area to go to during floods, and the meaning of the drills, reinforcing the importance of training the nursing students on DP.

In terms of nursing students' attitude, our study showed that most of the students had positive attitude toward DP, with mean attitude score 7.67 (SD = 2.19) out of 11, which reflects positive attitude. Moreover, majority of the students agreed with that the college administration should be adequately prepared for disasters, also they agreed with "that any potential hazards likely to cause disaster should be identified, and that training is necessary for all college personnel". These findings might be attributed to that the adequate knowledge which participants had about disaster preparedness is likely to have resulted in positive attitude toward disaster preparedness and vice versa.

This finding is in harmony with those of Abou Hashish and Banoona¹³ study in a sample of Saudi nursing students, which found that most of participants had a favorable attitude towards DP. Furthermore, these students perceived themselves as competent in disaster nursing. Similarly, Aurelio et al⁸ who conducted a similar study at Philippines and found that nursing students had a positive attitude toward DP. Additionally, a study conducted by Mariappan and Philip¹⁸ indicated that most of the participated nursing students had favorable attitude toward DP.

This finding is incongruent with an interventional study by Abdel Sattar et al¹⁶ on nursing students in Egypt, who found that only about 20% of the students had positive attitude toward DP before conducting the study educational intervention.

As far as the students' practice regarding DP, the current study findings demonstrated that most of the nursing students had inadequate practice, with mean score 1.23 out of 3 (SD = 0.47). Additionally, our study findings revealed that all aspects of practice regarding disaster preparedness were inadequate, which emphasize the importance of training the nursing students on disaster preparedness and risk management. These finding might be attributed to that the nursing students all time were busy with their courses and clinical training and the lack the opportunities to share in disaster preparedness training or drills.

This finding is consistent with Alrazeeni¹⁷ study in Saudi Arabia on medical students who found that Saudi EMS students reported weak to moderate skills on DP. Similarly, a study by Izquierdo-Condoy et al¹⁵ in Latin America and the Caribbean and found inadequate practice and that most of the participated medical students had not taken training about DP. Additionally, Schmidt et al²⁰ found that the nursing students were generally not well prepared for disasters.

On the other hand, a study by Aurelio et al⁸ in Philippines found that the nursing students' practices regarding DP were satisfactory. Moreover, our study result was inconsistent with that of Taghizadeh et al²¹ in Iran, who found that more than two thirds of the participated students reported coping with disaster conditions and participating in triage.

The current study results showed a statistically significant positive correlation between knowledge and attitude of the students regarding DP. This may be due to that our attitude toward certain subject is influenced by our knowledge about that subject. This result is similar to that of Abdel Sattar et al¹⁶ study on student nurse in Egypt, which found a positive statistically significant correlation between students' knowledge and their attitude toward DP.

Leading us to assume that risk and DP training and conducting training programs for nursing students on DP is crucial to achieve optimal knowledge and skills on DP. Furthermore, there is a need to incorporate DP as a subject during undergraduate studies. Such measures can produce positive effects, improve the students' disaster preparedness and their ability to respond.^{16,22,23}

Limitations of the Study

This study was a cross-sectional study that does not provide cause-and-effect relationships between variables. Furthermore, the study was conducted on nursing students from only one Saudi university, which might limit the generalizability of its findings. So, it is recommended to repeat this study using a well-designed research design with larger representative samples from different universities in Saudi Arabia to grant a higher level of evidence.

Conclusion

The current study findings revealed that more than two thirds of the nursing students had adequate knowledge and positive attitude toward DP; however, most of them had inadequate practice. Students' GPA, gender and age were factors significantly associated with their KAP. Moreover, students' knowledge was positively correlated with their attitude.

Implications of Practice and Future Research

Continuing education and training of nursing students on DP is critical to improve their knowledge and practices; thereby increasing their self-confidence and being proficient nurses in preparation for and management of any potential disasters or risks in their communities. As a future essential member of the healthcare team, undergraduate nursing students should be trained and prepared to deal with disasters; moreover, disaster preparedness should be a part of their educational curricula. The findings of this study provide evidence that would help in the development of educational policies for disaster preparedness in nursing students.

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Disclosure

The authors declare that they have no conflicts of interest in this work.

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