

“Health Care Worker’s Perceived Competency in Disaster Management” - A Self Assessment Cross Sectional Survey

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Abstract

Introduction: Disaster preparedness and Disaster management are terms that are rarely mentioned in the organized academic training of community based physicians. A key concept of disaster management and planning is “emergency preparedness”. Although this concept is frequently mentioned in literature, the term is not well defined and training remains inadequate.

Aim: To assess the perceived competencies of healthcare workers in disaster management.

Methods: An observational survey was conducted at Alkhor Hospital, Qatar from 1 Aug 2017 to 31st December 2017. Study participants included physicians, nurses, paramedical staff and senior administrative staff working in the hospital. A survey questionnaire was distributed among the participants.

Keywords: *Disaster Preparedness; Disaster Management*

Background

A disaster is a serious disruption of the functioning of a community or society involving widespread human, material, economic, and environmental losses and impacts which exceed the ability of the affected community and society to cope using its own resources [1]. Disasters are increasing in incidence and severity worldwide. The consequences of disasters in terms of human morbidity and mortality, as well as economic cost, are growing at an astounding rate [2].

Preventing disasters and reducing its consequences is a challenging task and has become part of the long term policies of many governments all over the world. Extensive and costly resources are being invested into preventing and responding to public health emergencies [3]. Disasters, whether natural or manmade, strike unexpectedly. Proper preparedness is an integral part of disaster management. The four main components of disaster management are mitigation, preparedness, response, and recovery [4]. When a disaster occurs, members of the healthcare system are often one of the initial agencies that respond to the situation [5].

Disaster preparedness training of all healthcare workers is essential to maintain an efficient healthcare system in the midst of a disaster, particularly in view of the potentially widespread nature and complex environment of these types of incidents [6].

Disaster preparedness and disaster management are terms that are rarely mentioned in the organized academic training of community based physicians [7]. A key concept of disaster management and planning is “emergency preparedness”. Although this concept is frequently mentioned in the literature, the term is not well defined and training remains inadequate [8]. In a systemic review conducted to identify competency and educational guidance for workers in disaster medicine, an expert working group identified seven competency domains: 1) Preparation and planning; 2) Detection and communication; 3) Incident management and support system; 4) Safety and security; 5) Clinical/public health assessment and intervention; 6) Contingency, continuity and recovery; and 7) Public health law and ethics [9].

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Surveys of recent global disasters have noted persistent gaps in the education, training, and abilities of healthcare professional in managing such emergency situations [4,10]. Due to increasing number and severity of disasters worldwide, WHO recommends that all countries, no matter how frequently they experience disasters, consider training their health workers to respond to disasters as a national and local priority [11].

Various factors can influence the skills and expertise of health care workers in dealing with disasters. Since disaster management involves cooperation and coordination among various agencies, a multidisciplinary approach is essential. Prior exposure in disaster management, work experience, cultural background, and baseline training can influence the effectiveness of disaster response [12].

Rationale

In the state of Qatar, the disaster preparedness and training of healthcare professional is carried out by the Hamad Medical Corporation (HMC) in association with other government agencies. HMC is the major health provider in the country and plays an important role in Disaster preparedness and management. Alkhor hospital, which is a part of HMC, provides healthcare services to the Northern Province of the country. The presence of major oil fields and refineries in the Northern Province demands that healthcare staff be trained and updated in disaster management.

Aim of the Study

To assess the competencies of healthcare workers in disaster management in a secondary care hospital. The above titled study is designed to test the following hypothesis: The medical staffs at Alkhor hospital perceive themselves as competent in disaster management.

Methods

Study design and settings: The self assessment survey was carried out at Alkhor Hospital, Hamad Medical Corporation Qatar from 1st August 2017 to 31st December 2017.

Participants: Printed survey questionnaire (Appendix 1) was distributed to randomly selected hospital health care workers. The participants were grouped into 4 categories according to their profession (physicians, nurses, paramedical staff, and senior administrative staff).

Inclusion criteria: Hospital healthcare workers with a minimum of 6 months experience were included in the study. The details of the survey was explained to the potential participants. The participation in the study was purely voluntary.

Exclusion criteria: Those who refused to join the survey after explaining about the study and those who submitted incomplete answers were excluded.

The initial part of the questionnaire included the demographic details and basic training of the participants. The latter part of the survey included specific questions regarding disaster management. The questions reflected the participant categories covered by the Disaster Medicine Certification Examination. The participants were asked to grade their understanding on a scale of 1 to 5 which translates to very poor, poor, average, good and very good.

The questionnaire was validated before the survey. The enrolment in the survey was purely on voluntary basis. Before inclusion the potential participants were explained about the details of the survey and those who were willing to participate were enrolled in the study. Their willingness to participate after understanding about the study was considered as informed consent for participation.

Sample size and statistical analysis

Was based on the assumption on percentage of competency as 50% and level of confidence interval 95% and margin of error 5%. Open Epi software was used to calculate the sample size. Frequency presentation and descriptive statistics were applied to analyse the data. Chi square test used to compare the response among the subgroups. We also applied T-test and ANOVA for comparison. SPSS software used for the analysis

Outcome

The primary outcome of the study was to assess the perceived competency of the hospital health care workers in disaster management

Ethical issue

Study approval was obtained from the ethical committee of the Medical Research Department of Hamad Medical Corporation. No data were collected that revealed the identity of the participants. Strict confidentiality was maintained throughout the study.

Results

A total of 350 questionnaire were distributed of which 305 participants responded (Response rate 87.14%). After exclusion (5-incomplete data) 300 were included for the final analysis. Majority of the participants were nurses (n = 152, 50.6%). When the years of service in the respective field of work was analyzed, we found that 73.3% (n = 220) of the participants had more than 8 years of work experience. Only 1 candidate had a professional experience of less than 1 year (Table 1).

Characteristics	Number	Percentage (%)	
Gender	Female	147	49
	Male	153	51
Age	Less than 35 yrs	84	28
	35 - 45 yrs	157	52.3
	More than 45 yrs	59	19.7
Ethnic Background	African	10	3.33
	Asian	244	81.3
	Europe	2	0.66
	Australia	1	0.33
	Mediterranean	43	14.33
Profession	Physician	55	18.3
	Nurses	152	50.6
	Paramedical	45	15
	Administrative staff	48	16
Total Years of Practice	< 1 year	1	0.33
	1 - 3 years	21	7
	4 - 8 years	57	19
	> 8 years	221	73.3
Experience in current institution	< 1 year	31	10.3
	1 - 3 years	56	18.6
	4 - 8 years	75	25
	> 8 years	138	46

Table 1: Baseline demographic characteristics.

83% (n = 249) of participants had formal training in disaster management. Of these, 51.4% completed online training and the rest received hands on training. The details of training experience among the various groups are shown in figure 1. Regarding participation in disaster drills, 203 (67%) participants gave a positive response (Figure 2). On the need for mandatory education in disaster management, 87.33% (n = 262) responded in the affirmative. A majority of the survey respondents (n = 236) did not participate in any real disaster management during their service (Figure 3).

The second part of the survey was focused on specific competencies in disaster management. The participants were asked 14 questions covering various aspects in disaster management. On analysis of the mean score for the participants in general, it was observed that the question regarding the importance of Disaster Management (Q1) received the highest score of 3.60 ± 1.021, while the lowest score was for the question regarding ethical aspects of disaster management (Q10), 2.79 ± 0.915 (Figure 3). When the scores were analysed with regards to gender, except for questions regarding the importance of disaster management (Q1) and psychosocial issues in disaster (Q7), females

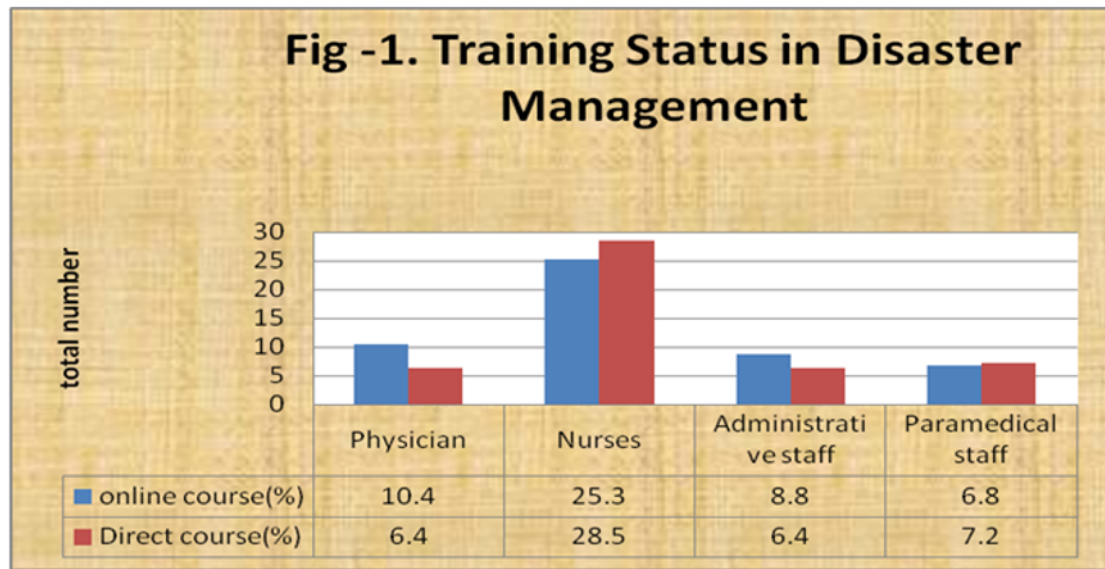


Figure 1: Training status in disaster management.

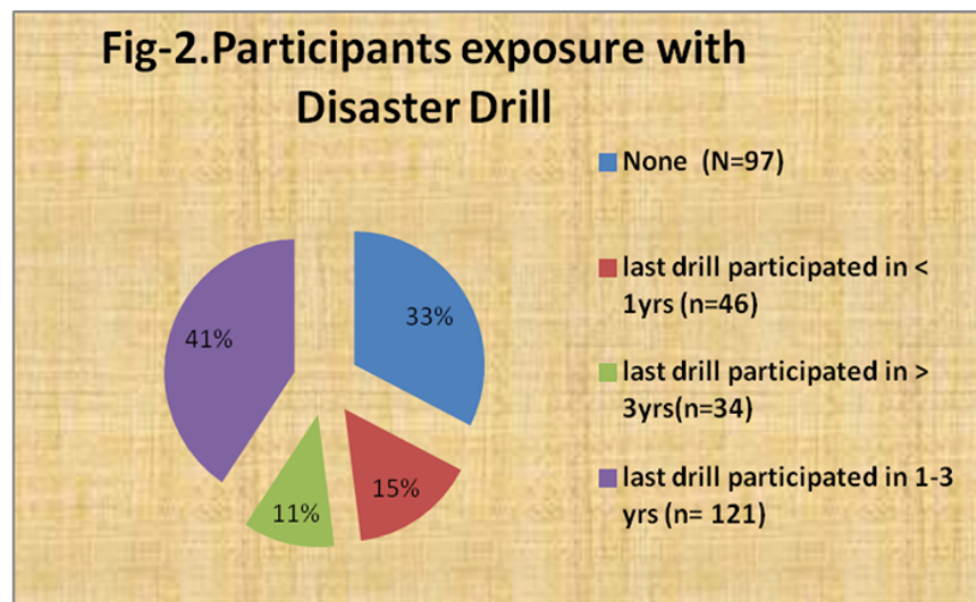


Figure 2: Participants exposure with disaster drill.

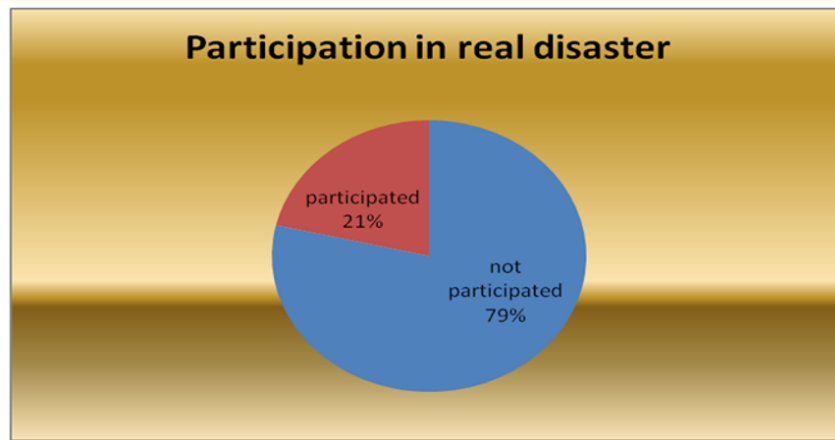


Figure 3: Participants experience with prior disaster management.

scored higher. The difference in response between the groups were statistically significant only for questions concerning competencies in ethical issue (Q10) and that regarding decontamination and use of personal protective equipments (Q13). For both the questions female participants fared better (Table 2).

	Gender	Number	Mean	Std. Deviation	P-Value
Q1	Male	153	3.61	1.065	0.248
	Female	147	3.59	.978	
Q2	Male	153	3.08	.903	0.381
	Female	147	3.10	.855	
Q3	Male	153	3.17	.894	0.932
	Female	147	3.31	.833	
Q4	Male	153	3.01	.888	0.330
	Female	147	3.17	.909	
Q5	Male	153	3.34	1.040	0.133
	Female	147	3.35	.920	
Q6	Male	153	3.03	.896	≤0.365
	Female	147	3.15	.932	
Q7	Male	153	2.87	.894	0.824
	Female	147	2.75	.835	
Q8	Male	153	2.94	.875	≤0.643
	Female	147	3.13	.901	
Q9	Male	153	3.14	.884	0.677
	Female	147	3.29	.891	
Q10	Male	153	2.71	.951	0.026
	Female	147	2.86	.873	
Q11	Male	153	3.27	.961	0.980
	Female	147	3.48	.932	
Q12	Male	153	2.84	.976	0.469
	Female	147	2.89	.937	
Q13	Male	153	3.37	1.081	0.024
	Female	147	3.64	.906	
Q14	Male	153	3.34	1.008	0.213
	Female	147	3.48	.894	

Table 2: Mean score on the basis of gender.

When the scores and years of professional experience were compared, statistically significant difference was noted only for the question regarding triage competency. It was observed that staff with 4 - 8 year of experience had a better score than the rest (Table 3). No significant difference were seen across the three age groups (Table 4).

		N	Mean	Std. Deviation	Std. Error Lower Bound	95% CI for Mean		
						Upper Bound	P Value	
Q1	< 3 years	23	3.48	1.123	.234	2.99	3.96	0.64
	4 to 8 years	57	3.70	1.017	.135	3.43	3.97	
	> 8 years	220	3.59	1.014	.068	3.46	3.73	
Q2	< 3 years	23	2.91	.848	.177	2.55	3.28	0.14
	4 to 8 years	57	3.28	.796	.105	3.07	3.49	
	> 8 years	220	3.05	.897	.061	2.94	3.17	
Q3	< 3 years	23	2.87	1.014	.211	2.43	3.31	0.10
	4 to 8 years	57	3.30	.778	.103	3.09	3.50	
	> 8 years	220	3.26	.866	.058	3.14	3.37	
Q4	< 3 years	23	2.78	1.043	.217	2.33	3.23	0.13
	4 to 8 years	57	3.00	.779	.103	2.79	3.21	
	> 8 years	220	3.15	.910	.061	3.02	3.27	
Q5	< 3 years	23	2.87	.968	.202	2.45	3.29	0.05
	4 to 8 years	57	3.42	.944	.125	3.17	3.67	
	> 8 years	220	3.38	.983	.066	3.25	3.51	
Q6	< 3 years	23	3.00	.603	.126	2.74	3.26	≤ 0.89
	4 to 8 years	57	3.11	.920	.122	2.86	3.35	
	> 8 years	220	3.09	.942	.063	2.97	3.22	
Q7	< 3 years	23	2.61	.783	.163	2.27	2.95	0.41
	4 to 8 years	57	2.89	.880	.117	2.66	3.13	
	> 8 years	220	2.81	.871	.059	2.69	2.92	
Q8	< 3 years	23	3.04	.638	.133	2.77	3.32	0.31
	4 to 8 years	57	3.19	.766	.101	2.99	3.40	
	> 8 years	220	2.99	.941	.063	2.87	3.12	
Q9	< 3 years	23	2.91	.793	.165	2.57	3.26	0.20
	4 to 8 years	57	3.18	.848	.112	2.95	3.40	
	> 8 years	220	3.25	.906	.061	3.13	3.37	
	Total	300	3.21	.889	.051	3.11	3.31	
Q10	< 3 years	23	2.87	.869	.181	2.49	3.25	0.51
	4 to 8 years	57	2.89	.880	.117	2.66	3.13	
	> 8 years	220	2.75	.930	.063	2.63	2.87	
Q11	< 3 years	23	3.04	.878	.183	2.66	3.42	0.14
	4 to 8 years	57	3.30	.865	.115	3.07	3.53	
	> 8 years	220	3.43	.975	.066	3.30	3.56	
	Total	300	3.38	.951	.055	3.27	3.48	
Q12	< 3 years	23	2.70	.876	.183	2.32	3.07	0.61
	4 to 8 years	57	2.93	.904	.120	2.69	3.17	
	> 8 years	220	2.86	.979	.066	2.73	2.99	
Q13	< 3 years	23	2.87	1.058	.221	2.41	3.33	0.06
	4 to 8 years	57	3.63	.837	.111	3.41	3.85	
	> 8 years	220	3.54	1.022	.069	3.40	3.67	
Q14	< 3 years	23	2.96	1.224	.255	2.43	3.49	0.36
	4 to 8 years	57	3.56	.846	.112	3.34	3.79	
	> 8 years	220	3.42	.940	.063	3.29	3.54	

Table 3: Years of experience and competency.

		N	Mean	Std. Deviation	Std. Error Lower Bound	95% CI for Mean		
						Upper Bound	P value	
Q1	< 35 years	84	3.50	1.146	.125	3.25	3.75	0.46
	35 to 45 years	157	3.62	.984	.079	3.46	3.77	
	> 45 years	59	3.71	.929	.121	3.47	3.95	
Q2	< 35 years	84	3.11	.892	.097	2.91	3.30	0.944
	35 to 45 years	157	3.07	.866	.069	2.93	3.21	
	> 45 years	59	3.10	.904	.118	2.87	3.34	
Q3	< 35 years	84	3.12	.897	.098	2.92	3.31	0.255
	35 to 45 years	157	3.25	.869	.069	3.12	3.39	
	> 45 years	59	3.36	.804	.105	3.15	3.57	
Q4	< 35 years	84	2.92	.921	.100	2.72	3.12	0.104
	35 to 45 years	157	3.14	.880	.070	3.00	3.28	
	> 45 years	59	3.20	.906	.118	2.97	3.44	
Q6	< 35 years	84	3.24	1.013	.111	3.02	3.46	0.485
	35 to 45 years	157	3.38	.978	.078	3.23	3.54	
	> 45 years	59	3.41	.949	.124	3.16	3.65	
Q6	< 35 years	84	2.98	.944	.103	2.77	3.18	≤0.388
	35 to 45 years	157	3.15	.853	.068	3.01	3.28	
	> 45 years	59	3.08	1.022	.133	2.82	3.35	
Q7	< 35 years	84	2.70	.941	.103	2.50	2.91	0.398
	35 to 45 years	157	2.86	.866	.069	2.72	3.00	
	> 45 years	59	2.83	.746	.097	2.64	3.02	
Q8	< 35 years	84	2.95	.956	.104	2.74	3.16	0.614
	35 to 45 years	157	3.07	.841	.067	2.94	3.20	
	> 45 years	59	3.05	.936	.122	2.81	3.29	
Q9	< 35 years	84	3.05	.863	.094	2.86	3.23	0.99
	35 to 45 years	157	3.31	.852	.068	3.17	3.44	
	> 45 years	59	3.20	.996	.130	2.94	3.46	
Q10	< 35 years	84	2.77	.998	.109	2.56	2.99	0.987
	35 to 45 years	157	2.79	.825	.066	2.66	2.92	
	> 45 years	59	2.80	1.030	.134	2.53	3.07	
Q11	< 35 years	84	3.37	.847	.092	3.19	3.55	0.305
	35 to 45 years	157	3.32	.987	.079	3.16	3.47	
	> 45 years	59	3.54	.988	.129	3.28	3.80	
Q12	< 35 years	84	2.79	.945	.103	2.58	2.99	0.347
	35 to 45 years	157	2.85	.942	.075	2.70	3.00	
	> 45 years	59	3.02	1.008	.131	2.75	3.28	
Q13	< 35 years	84	3.50	.925	.101	3.30	3.70	0.46
	35 to 45 years	157	3.45	1.047	.084	3.29	3.62	
	> 45 years	59	3.64	1.013	.132	3.38	3.91	
Q14	< 35 years	84	3.37	1.073	.117	3.14	3.60	0.329
	35 to 45 years	157	3.37	.894	.071	3.23	3.51	
	> 45 years	59	3.58	.932	.121	3.33	3.82	

Table 4: Mean score among various age groups.

The response among the four professional groups regarding various competencies were analysed. For the question regarding the competency in disaster management (Q1), the administrative staff scored an average score of 3.13 ± 1.024 whereas physicians scored 3.89 ± 1.048 , a statistically significant difference (Table 5 and 6). Similarly, a statistically significant difference was noted among the groups in

response to the question regarding the Incident command system (Q3). Nurses scored an average of 3.38 ± 0.745 , while that by admin staff was 2.96 ± 0.988 . When enquired about disaster management in general (Q2), paramedics scored the lowest mean score of 2.82 ± 1.018 , while the highest was for the nursing group 3.21 ± 0.697 . A similar pattern was noticed for the response regarding disaster communication (Q9) also. Response to both questions demonstrated a statistically significant difference between the four groups. Question 4 was about disaster planning for which again the nurses scored higher than the other groups, with a significant difference between them. With regards to competencies about psychological issues in disasters (Q7) and ethical issues in disasters (Q10), the average score was the lowest for all the groups when compared to other competencies. However, there was no statistically significant difference within the group. On the competency of clinical assessment and treatment in disasters (Q11), nurses recorded an average score of 3.70 ± 0.70 , while that for the admin staff was 2.63 ± 1.142 . A similar pattern was seen in response to use of personal protective devices where the nurses scored an average of 3.80 ± 0.775 and the score for admin staff was 2.73 ± 1.125 . Responses to competency in disaster communication (Q9) also had a similar pattern with nurses acquiring a higher score which was significant. For the competencies regarding Q 11 to Q 14, there were significant differences in their mean scores among the four professional groups (Table 5 and 6).

Importance of competency in disaster management					
	Very poor	Poor	Average	Good	Very good
Administrative staff	1 (2.08%)	13 (27.08%)	19 (39.58%)	9 (1.75%)	6 (12.5%)
Nurses		9 (5.92%)	54 (35.52%)	54 (35.52%)	35 (23.02%)
Physician	2 (3.63%)	3 (5.45)	12 (21.82%)	20 (36.36%)	18 (32.73%)
Paramedic	5 (11.11%)	4 (8.89%)	19 (42.22%)	9 (20%)	8 (17.78%)
Disaster management in general					
	Very poor	Poor	Average	Good	Very good
Administrative staff	2 (4.1%)	15 (31%)	18 (37.5%)	9 (18.25%)	4 (8.33%)
Nurses	2 (1.3%)	15 (9.9%)	87 (72%)	45 (30%)	3 (1.9%)
Physician	6 (11%)	5 (9.1%)	27 (49%)	13 (24%)	4 (7.3%)
Paramedic	5 (11.11%)	11 (24%)	16 (35.6%)	11 (24.4%)	1 (2.2%)
Understanding of Incident command system					
	Very poor	Poor	Average	Good	Very good
Administrative staff	2 (4.1%)	14 (29.17%)	20 (41.67%)	8 (16.67%)	4 (8.33%)
Nurses	1 (0.66%)	12 (7.89%)	76 (50%)	54 (35.52%)	9 (5.9%)
Physician	4 (7.27%)	3 (5.45%)	25 (45.45%)	20 (36.36%)	3 (5.45%)
Paramedic	4 (8.89%)	5 (11.11%)	25 (55.55%)	9 (20%)	2 (4.44%)
Competency in disaster planning					
	Very poor	Poor	Average	Good	Very good
Admin	3 (6.25%)	18 (37.5%)	16 (33%)	6 (12.5%)	5 (10.4%)
Nurses	3 (1.9%)	19 (12.5%)	77 (50.6%)	48 (31.5%)	5 (3.2%)
Physician	3 (5.4%)	9 (16.3%)	25 (45.5%)	14 (25.4%)	4 (7.3%)
Paramedic	4 (8.8%)	8 (17.7%)	24 (53.3%)	7 (15.5%)	2 (4.4%)
Level of competency in triage					
	Very poor	Poor	Average	Good	Very good
Administrative staff	5 (10.4%)	20 (41.1%)	14 (29.2%)	5 (10.4%)	4 (8.33%)
Nurses	1 (0.6%)	13 (8.5%)	53 (34.9%)	70 (46.1%)	15 (9.8%)
Physician	3 (5.5%)	2 (3.6%)	17 (31%)	24 (43.6%)	9 (16.4%)
Paramedic	4 (8.8%)	6 (13.3%)	21 (46%)	12 (26.6%)	2 (4.4%)
Competency in public health					
	Very poor	Poor	Average	Good	Very good
Admin	2 (4.6%)	17 (35%)	19 (39.5%)	6 (12.5%)	4 (8.3%)
Nurses	6 (3.9%)	19 (12.5%)	78 (51.3%)	43 (28.3%)	6 (0.4%)
Physician	3 (5.5%)	7 (12.7%)	24 (43.6%)	18 (32.7%)	3 (5.45%)
Paramedic	4 (8.9%)	10 (22.2%)	17 (37.8%)	12 (26.7%)	2 (4.4%)

Competency in disaster related psychosocial issue					
	Very poor	Poor	Average	Good	Very good
Admin	5 (10.4%)	20 (42.6%)	14 (29.2%)	8 (16.6%)	1 (2%)
Nurses	8 (5.2%)	33 (21.7%)	83 (54%)	28 (18%)	
Physician	3 (5.4%)	12 (21.8%)	28 (51%)	10 (20%)	2 (3.6%)
Paramedic	6 (13.37)	10 (22.3%)	21 (41%)	6 (13.3%)	2 (4.4%)
Competency in disaster support and assistance					
	Very poor	Poor	Average	Good	Very good
Admin	2 (4.1%)	13 (27%)	20 (41.7%)	9 (18.7%)	4 (8.3%)
Nurses	6 (3.9%)	22 (14.5%)	72 (47.2%).42	49 (32.2%)	3 (2%)
Physician	4 (7.3%)	10 (18.2%)	27 (29%)	12 (21.9%)	2 (3.6%)
Paramedic	4 (8.8%)	10 (22.7%)	24 (53.3%)	5 (11.1%)	2 (4.4%)
Understanding of disaster communication					
	Very poor	Poor	Average	Good	Very good
Admin	5 (10.4%)	11 (23%)	18 (37%)	9 (19%)	5 (10.4%)
Nurses	3 (1.9%)	9 (6%)	73 (48%)	66 (43%)	1 (0.6%)
Physician	3 (5.4%)	6 (11%)	20 (36%)	23 (42%)	3 (5.4%)
Paramedic	4 (8.8%)	10 (22.2%)	20 (44%)	8 (17.8%)	3 (6.6%)
Understanding of regulatory, legal and ethical in disaster					
	Very poor	Poor	Average	Good	Very good
Admin	5 (10.42%)	15 (31.2%)	16 (33.3%)	8 (16.7%)	4 (8.33%)
Nurses	4 (2.6%)	44 (29%)	73 (48%)	30 (19.7%)	1 (0.6%)
Physician	4 (7.3%)	19 (34.5%)	22 (40%)	9 (16.4%)	1 (1.8%)
Paramedic	10 (22.2%)	9 (20%)	40 (18%)	6 (13.3%)	2 (4.4%)
Competency in clinical assessment and treatment					
	Very poor	Poor	Average	Good	Very good
Administrative staff	7 (14.6%)	18 (37.5%)	13 (27%)	6 (12.5%)	4 (8.3%)
Nurses	1 (0.6%)	3 (1.9%)	52 (34%)	81 (53%)	15 (9.8%)
Physician	2 (3.6%)	2 (3.6%)	19 (34.5%)	26 (47%)	6 (11%)
Paramedic	4 (8.8%)	9 (20%)	23 (51.1%)	8 (17.7%)	1 (2.2%)
Competency in disaster related pathology					
	Very poor	Poor	Average	Good	Very good
Admin	8 (16.7%)	24 (50%)	8 (16.7%)	5 (10.4%)	3 (6.3%)
Nurses	8 (5.2%)	27 (17.8%)	79 (52%)	36 (23.7%)	2 (1.3%)
Physician	3 (5.5%)	10 (18%)	25 (45.5%)	13 (23.6%)	4 (7.3%)
Paramedic	6 (13.3%)	14 (31%)	14 (31%)	10 (22.2%)	1 (2.2%)
Understanding Decontamination and personal Protective Equipment in Disaster					
	Very poor	Poor	Average	Good	Very good
Administrative staff	6 (12.5%)	16 (33.3%)	15 (31.2%)	7 (14%)	4 (8.3%)
Nurses	1 (0.6%)	4 (2.6%)	46 (30.3%)	75 (49%)	26 (17.1%)
Physician	2 (3.6%)	5 (9.1%)	16 (29.1%)	21 (38%)	11 (20%)
Paramedic	3 (6.6%)	8 (17.7%)	15 (33.3%)	15 (33.3%)	4 (8.8%)
Understanding of Safety in Disaster					
	Very poor	Poor	Average	Good	Very good
Admin	5 (10.4%)	12 (25%)	16 (33.3%)	11 (23%)	4 (8.3%)
Nurses	3 (1.9%)	4 (2.6%)	54 (35.5%)	76 (50%)	15 (9.8%)
Physician	2 (3.6%)	2 (3.6%)	23 (42%)	20 (36.4%)	8 (14.5%)
Paramedic	4 (8.8%)	9 (20%)	19 (42.2%)	9 (20%)	4 (8.8%)

Table 5: Response to competency.

		N	Mean	Std. Deviation	Std. Error Lower Bound	95% CI for Mean		
						Upper Bound	P value	
Importance of competency in Disaster Management (Q1)	Physician	55	3.89	1.048	.141	3.61	4.17	≤ 0.001
	Nurse	152	3.76	.876	.071	3.62	3.90	
	Paramedical	45	3.24	1.190	.177	2.89	3.60	
	Admin	48	3.13	1.024	.148	2.83	3.42	
Disaster management in general (Q2)	Physician	55	3.07	1.034	.139	2.79	3.35	0.042
	Nurse	152	3.21	.697	.056	3.10	3.32	
	Paramedical	44	2.82	1.018	.153	2.51	3.13	
	Admin	48	2.96	1.010	.146	2.67	3.25	
Understanding of command system (Q3)	Physician	55	3.27	.932	.126	3.02	3.52	0.005
	Nurse	152	3.38	.745	.060	3.26	3.50	
	Paramedical	45	3.00	.929	.139	2.72	3.28	
	Admin	48	2.96	.988	.143	2.67	3.25	
Competency in Disaster Planning (Q4)	Physician	55	3.13	.963	.130	2.87	3.39	0.025
	Nurse	152	3.22	.780	.063	3.09	3.34	
	Paramedical	45	2.89	.935	.139	2.61	3.17	
	Admin	48	2.83	1.078	.156	2.52	3.15	
level of competency in triage (Q5)	Physician	55	3.62	.991	.134	3.35	3.89	
	Nurse	152	3.56	.812	.066	3.43	3.69	
	Paramedical	45	3.04	.976	.145	2.75	3.34	
	Admin	48	2.65	1.082	.156	2.33	2.96	
Competency in Public Health (Q6)	Physician	55	3.20	.931	.126	2.95	3.45	0.121
	Nurse	152	3.16	.839	.068	3.02	3.29	
	Paramedical	45	2.96	1.021	.152	2.65	3.26	
	Admin	48	2.85	.989	.143	2.57	3.14	
Competency in Disaster related Psychosocial issue (Q7)	Physician	55	2.93	.879	.119	2.69	3.16	≤ 0.158
	Nurse	152	2.86	.772	.063	2.74	2.99	
	Paramedical	45	2.73	1.009	.150	2.43	3.04	
	Admin	48	2.58	.964	.139	2.30	2.86	
Competency in Disaster support and assistance (Q8)	Physician	55	2.96	.922	.124	2.71	3.21	0.133
	Nurse	152	3.14	.830	.067	3.01	3.27	
	Paramedical	45	2.80	.919	.137	2.52	3.08	
	Admin	48	3.00	.989	.143	2.71	3.29	
Understanding of Disaster Communication(Q9)	Physician	55	3.31	.940	.127	3.05	3.56	0.004
	Nurse	152	3.35	.693	.056	3.24	3.46	
	Paramedical	45	2.91	1.019	.152	2.61	3.22	
	Admin	48	2.96	1.129	.163	2.63	3.29	
Understanding of regulatory, legal and ethical aspects of disaster response (Q10)	Physician	55	2.71	.896	.121	2.47	2.95	0.253
	Nurse	152	2.87	.778	.063	2.74	2.99	
	Paramedical	45	2.58	1.118	.167	2.24	2.91	
	Admin	48	2.81	1.104	.159	2.49	3.13	

Competency in Clinical assessment and treatment (Q11)	Physician	55	3.58	.875	.118	3.35	3.82	≤ 0.001
	Nurse	152	3.70	.700	.057	3.59	3.81	
	Paramedical	45	2.84	.903	.135	2.57	3.12	
	Admin	48	2.63	1.142	.165	2.29	2.96	
Competency in Disaster related pathology (Q12)	Physician	55	3.09	.967	.130	2.83	3.35	≤ 0.001
	Nurse	152	2.98	.826	.067	2.85	3.11	
	Paramedical	45	2.69	1.041	.155	2.38	3.00	
	Admin	48	2.40	1.086	.157	2.08	2.71	
Understanding Decontamination and personal Protective Equipment in Disaster (Q13)	Physician	55	3.62	1.027	.139	3.34	3.90	≤ 0.001
	Nurse	152	3.80	.775	.063	3.67	3.92	
	Paramedical	45	3.20	1.057	.158	2.88	3.52	
	Admin	48	2.73	1.125	.162	2.40	3.06	
understanding of Safety in Disaster (Q14)	Physician	55	3.55	.919	.124	3.30	3.79	≤ 0.001
	Nurse	152	3.63	.778	.063	3.51	3.76	
	Paramedical	45	3.00	1.066	.159	2.68	3.32	
	Admin	48	2.94	1.119	.161	2.61	3.26	

Table 6: Mean score in professional groups.

Discussion

We sought to examine the self-perception of training and competencies of healthcare workers in disaster management. We found 78.67% of the participants did not have any exposure to real disasters during their employment period whereas 81.16% were found to have prior training in disaster response. Our study validates the past survey done by Slepski, *et al.* who reported 85% of the participants to have prior training [8]. In contrast to our study, 60% of their participants had prior experience with disaster response. The relative high exposure in their study can be attributed to geographic location and a high incidence of natural calamities in the area. A survey done by Bruce found only 25% of the participants received formal training whereas Hsu, *et al.* found only 27.6% received formal training [7,13].

Regarding the preparedness to manage a disaster in general, the clinical and paramedical staff felt more confident than the administrative staff, as expected. This could be due to the routine exposure to clinical cases in their practice. In contrast to our result, a survey done by Chen, *et al.* found only 27% of the participants in their study were prepared to manage a bioterrorist attack [14].

In the clinical assessment and triage competency, the nurses, physicians, and paramedics felt more competent than administrative staff. This level of difference can be explained by their professional background as well as by the job profile.

Training of healthcare workers in public health emergency preparedness showed significant improvement in their skills relative to this area of expertise [15]. Effective prior training ensures the safety and health of the medical workers and other responders during a disaster [6]. With the increase in web based training and easy availability of resources, a small study showed a trend in favour of web based interventions. However, the trend was not statistically significant [16].

87.33% of our study population was of the opinion that Disaster Management should be included in the curriculum of professional training. A study carried out in community hospital in Florida showed all the participants agreeing for inclusion of disaster management in the professional curriculum. However, in Pennsylvania, only 36% of the responders agreed with this.⁷ Emergency Medicine curricula do not typically focus on disaster medicine or disaster response. It mainly focuses on maximum possible, individual patient tailored care [17-19].

In any disaster, whether internal or external, the need for resources frequently exceeds the supply. In such conditions, the healthcare providers may not be able to strictly adhere to the routine practice guidelines and ethical aspects of clinical management. In addition to clinical competencies, responding to the disaster’s impact also requires management of psychological consequences of the scenario in

victims, relatives and the healthcare providers. This aspect needs a proper preparedness and understanding. Therefore the present medical education curriculum needs to incorporate disaster management as one of its participants. Studies have shown that an integrated curriculum of traditional teaching methods and electronic (e-) learning modules enhance the adult learning experience [20,21].

In a study conducted among healthcare professional and medical students in China, 87.1% of the participants had low or moderate self estimated knowledge in disaster medicine [22]. In the same study, healthcare workers showed a low level of knowledge in disaster administration and psychology.

Conventional medical teaching curricula and training methods focus mainly on clinical aspects of the patients, while disaster medicine has been long neglected [23]. During disasters, the healthcare workers have to work in unfamiliar and unaccustomed environments. Prior training and proper precautions will help to avoid the injuries to responders and care givers. The efficiency of safety training in decreasing the injuries to responders has been well established. Safety instruction can be implemented both before the event and as “Just in time” on scene training [24]. Some authors recommend targeting contents to specific subgroup of responders depending on the roles they assume during a disaster [25].

Triage helps in rapidly identifying patients who require urgent care and also helps in judicious utilization of available resources. The majority of individuals presenting for medical attention in the early phases of disasters frequently have less serious medical problems. In the early hours of a disaster response, healthcare providers are often seen dealing with large volumes of patients with low acuity problems.

Clinical competencies in disaster response are highlighted by the change from the usual setting of providing maximum benefit to the individual patient to provide optimal care for the maximum number of patients. Studies have clearly shown that the training of healthcare providers in advanced life support skills will improve the outcome of the patient care. There is evidence in the literature that advanced life support training does improve clinical skills, including those used in disaster settings, though retention of the skills may diminish over time [26-28]. This emphasizes the importance of periodic drills and review courses.

Mental health issues following a disaster are stressed in various articles, for both victims and responders. However, these factors are not given much importance in the initial hours of disaster management. The importance of Psychological First Aid while managing a disaster is well explained and stressed in recent publications [29]. Several formats of disaster training have been used and these have demonstrated measurable educational effects, though the effect of this training on patient oriented outcomes in actual disaster has not studied [30-32]. Geggie and Qureshi suggested that the” first step toward emergency preparedness is the identification of Who needs to know how to do what”.

Limitations of the Study

Main limitation of the survey was that the selected participants were from different departments with varying clinical exposure which might have affected their competencies. However, we assume that since all the hospital staff received basic disaster management training this limitation affecting the results of the study may be negligible.

Conclusion

- 1) Majority of the health care workers at Alkhor Hospital felt competent in managing disasters in general and perceived that their training in disaster management was adequate.
- 2) There is need for training in management of psychological aspects in disaster and also regarding the legal and ethical issues in disaster.
- 3) Regular drills and practice session are required to maintain the skills of the staff.

Acknowledgment

This study is submitted to the Università del Piemonte Orientale and Veije Universiteit, in partial fulfilment of the university requirement for master of Science in Disaster Medicine (Msc-EMDM).

Appendix 1

Survey Questionnaire

1) Age _____ Yrs

2) Gender Male female

3) Profession -Physician
 Nurse
 Paramedical
 Administrative

4) Years of practice (yrs)
Total- <1 1-3 4-8 >8
In current institution - <1 1-3 4-8 >8

5) In which country did you have basic professional training? _____

6) Have you received any formal training in Disaster management?
 No Yes (if yes online Hands on)

7) Have you ever participated in a Disaster drill ? Yes No

 If yes, last drill participated in <1 yr 1-3 Yrs >3 Yrs

8) Have you ever actively participated in real disaster? Yes No

9) *Should mandatory education in disaster management be required?*

 yes No neutral

Figure

Competency	1	2	3	4	5	Key
Q1) How important do you feel competency in Disaster Management is to your practice and community situation						
Q2) Where do you place your level of competency in disaster management in general						1-very poor
Q3) Where do you place your level of understanding of incident command system****						2 -Poor
Q4) Where do you place your level of competency in disaster planning						3Average
Q5) Where do you place your level of competency in triage						4- good
Q6) Where do you place your level of competency in public health**						5- very good
Q7) Where do you place your level of competency in disaster related psychosocial issues*						
Q8) Where do you place your level of competency in disaster support and assistance						
Q9) Where do you place your level of understanding of disaster communication						
Q10) Where do you place your level of understanding of regulatory, legal and ethical aspects of disaster response						
Q11) Where do you place your level of competency in clinical assessment and treatment						
Q12) Where do you place your level of competency in disaster related pathology***						
Q13) Where do you place your level of understanding of decontamination and personal protective equipment						
Q14) Where do you place your level of understanding of safety in disaster						
<ul style="list-style-type: none"> • *Immediate and long term psychological problem related to disaster • **Community health issues in general • *** health issue due to disaster • ****HMC and AKH Major incident plan 						

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