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Knowledge, Attitudes, and Practices of Health Professionals Toward Disaster and Public Health Emergency Preparedness in Somalia

Abdullahi Ahmed Tahlil

abdullahi.tahlily@gmail.com

Department of Public Health, Faculty of Graduate Studies and Research, Somali National University

Gallad D. Hassan

Department of Public Health, Faculty of Graduate Studies and Research, Somali National University

Sawsan AlNahas

Department of Public Health Protection, Dubai Health Authority

Mohamed Abdelrahman Mohamed

Ministry of Health and Human Services

Kasim Mahdi Sultan

African Field Epidemiology Network

Abdirahman Khalif Mohamud

Africa Centre for Disease Control and Prevention

Ahmed Abdi Ismail

Africa Centre for Disease Control and Prevention

Ahmed Dahir

World Health Organization Country Office

Abdinasir Yusuf Osman

Ministry of Health and Human Services

Mohamed Ali Kamil

World Health Organization Country Office

Guled Abdijalil

World Health Organization Country Office

Ali Haji Adam

World Health Organization Country Office

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Abstract

Background

Disasters and public health emergencies pose persistent threats to fragile health systems, particularly in Somalia, where recurrent outbreaks, climate-related shocks, and protracted conflict challenge service delivery and population health. The effectiveness of national preparedness structures, such as surveillance systems and Public Health Emergency Operations Centers, depends heavily on the readiness of the health workforce. This study aimed to assess the knowledge, attitudes, and practices (KAP) of health professionals toward disaster and public health emergency preparedness in Somalia and to identify factors associated with these domains.

Methods

A nationwide facility-based cross-sectional study was conducted across eight administrative states of Somalia among 1,678 health professionals selected using multistage sampling. Data were collected using a structured, self-administered questionnaire. Knowledge, attitude, and practice scores were generated using predefined cutoffs. Multivariable logistic regression analyses were performed to identify factors independently associated with each KAP domain. Statistical significance was set at a p-value of less than 0.05.

Results

The study revealed that 71.0% of participants had adequate knowledge, 69.1% exhibited positive attitudes, and 82.3% demonstrated poor practices toward disaster and public health emergency preparedness. Prior involvement in disaster or outbreak response was the strongest predictor of adequate knowledge (AOR = 31.98; 95% CI: 17.53–58.34), positive attitudes (AOR = 10.44; 95% CI: 6.64–16.40), and good practices (AOR = 22.60; 95% CI: 12.39–41.25). Female sex and clinical professional cadres were significantly associated with higher knowledge levels. Formal preparedness training was strongly associated with good practices (AOR = 3.28; 95% CI: 2.16–4.97). Age, years of experience, marital status, and employment sector also showed significant associations across KAP domains.

Conclusion

Health professionals in Somalia generally possessed adequate knowledge and favorable attitudes toward disaster and public health emergency preparedness; however, substantial deficiencies were observed in operational practices. These findings highlight critical system-level gaps in training coverage, simulation exercises, and institutional preparedness mechanisms. Strengthening routine in-service training, expanding drills, and integrating preparedness indicators into facility governance and

national quality-improvement frameworks are essential to enhance workforce readiness and reinforce Somalia's capacity to respond effectively to future public health emergencies.

Introduction

Disaster and public health emergencies are still among the major threats facing health systems across the world. The frequency and complexity have increased due to climate change, emerging and re-emerging infectious diseases, rapid urbanization, technological hazards, and protracted humanitarian crises. [1–4] These events account for a considerable burden of morbidity and mortality and disruption of essential health services, with disproportionate effects in low- and middle-income countries, including Somalia.

In response, disaster and emergency preparedness has been identified as a core element of health system resilience and global health security. This is reflected in key international frameworks, including the International Health Regulations (IHR 2005), the Sendai Framework for Disaster Risk Reduction, and the World Health Organization's Health Emergency and Disaster Risk Management (EDRM) framework. [5] These frameworks highlight preparedness, coordination, and workforce capacity as elements that reduce the burden of emergencies.

Healthcare professionals also appear critical in all phases of the emergency response cycle, from prevention and preparedness to response and recovery. Beyond clinical care, other duties include preparedness planning, disease surveillance, early warning systems, risk communication, and preparedness and response activities associated with emergencies. The efficiency of professionals in this process appears highly dependent upon their awareness and understanding of disaster management concepts and attitudes towards preparedness and professional responsibilities, together with practices involved in preparedness processes, such as participation in training and emergency drills. [6, 7]

Global studies have provided evidence that inadequate knowledge, negative attitudes, and poor practices of healthcare professionals can drastically reduce the efficiency of emergencies, even in places where there are already existing policies and response plans [8] In Malaysia, a study on healthcare workers in the emergency department revealed that 91.6% of the workers possessed adequate disaster preparedness knowledge, while 78.2% had positive attitudes toward emergency readiness, and 61.1% reported taking part in activities such as drills and being well acquainted with emergency plans, which could be termed as satisfactory preparedness practices. [9] Similarly, a study in Nepal, which included pre-hospital and emergency healthcare providers, indicated that 62% of them had good disaster response knowledge, 66% had positive attitudes, but only 25% showed good preparedness practices. [10]

In Africa, the situation is usually worse when it comes to these issues. A study conducted in Ethiopia revealed that more than half (51.7%) of the medical staff had poor knowledge of disaster preparedness, 55% had negative attitudes towards preparedness, and 67.5% were not practicing adequate

preparedness at all. [11] The same trend was seen in Addis Ababa, where about 49.2% of professionals working in the health sector were considered to have low knowledge of disaster preparedness in hospitals, and only 8.3% were reporting their participation in such activities as drills and continuing education. [12] On the other hand, the continent is not homogeneous in its findings, as some studies—like a study from Tanzania—reported that more than half (53.2%) of their participants had adequate knowledge and more than three-quarters (79.8%) demonstrated positive attitudes towards disaster and emergency preparedness. [13]

In Somalia, the situation is rather critical when it comes to disaster and public health emergency preparedness. The country experiences prolonged conflict and insecurity, recurrent droughts and floods, frequent outbreaks of infectious diseases like cholera and measles, and large-scale population displacement. Even though the disease surveillance systems, Public Health Emergency Operations Centers (PHEOCs), and participation in global health security initiatives have been improved through recent efforts. [14, 15] The effectiveness of these systems ultimately depends on the preparedness of the health workforce responsible for their implementation. Despite this, there is still not much empirical evidence that evaluates the level of knowledge, attitudes, and practices regarding disaster and all-hazards emergency preparedness among health professionals in Somalia.

Against this backdrop, the present study aims to assess the knowledge, attitudes, and practices of health professionals working toward disaster and public health emergency preparedness in Somalia. By generating context-specific evidence, this study seeks to inform targeted training interventions, strengthen institutional preparedness mechanisms, and support the development of a resilient health workforce aligned with national priorities and global health security frameworks.

Methods

Study Design and Setting

A cross-sectional study was conducted to assess the health professionals' knowledge, attitudes, and practices towards disaster and public health emergency preparedness in Somalia. This type of research design is appropriate for measuring the level of knowledge, attitudes, and practices, as well as identifying factors associated with KAP at a particular point in time.

The study was conducted in all the major 8 administrative regions of Somalia, including Banadir Regional Administration, Southwest, Jubbaland, Hirshabelle, Galmudug, Puntland, Northeast, and Somaliland (Fig. 1). The study took place in a selection of public and private healthcare facilities throughout Somalia, such as tertiary hospitals, regional referral hospitals, district hospitals, and primary health care centers. The facilities involved in routine service delivery, disease surveillance, and emergency response, including those linked to PHEOCs, were included to ensure the representation of different levels of the health system.

Study Population

The study population included health professionals working in both the public and private facilities, including tertiary, regional, and primary care facilities, and was drawn from all eight administrative states of the country. Participants were considered eligible if they were actively practicing health professionals like doctors, nurses, midwives, laboratory technicians, pharmacists, and public health officers who have been working in the selected facilities for at least six months prior to the time of the data collection, are directly or indirectly engaged in public health emergency preparedness and response activities and are willing to provide informed consent. Health professionals who are on leave, those who were interns, students, those who volunteered without a formal agreement, and those who were unwilling to participate were excluded.

Sample Size Determination

The sample size was calculated using the single population proportion formula: $n = (Z^2 \times p \times (1 - p)) / d^2$. Where *n* denotes the sample size that we require, *Z* represents our desired confidence level (approaching 1.96 for 95% confidence), *p* denotes our sample proportion that possesses our subject attribute, and *d* denotes our margin of error. The portion (1 - p) refers to those who lack our subject attribute. A prevalence rate of 50% for adequate preparedness was presumed, considering the fact that there is no data on disaster and public health emergency preparation among health professionals in Somalia. Using the 95% confidence level with Z = 1.96 and a margin of error (d) of 2.5% are used to increase the precision of the estimate due to the existing lack of baseline preparedness data among health professionals in the country. To account for non-response and missing data, we added 10% to our calculated sample. With this in mind, the final sample size was 1,691. To ensure the sample was representative, it was allocated in equal shares for all eight administrative states of Somalia, as illustrated in Table 1.

Table 1
Distribution of the Sample Across the Eight States of Somalia

States	Estimated Workforce Share	Calculated Sample (n)	Rounded Final Sample (n)
Banadir	25%	422.75	423
Somaliland	20%	338.20	338
Puntland	15%	253.65	254
Southwest	11%	186.01	186
Jubbaland	10%	169.10	169
Hirshabelle	8%	135.28	135
Galmudug	6%	101.46	101
Northeast	5%	84.55	85
Total	**100%**	**1,691.00**	**1,691**

Sampling Technique and Procedure

A multistage sampling method was employed to ensure adequate representation of health workers in Somalia in terms of national, geographic, and professional categories. The sampling procedure was implemented in four stages, which are explained below.

Stage 1: Selection of States and Districts

The initial step of the study, all eight target administrative states—Banadir, Somaliland, Puntland, Southwest, Jubbaland, Hirshabelle, Galmudug, and Northeast— was included to ensure national representativeness (Fig. 1). To select districts in each state, a simple random sampling of two to three districts was selected from the official list of districts. The number of districts selected per state was proportionate to the state's allocated sample size, as shown in Table 1.

Stage 2: Selection of Healthcare Facilities

During this phase, the complete listing of all public and private healthcare facilities in the districts selected was compiled in collaboration with the local health authorities. The healthcare facilities were classified by type, which included tertiary hospitals, regional hospitals, and primary health care centers. For each stratum, two to three facilities were chosen by simple random sampling, proportional to the estimated number of health professionals in each state, in order to guarantee representation across different levels of the health system.

Stage 3: Selection of Health Professionals

In stage three, the full list of health professionals qualified for participation, including physicians, nurses, midwives, laboratory technicians, pharmacists, and public health officers, was collected from the administration of each chosen healthcare facility. The number of participants to be recruited from each facility was based on the facility's workforce size and the state-level sample allocation. Systematic random sampling was then applied by calculating the sampling interval (*k*), defined as the total number of eligible health professionals divided by the required number of participants from that facility. A random starting point between *1* and *k* was selected, after which every k^{th} individual on the list was recruited.

Stage 4: Eligibility Verification and Replacement

During the last phase of the selection process, all health professionals who were shortlisted were contacted to check their eligibility, among other things, their licensure status, and that they had at least six months at least of active professional practice. If the participant chosen was not available or did not want to take part, the next one on the list of eligible candidates was contacted. If there are fewer eligible professionals at the selected healthcare facility than required, a replacement facility of the same type was randomly selected from the original district list. This was done repeatedly until the predetermined, state-specific sample size was reached.

Data Collection Instrument

The data were gathered using a structured, self-administered questionnaire that was developed based on the Health EDRM framework, the IHR 2005, and previously validated studies on disaster and emergency preparedness. [11–13] The questionnaire was modified to reflect the Somali context by incorporating locally relevant disasters and public health emergency scenarios, health system structures, and terminology that is commonly used in Somalia's emergency preparedness and response system. The questionnaire was originally in English and then translated into Somali. To make sure both versions are conceptually equivalent and linguistically accurate, the Somali version was back-translated into English by independent translators. Any differences identified during the translation and back-translation process were addressed and settled through discussions among the research team. The questionnaire consisted of four main sections. The first section is designed to gather sociodemographic and professional information, such as age, gender, professional cadre, educational qualification, years of work experience, health facility type, and previous training in disaster or public health emergency preparedness. The second section aimed at knowledge assessment through ten structured questions. The third section evaluated attitudes through ten statements on a Likert scale. The fourth section measured practices via ten questions about preparedness behaviors.

Data Collection Procedure

Data collection was conducted by trained data collectors who had prior experience in public health research as well as electronic data collection. Before the commencement of the data collection, all participants were provided with detailed information regarding the study's purposes, the data collection procedure, the potential benefits, and the minimal risks of being a participant in the study. Each participant was required to provide electronic written informed consent before the questionnaire was administered. The data was collected with the help of a structured questionnaire that was conducted via an online data collection platform called Open Data Kit (ODK). The use of ODK made it possible for the data to be captured in real-time, minimized the chances of data entry errors, and elevated the overall accuracy of the data. Participants were allowed to fill out the questionnaire using electronic gadgets in a calm and private space within the health institutions. This method was to guarantee confidentiality, encourage honest answers, and limit the impact of social desirability bias. In instances when it was vital, the trained data collectors gave standardized assistance without swaying participants' responses. Upon completion, the submitted questionnaires were automatically uploaded to a secure server. The data was protected with encryption, password-protected access, and limited authorization granted only to the principal investigator and designated members of the research team. Regular backups of data were performed to avoid loss of data. Supervisors checked the data every day to judge its completeness, consistency, and logical accuracy. Any identified inconsistency or missing information was found, it was promptly addressed to maintain the quality and integrity of the data throughout the process of data collection.

Data Quality Assurance

Several measures were implemented to ensure the quality and reliability of the data. The questionnaire was pretested with a group of 60 healthcare workers in a specific administrative state, which was thereafter excluded from the main study. The feedback obtained from the pretest was used to refine the clarity, relevance, and structure of the questionnaire items. The data collectors and their supervisors received standardized training prior to data collection, which included study objectives, ethical considerations such as informed consent and confidentiality, the appropriate use of the Open Data Kit (ODK) platform, the standardized interview procedures, and the application of strategies to reduce data entry errors and biases.

Supervision was conducted through a combination of direct monitoring of data in real-time and field-based supervision. The supervisors regularly checked the submitted data for completeness, consistency, and logical accuracy through the ODK dashboard, and they also carried out periodic field visits to assess data collection practices, provide support on-site, and make sure that the protocols of the study were followed. Any identified errors or inconsistencies found in the data were promptly communicated to the data collectors and rectified if necessary. The internal consistency of the knowledge, attitude, and practice domains was assessed using Cronbach’s alpha, with a coefficient value of ≥ 0.70 being considered acceptable, thus indicating the measurement scales are reliable.

Data Management and Analysis

Data collected with the Open Data Kit (ODK) platform was securely uploaded to a password-protected server in real time, and securely, where only the research team members with permission could access it. When the data collection was finished, the dataset was imported into EpiData and then analyzed with IBM SPSS Statistics version 26.0. The data cleaning process consisted of checking for completeness, internal consistency, range errors, and duplicate records. Logical validation rules were used to pinpoint and rectify inconsistencies before analysis. Descriptive statistical analyses were performed to describe the sociodemographic and professional characteristics of the participants, as well as their awareness, attitudes, and practices towards disaster and public health emergency preparedness. Categorical variables were shown in terms of their frequencies and percentages, whereas continuous variables were described using means and standard deviations.

The knowledge domain comprised ten items, wherein each correct answer received a score of one (1), and *incorrect* or "*don't know*" responses received a score of zero (0), which led to a total possible score ranging between 0 and 10. Participants who scored 70% and above (7 out of 10 or more) were classified as having adequate knowledge, while those who scored below 70% (less than 7 out of 10) were classified as having inadequate knowledge. The attitude domain consists of ten statements assessed on a five-point Likert scale from "*strongly disagree*" (1) to "*strongly agree*" (5). Items that were negatively phrased were reverse-coded before analysis. Scores for each individual item were totaled to create a composite attitude score that varied from 10 to 50. Those participants who obtained ≥ 70% of the maximum possible score (≥ 35 out of 50) were classified as having a positive attitude, whereas those who obtained < 70% (< 35 out of 50) were classified as having a negative attitude towards disaster and public health emergency preparedness, respectively. The practice domain consisted of ten items that evaluated behaviors related to preparedness, where responses were given one (1) point for appropriate practices and zero (0) points for inappropriate or absent practices, resulting in a total score that could range from 0 to 10. The participants who scored ≥ 70% (≥ 7 out of 10) were assumed to have good preparedness practices; conversely, those who scored < 70% (< 7 out of 10) were classified as having poor preparedness practices.

Bivariate analyses were performed using chi-square tests to examine associations between independent variables and each KAP outcome. Variables with a p-value of less than 0.25 in the bivariate analysis were entered into multivariable logistic regression models to identify independent predictors of adequate knowledge, positive attitudes, and good preparedness practices. Records with missing outcome variables were excluded from regression analyses using complete-case analysis. Adjusted odds ratios (AORs) with 95% confidence intervals were reported, and statistical significance was set at a p-value of less than 0.05. Multicollinearity was assessed using variance inflation factors (VIF), and goodness-of-fit was evaluated using the Hosmer–Lemeshow test. The study findings were presented using tables, figures, and narrative descriptions in accordance with standard scientific reporting guidelines, while ensuring strict adherence to ethical principles and data confidentiality.

Results

Socio-demographic and Professional Characteristics of the Study Participants

A total of 1,678 health professionals participated in the study, yielding a response rate of 99.2%. The mean age of respondents was 31.4 ± 10.1 years, with the majority, 668 (39.8%), aged 28–37 years. Males represented more than two-thirds of the participants, 1,140 (67.9%). Regarding marital status, most participants were married. (59.5%). In terms of educational attainment, the majority held undergraduate qualifications, 1,420 (84.6%). Nurses represented the largest professional cadre, 627 (37.4%). More than half, 899 (53.6%), of the participants had fewer than three years of work experience. Over half, 935 (55.7%), of the participants were employed in the private sector. Only one-third, 563 (33.6%), had previously been involved in disaster or outbreak response activities. Slightly more than half, 922 (54.9%), reported having received prior formal training in disaster or emergency preparedness (Table 1).

Table 1
Socio-demographic and Professional Characteristics of Health Professionals in Somalia (n = 1,678)

Variable	Frequency	Percentage
Age (In years)		
18–27	653	38.9
28–37	668	39.8
38–47	241	14.4
≥ 48	116	6.9
Sex		
Female	538	32.1
Male	1140	67.9
Marital Status		
Single	536	31.9
Married	999	59.5
Divorced	119	7.1
Widowed	24	1.4
Highest Educational Level		
Undergraduate	1420	84.6
Postgraduate	258	15.4
Profession		
Laboratory Technician	262	15.6
Medical Doctor	252	15.0
Midwife	91	5.4
Nurse	627	37.4
Pharmacist	92	5.5
Public Health Officer	354	21.1
Years of Experience		
< 3	899	53.6
3–5	533	31.8

Variable	Frequency	Percentage
Age (In years)		
> 5	246	14.7
Employment Sector		
Government	554	33.0
NGO	189	11.3
Private	935	55.7
Previous involvement in disaster or outbreak response		
No	1115	66.4
Yes	563	33.6
Prior formal training in disaster/emergency preparedness		
No	756	45.1
Yes	922	54.9

Knowledge of Disaster and Public Health Emergency Preparedness

More than three-quarters, 1,366 (81.4%), reported awareness of their roles and responsibilities during emergencies, and 1,255 (74.8%) understood the incident management system used in emergency responses. Knowledge of common disaster types affecting Somalia was reported by 1,246 (74.3%), while 1,227 (73.1%) were familiar with the functions of the Public Health Emergency Operations Center. Approximately two-thirds of participants were aware of the International Health Regulations requirements, 1,052 (62.7%), and disease surveillance and early warning systems, 1,070 (63.8%). Similarly, 1,203 (71.7%) knew official reporting channels within their institutions, and 1,199 (71.5%) were aware of infection prevention and control measures during outbreaks. However, only 1,107 (66.0%) reported knowing where to access national or institutional preparedness guidelines (Table 2).

Table 2
Knowledge of Health Professionals Regarding Disaster and Public Health Emergency Preparedness in Somalia (n = 1,678)

Variable	Yes (%)	No (%)
I understand the meaning of disaster and public health emergency preparedness	1062 (63.3)	616 (36.7)
I can know the common types of disasters and public health emergencies affecting Somalia	1246 (74.3)	432 (25.7)
I am aware of my roles and responsibilities during a disaster and public health emergency	1366 (81.4)	312 (18.6)
I know what the Public Health Emergency Operations Center (PHEOC) is and its main functions	1227 (73.1)	451 (26.9)
I am aware of the International Health Regulations (IHR 2005) requirements related to emergencies	1052 (62.7)	626 (37.3)
I know the disease surveillance and early warning systems used in Somalia	1070 (63.8)	608 (36.2)
I understand the incident management system used during emergency response	1255 (74.8)	423 (25.2)
I know the official reporting channels for public health emergencies in my institution	1203 (71.7)	475 (28.3)
I am aware of the infection prevention and control (IPC) measures required during outbreaks	1199 (71.5)	479 (28.5)
I know where to access national or institutional emergency preparedness guidelines	1107 (66.0)	571 (34.0)

Attitudes Toward Disaster and Public Health Emergency Preparedness

Nearly three-quarters 1,283 (76.4%) of the participants agreed or strongly agreed that preparedness is essential for health professionals and that Somalia's health system requires stronger emergency preparedness mechanisms. A large proportion also supported the prioritization of preparedness activities even in the absence of active emergencies—900 (53.6%). Support for multisectoral coordination was particularly strong, with 1,210 (72.2%) agreeing or strongly agreeing that effective emergency response requires cross-sector collaboration. Similarly, 1,195 (71.2%) believed that health facilities should allocate specific budgets for preparedness, and 1,024 (60.7%) felt personally responsible for contributing to preparedness activities. Willingness to participate in emergency response activities was reported by 1,057 (63.0%) of participants (Table 3).

Table 3
Attitudes of Health Professionals Toward Disaster and Public Health Emergency Preparedness in Somalia (n = 1,678)

Variable	Strongly Disagree n (%)	Disagree n (%)	Neutral n (%)	Agree n (%)	Strongly Agree n (%)
I believe disaster and public health emergency preparedness is essential for health professionals	128 (7.6)	143 (8.5)	124 (7.4)	502 (29.9)	781 (46.5)
I believe I should receive regular training on disaster and emergency preparedness	119 (7.1)	211 (12.6)	144 (8.6)	547 (32.6)	657 (39.2)
I believe Somalia's health system requires stronger emergency preparedness	108 (6.4)	208 (12.4)	252 (15.0)	503 (30.0)	607 (36.2)
I believe preparedness activities can reduce illness and death during emergencies	167 (10.0)	433 (25.8)	196 (11.7)	430 (25.6)	452 (26.9)
I feel personally responsible for contributing to emergency preparedness	195 (11.6)	303 (18.1)	156 (9.3)	512 (30.5)	512 (30.5)
I believe emergency preparedness should be prioritized even when there is no emergency	143 (8.5)	351 (20.9)	284 (16.9)	448 (26.7)	452 (26.9)
I believe effective emergency response requires strong multisectoral coordination	92 (5.5)	180 (10.7)	196 (11.7)	558 (33.3)	652 (38.9)
I believe health facilities should allocate budgets for emergency preparedness	112 (6.7)	183 (10.9)	188 (11.2)	541 (32.2)	654 (39.0)
I believe simulation exercises and drills improve emergency response performance	199 (11.9)	276 (16.4)	184 (11.0)	490 (29.2)	529 (31.5)
I am willing to participate in disaster or public health emergency response activities	148 (8.8)	274 (16.3)	199 (11.9)	560 (33.4)	497 (29.6)

Practices Related to Disaster and Public Health Emergency Preparedness

Over half of the respondents, 922 (54.9%), had received formal preparedness training, and only 534 (31.8%) had participated in drills or simulation exercises within the past two years. Fewer than one-third, 485 (28.9%), had been involved in actual disaster or outbreak response activities. Only 583 (34.7%) reported that their workplace had a written emergency preparedness and response plan, and 666

(39.7%) knew their specific institutional role during emergencies. Access to personal protective equipment during emergencies was reported by 866 (51.6%) of participants. Nonetheless, 1,184 (70.6%) indicated that they report suspected public health emergencies through official channels, and 1,111 (66.2%) regularly update themselves on preparedness guidelines (Table 4).

Table 4
Practices of Health Professionals Related to Disaster and Public Health Emergency Preparedness in Somalia (n = 1,678)

Variable	Yes (%)	No (%)
I have received formal training on disaster or public health emergency preparedness	922 (54.9)	756 (45.1)
I have participated in emergency drills or simulation exercises in the past two years	534 (31.8)	1144 (68.2)
I routinely follow standard operating procedures (SOPs) during emergencies	1236 (73.7)	442 (26.3)
I have been involved in actual disaster or outbreak response activities	485 (28.9)	1193 (71.1)
I regularly update myself on emergency preparedness guidelines	1111 (66.2)	567 (33.8)
My workplace has a written emergency preparedness and response plan	583 (34.7)	1095 (65.3)
I know my specific role during an emergency response in my institution	666 (39.7)	1012 (60.3)
I have access to personal protective equipment (PPE) during emergencies	866 (51.6)	812 (48.4)
I report suspected public health emergencies through official channels	1184 (70.6)	494 (29.4)
I participate in coordination meetings or preparedness planning activities	546 (32.5)	1132 (67.5)

Overall Knowledge, Attitudes, and Practices Levels among Health Professionals

The study revealed that the majority of health professionals, 1,191 (71.0%), demonstrated adequate knowledge of disaster and public health emergency preparedness. Similarly, approximately three-quarters, 1,159 (69.1%), exhibited a positive attitude toward disaster and public health emergency preparedness. Conversely, the majority of health professionals (1,381, 82.3%) exhibited poor practices related to disaster and public health emergency preparedness (Fig. 2).

Factors Associated with Knowledge of Disaster and Public Health Emergency Preparedness

Previous involvement in disaster or outbreak responses was the strongest predictor of adequate knowledge. Health professionals with prior response experience were nearly 32 times more likely to demonstrate adequate knowledge than those without such experience (AOR = 31.98; 95% CI: 17.53–58.34; $p < 0.001$). Sex was also significantly associated with participants' knowledge. Female participants had more than twice the odds of possessing adequate knowledge compared with male participants (AOR = 2.14; 95% CI: 1.52–3.00; $p < 0.001$). Professional cadre showed a strong association: medical doctors (AOR = 6.21; 95% CI: 3.58–10.75; $p < 0.001$), pharmacists (AOR = 6.18; 95% CI: 2.99–12.75; $p < 0.001$), laboratory technicians (AOR = 4.38; 95% CI: 2.55–7.54; $p < 0.001$), and nurses (AOR = 3.83; 95% CI: 2.40–6.13; $p < 0.001$) were significantly more likely to have adequate knowledge than public health officers were. Age remained statistically significant; participants aged 38–47 years were less likely to demonstrate adequate knowledge than those aged 18–27 years (AOR = 0.39; 95% CI: 0.22–0.69; $p = 0.001$), whereas those aged 28–37 years also showed modestly reduced odds (AOR = 0.67; 95% CI: 0.45–0.99; $p = 0.042$). Years of experience were similarly associated; participants with fewer than three years of experience were more likely to have adequate knowledge compared with those with more than five years of experience (AOR = 4.32; 95% CI: 2.51–7.43; $p < 0.001$) (Table 5).

Table 5
Factors Associated with Knowledge of Disaster and Public Health Emergency Preparedness Among Health Professionals in Somalia (n = 1,678)

Variables	Knowledge level		COR (95%CI)	AOR (95%CI)	p-value
	Adequate	Inadequate			
Age (In years)					
18–27	429	224	1	1	
28–37	509	159	0.60 (0.4–0.76)	0.67 (0.45–0.99)	0.042
38–47	189	52	0.53 (0.37–0.75)	0.39 (0.22–0.69)	0.001
≥ 48	64	52	1.56 (1.04–2.32)	1.65 (0.71–3.85)	0.246
Sex					
Female	334	204	1.85 (1.48–2.31)	2.14 (1.52-3.00)	< 0.001
Male	857	283	1		
Marital Status					
Single	347	189	1	1	
Married	783	216	0.51 (0.40–0.64)	1.12 (0.74–1.68)	0.600
Divorced	47	72	2.81 (1.87–4.23)	7.65 (3.95–4.83)	< 0.001
Widowed	14	10	1.31 (0.57–3.01)	1.05 (0.33–3.30)	0.937
Profession					
Laboratory Technician	163	99	3.53 (2.40–5.19)	4.38 (2.55–7.54)	< 0.001
Medical Doctor	164	88	3.12 (2.11–4.61)	6.21 (3.58–10.75)	< 0.001
Midwife	67	24	2.08 (1.20–3.61)	1.94 (0.87–4.31)	0.105
Nurse	439	188	2.49 (1.77–3.50)	3.83 (2.40–6.13)	< 0.001
Pharmacist	56	36	3.73 (2.24–6.23)	6.18 (2.99–12.75)	< 0.001

Variables	Knowledge level		COR (95%CI)	AOR (95%CI)	p-value
	Adequate	Inadequate			
Age (In years)					
Public Health Officer	302	52	1	1	
Years of Experience					
< 3	520	379	5.68 (3.75–8.60)	4.32 (2.51–7.43)	< 0.001
3–5	453	80	1.38 (0.87–2.18)	1.38 (0.77–2.46)	0.283
> 5	218	28	1	1	
Previous involvement in disaster or outbreak response					
No	1024	91	1	1	
Yes	167	396	26.68 (20.16–35.32)	31.98 (17.53–58.34)	< 0.001
Prior formal training in disaster/emergency preparedness					
No	344	412	1	1	
Yes	847	75	0.07 (0.06–0.10)	1.38 (0.75–2.55)	0.307

Factors Associated with Attitudes toward Disaster and Public Health Emergency Preparedness

Previous involvement in disaster or outbreak response was the most influential determinant. Respondents with prior experience were significantly more likely to exhibit positive attitudes toward preparedness than those without (AOR = 10.44; 95% CI: 6.64–16.40; p < 0.001). Marital status was significantly associated with attitudes toward seeking professional help. Divorced participants were more likely to demonstrate negative attitudes than single respondents (AOR = 3.84; 95% CI: 2.17–6.81; p < 0.001). Years of professional experience also influenced attitudes; participants with fewer than three years of service were more likely to show unfavorable attitudes than those with over five years of experience (AOR = 2.03; 95% CI: 1.34–3.11; p = 0.001). Conversely, those with three–five years of experience were less likely to report negative attitudes (AOR = 0.54; 95% CI: 0.34–0.87; p = 0.012). The professional cadre demonstrated limited independent associations, except pharmacists, who were more

likely to hold negative attitudes than public health officers (AOR = 2.28; 95% CI: 1.24–4.19; p = 0.008) (Table 6).

Table 6
Factors Associated with Attitudes Toward Disaster and Public Health Emergency Preparedness Among Health Professionals in Somalia

Variables	Attitude level		COR (95%CI)	AOR (95%CI)	p-value
	Positive	Negative			
Marital Status					
Single	361	175	1		
Married	736	263	0.74 (0.59–0.93)	1.39 (0.96–1.99)	0.080
Divorced	51	68	2.75 (1.83–4.13)	3.84 (2.17–6.81)	< 0.001
Widowed	11	13	2.44 (1.07–5.55)	2.84 (0.97–8.34)	0.058
Profession					
Laboratory Technician	178	84	1.43 (1.00-2.03)	0.89 (0.57–1.41)	0.629
Medical Doctor	168	84	1.51 (1.06–2.16)	1.44 (0.92–2.27)	0.111
Midwife	60	31	1.56 (0.95–2.57)	1.45 (0.75–2.81)	0.270
Nurse	435	192	1.33 (0.99–1.79)	1.18 (0.81–1.72)	0.390
Pharmacist	52	40	2.33 (1.44–3.75)	2.28 (1.24–4.19)	0.008
Public Health Officer	266	88	1	1	
Years of Experience					
< 3	504	395	3.23 (2.30–4.55)	2.03 (1.34–3.11)	0.001
3–5	457	76	0.69 (0.46–1.02)	0.54 (0.34–0.87)	0.012
> 5	198	48	1	1	
Previous involvement in disaster or outbreak response					
No	980	135	1	1	
Yes	179	384	15.57 (12.10-20.05)	10.44 (6.64–16.40)	< 0.001

Variables	Attitude level		COR (95%CI)	AOR (95%CI)	p-value
	Positive	Negative			
Marital Status					
Prior formal training in disaster/emergency preparedness					
No	340	416	1	1	0.117
Yes	819	103	0.10 (0.08–0.13)	0.69 (0.44–1.10)	

Factors Associated with Practices Related to Disaster and Public Health Emergency Preparedness

Previous disaster or outbreak response involvement showed the strongest association with good practice. Respondents with previous experience were significantly more likely to report good preparedness practices than those without (AOR = 22.60; 95% CI: 12.39–41.25; p < 0.001). Formal training in disaster or emergency preparedness was also strongly associated with practice; trained health professionals had more than threefold higher odds of reporting good preparedness behavior than their untrained counterparts (AOR = 3.28; 95% CI: 2.16–4.97; p < 0.001). Age remained significant after the adjustment. Participants aged ≥ 48 years were more likely to demonstrate good preparedness practices than those aged 18–27 years (AOR = 3.58; 95% CI: 1.18–10.89; p = 0.025), whereas respondents aged 28–37 years (AOR = 0.35; 95% CI: 0.24–0.52; p < 0.001) and 38–47 years (AOR = 0.46; 95% CI: 0.28–0.75; p = 0.002) were significantly less likely to report good practices. The professional category was strongly associated with the practice level. Laboratory technicians (AOR = 44.34; 95% CI: 13.63–144.31; p < 0.001) and nurses (AOR = 5.68; 95% CI: 3.75–8.60; p < 0.001) demonstrated substantially higher odds of good practice than public health officers. Employment in non-governmental organizations was also associated with better practices than private-sector employment (AOR = 1.95; 95% CI: 1.12–3.39; p = 0.019). Divorced respondents were more likely to report good preparedness practices (AOR = 4.33; 95% CI: 1.54–12.14; p = 0.005) (Table 7).

Table 7
Factors Associated with Practices Related to Disaster and Public Health Emergency Preparedness among Health Professionals in Somalia

Variables	Practice level		COR (95%CI)	AOR (95%CI)	p-value
	Good	Poor			
Age (In years)					
18–27	72	581	1	1	
28–37	167	501	0.37 (0.28–0.50)	0.35 (0.24–0.52)	< 0.001
38–47	53	188	0.44 (0.30–0.65)	0.46 (0.28–0.75)	0.002
≥ 48	5	111	2.75 (1.09–6.97)	3.58 (1.18–10.89)	0.025
Marital Status					
Single	65	471	1	1	
Married	224	775	0.48 (0.35–0.64)	0.76 (0.51–1.14)	0.181
Divorced	5	114	3.15 (1.24–7.99)	4.33 (1.54–12.14)	0.005
Widowed	3	21	0.97 (0.28–3.33)	1.15 (0.29–4.49)	0.844
Highest Educational Level					
Undergraduate	266	1154	1	1	
Postgraduate	31	227	1.69 (1.13–2.51)	0.76 (0.44–1.30)	0.317
Profession					
Laboratory Technician	3	259	39.44 (12.36-125.81)	44.34 (13.63-144.31)	< 0.001
Medical Doctor	77	175	1.04 (0.73–1.47)	0.88 (0.58–1.33)	0.537
Midwife	20	71	1.62 (0.94–2.80)	1.07 (0.58-2.00)	0.822
Nurse	54	573	4.85 (3.39–6.93)	5.68 (3.75–8.60)	< 0.001
Pharmacist	32	60	0.86 (0.53–1.39)	0.57 (0.32–1.03)	0.063

Variables	Practice level		COR (95%CI)	AOR (95%CI)	p-value
	Good	Poor			
Age (In years)					
Public Health Officer	111	243	1	1	
Employment Sector					
Government	127	427	0.62 (0.48–0.81)	0.80 (0.57–1.12)	0.194
NGO	24	165	1.27 (0.80–2.02)	1.95 (1.12–3.39)	0.019
Private	146	789	1	1	
Previous involvement in disaster or outbreak response					
No	277	838	1	1	
Yes	20	543	8.97 (5.63–14.31)	22.60 (12.39–41.25)	< 0.001
Prior formal training in disaster/emergency preparedness					
No	95	661	1	1	
Yes	202	720	0.51 (0.39–0.67)	3.28 (2.16–4.97)	< 0.001

Discussion

This study found that 71.0% of health professionals demonstrated adequate knowledge of disaster and public-health emergency preparedness. The level of knowledge observed in this study is higher than that reported in the country's 2023 Ebola virus disease preparedness survey (62.7%) [16], and is comparable to findings reported in Ethiopia, Tanzania, and Saudi Arabia, where approximately half to three-quarters of respondents demonstrated satisfactory disaster-preparedness knowledge. [11, 13, 17] Similar levels have also been documented in Qatar and the United Arab Emirates, particularly among emergency-department personnel. [18, 19] However, the Somali estimate remains lower than reports from some Gulf states, where structured institutional training and accreditation systems are well established. [17, 18] Conversely, it exceeds results from Ethiopian private hospitals, where nearly two-thirds of staff had poor knowledge of disaster-risk management. [20]

Previous disaster or outbreak involvement was the strongest predictor of adequate knowledge in Somalia, increasing the odds nearly thirty-two-fold. This strong association is consistent with evidence from Ethiopia, Iran, and Saudi Arabia, where experiential exposure to real emergencies significantly

improved familiarity with response systems and clinical protocols. [11, 17, 21] The higher likelihood of adequate knowledge among physicians, nurses, pharmacists, and laboratory personnel mirrors patterns observed in Tanzania and Ethiopia, where frontline cadres reported greater preparedness than administrative or public-health staff. [13, 20] Female participants in this study demonstrated significantly higher knowledge levels, a finding consistent with Iranian and United Arab Emirates studies reporting stronger engagement of female health workers in preparedness training and continuing professional development. [19, 21] The observation that younger professionals and those with fewer years of experience were more knowledgeable contrasts with reports from high-income contexts but resembles findings from Tanzania, where early-career workers exposed to recent training initiatives demonstrated better disaster awareness. [13] This may reflect the increasing inclusion of emergency-preparedness content in pre-service education and donor-supported in-service programs in Somalia.

This study found that approximately two-thirds of the respondents expressed positive attitudes toward preparedness, multisectoral coordination, and institutional investment, a pattern similar to studies conducted in Ethiopia, Tanzania, and Qatar, where favorable attitudes consistently exceeded knowledge and practice levels. [11, 13, 18] Prior response experience again strongly predicted positive attitudes, aligning with evidence from Iran and Saudi Arabia that participation in real events or drills enhances confidence and professional commitment. [17, 21] The higher odds of negative attitudes among divorced participants and those with limited experience have rarely been examined directly in previous disaster-preparedness research; however, systematic reviews have noted that psychosocial stressors, perceived lack of institutional support, and heavy workloads can reduce willingness to engage in emergency response. [22] Pharmacists' comparatively unfavorable attitudes in the Somali setting may similarly reflect limited involvement in preparedness committees and simulation exercises, an issue reported in Gulf-region hospitals and Ethiopian private facilities. [17, 20]

Despite relatively favorable knowledge and attitudes, preparedness practices in Somali health facilities were markedly inadequate. Participation in drills, availability of written emergency plans, and clarity of staff roles were all low, mirroring findings from Ethiopia, Tanzania, and Libya, where shortages of training opportunities, logistics, and institutional planning constrained operational readiness. [11, 13, 23] However, the magnitude of poor practice in this study appears greater than that reported in Saudi Arabia and Qatar, where emergency-department staff demonstrated higher levels of procedural readiness and access to preparedness plans. [17, 18] Prior disaster involvement and formal training were the strongest determinants of good practice, consistent with global evidence that simulation-based learning and field exposure are central to translating theoretical knowledge into effective performance. [21, 22] The exceptionally high odds of good practice among laboratory technicians and nurses' parallel reports from outbreak-prone settings in Ethiopia and the Gulf region, where these cadres play pivotal roles in triage, diagnostics, and infection-control implementation. [19, 20] Better practices among staff working in non-governmental organizations may similarly reflect greater participation in humanitarian emergency responses and externally supported preparedness initiatives, a pattern noted in fragile health-system contexts such as Libya and Ethiopia. [11, 23]

Implications

The findings of this study have important implications for public health emergency management in Somalia. Although most health professionals demonstrated adequate knowledge and positive attitudes, the very low level of preparedness practices indicates critical system-level gaps in operational readiness. These results support the need for national policies that institutionalize routine disaster-preparedness training, simulation exercises, and clearly defined facility-level emergency plans. Strengthening coordination mechanisms between governmental and non-governmental health facilities and integrating preparedness indicators into health-facility accreditation and quality-improvement frameworks could improve accountability and sustainability. The strong association between prior disaster involvement and improved preparedness also suggests that structured field deployments and experiential learning should be incorporated into workforce-development strategies.

Limitations

This study is subject to several limitations. Its cross-sectional design limits causal interpretation of the observed associations. The use of self-reported data may have introduced recall or social-desirability bias, potentially inflating estimates of preparedness. In addition, the study did not include direct facility audits or observation of emergency-response systems, which may restrict conclusions about institutional readiness. Contextual variation across states and facility types may also limit generalizability.

Future Research

Future research should employ longitudinal and mixed-methods approaches to better establish causal relationships between training, disaster exposure, and preparedness outcomes. Objective facility-level assessments and simulation-based evaluations are needed to complement self-reported measures. Further studies should also examine organizational and policy-level barriers to preparedness and assess the effectiveness of targeted training programs, routine drills, and accreditation-linked preparedness interventions to strengthen public health emergency management in Somalia.

Conclusions

This study demonstrates that health professionals in Somalia possess generally adequate knowledge and favorable attitudes but poor preparedness practices toward disaster and public-health emergency preparedness. Prior disaster involvement and formal training were consistently associated with improved knowledge, attitudes, and practices, underscoring the central role of experiential and capacity-building interventions in strengthening workforce preparedness. The pronounced gap between cognitive readiness and operational implementation highlights the need for system-level reforms that prioritize routine training, functional preparedness plans, institutional drills, and multisectoral coordination mechanisms. Addressing these gaps is essential for enhancing Somalia’s capacity to respond effectively

to future disasters and public-health emergencies and for building a more resilient national health system.

Declarations

Ethical Approval and Consent to Participate

The research was conducted in accordance with the Declaration of Helsinki and approved by the Institutional Review Board (IRB) of the National Institute of Health, Mogadishu, Somalia (Reference No. NIH/SNREN/004/2026). In addition, permission was granted from the health authorities and health facilities involved. Participation was voluntarily and informed consent was obtained from all participants prior to enrollment, including electronic consent for online data collection through the ODK platform. Participants were informed of their right to withdraw from the study at any time without consequence. The confidentiality and privacy of the participants' information were strictly adhered to; the data collected were anonymized, kept securely, and were only accessible to authorized researchers.

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Competing Interests

The authors declare that they have no competing interests.

Data Availability

The datasets generated and analyzed during the current study are available from the corresponding author upon reasonable request.

Authors’ Contributions

AAT led study conceptualization, design the methodology, ethical approval coordination, national field implementation, data analysis, and manuscript drafting. GDH, SAN and MAM contributed to instrument development, literature review, and oversight of data collection. KMS and AKM coordinated state-level supervision and quality control procedures. AAI and AD supported training of data collectors, database management, and preliminary analyses. AYO, MAK, GA and AHA contributed to interpretation of results and critical revision of the manuscript. All authors reviewed, revised, and approved the final manuscript.

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Figures

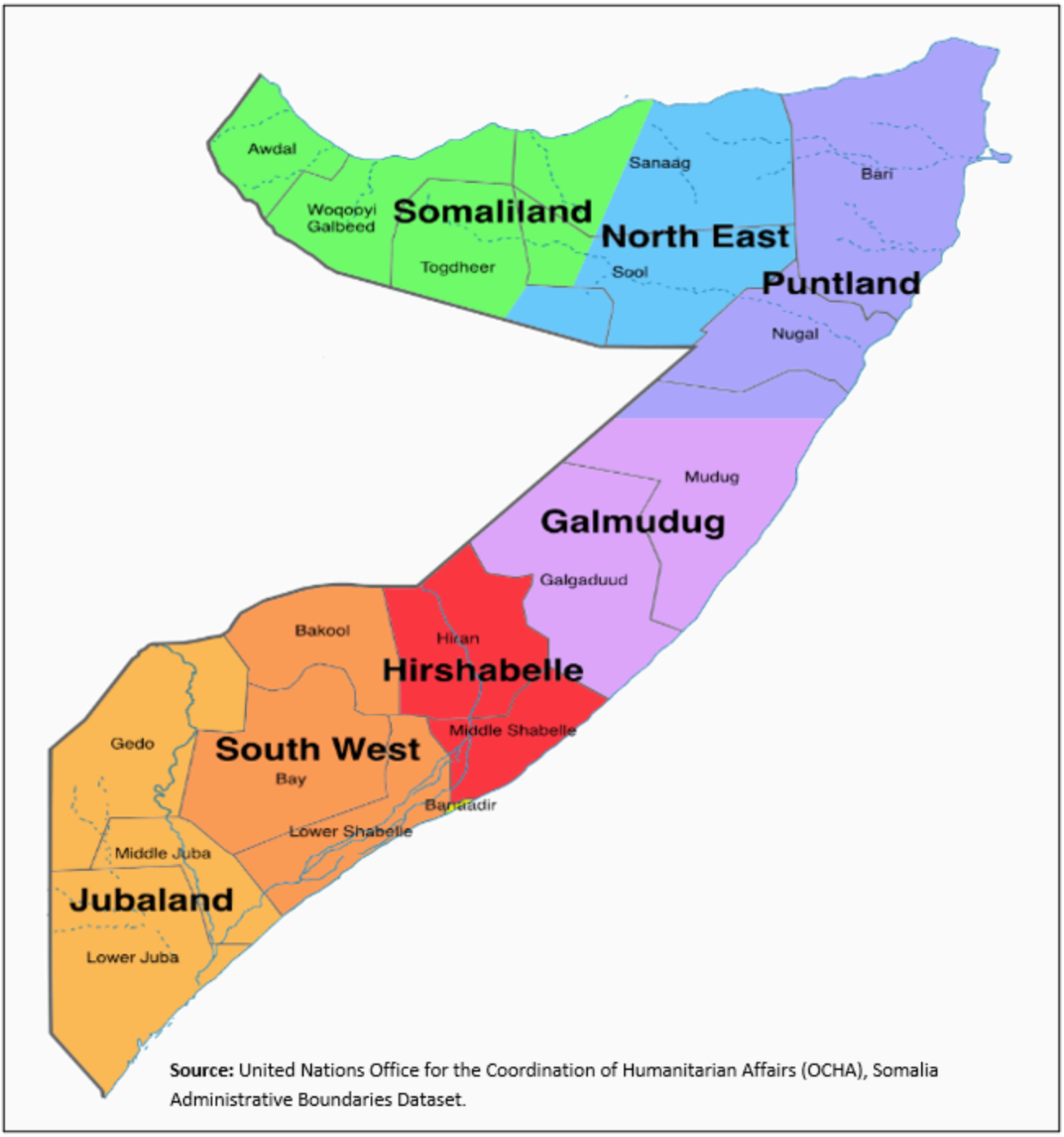


Figure 1

Geographical areas of the study showing the 8 states of Somalia

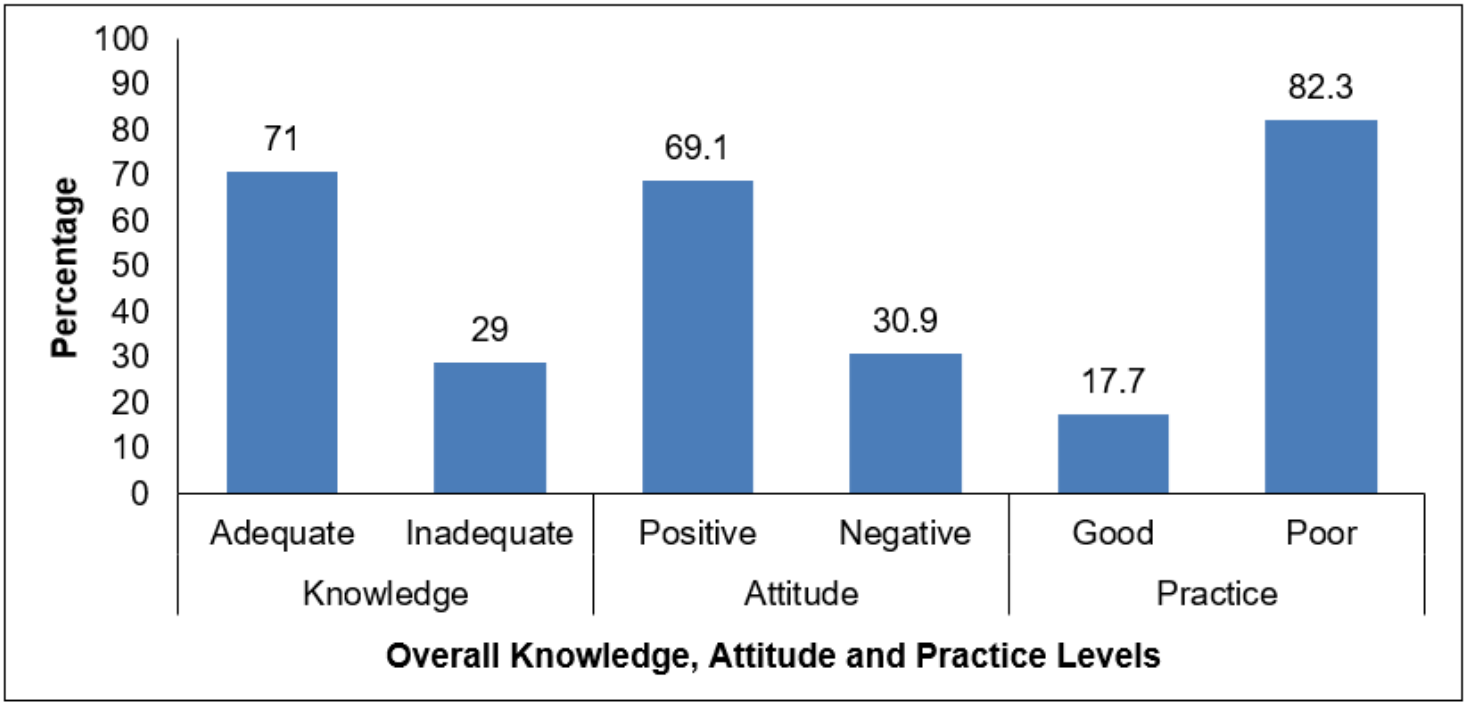


Figure 2

Overall Knowledge, Attitude, and Practice (KAP) Levels of Health Professionals toward Disaster and Public Health Emergency Preparedness in Somalia (n = 1,678)