Chapter 16
An Assessment of Primary Health Care Facilities and Their Preparedness Level in Khyber Pakhtunkhwa Province of Pakistan: Strengths, Weaknesses, Opportunities, and Threats (SWOT)

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Abstract Pakistan is one of the countries that are most vulnerable to climate-induced natural disasters such as floods. For this reason, it is essential that emergency relief services are in a state of preparedness in order to reduce causalities and other damages. Rural health centers could play an important role in this regard, but there is little information available about their current and potential capacities. This chapter assesses the level of flood disaster preparedness of rural health centers in six flood-affected districts of Khyber Pakhtunkhwa (KP), Pakistan. For this purpose, we collected data on three components of rural health centers' disaster preparedness, using structured questionnaires from 48 respondents from 19 rural health centers. The study findings show that the facilities at rural health centers are currently insufficient to meet the needs of local communities at times of disaster and that there are significant gaps in all three components of their disaster preparedness. In particular, the staff at rural health centers lack training, and the buildings lack the space, beds, and equipment required for relief work. A SWOT analysis revealed that these centers have much potential to fulfill this role if they were provided with proper infrastructure, trained human resources, and financial resources.

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16.1 Introduction

Flood disasters are the most frequent type of natural disasters (Rattanakanlaya et al. 2016). Between 2005 and 2014, there have been a total of 1751 flood disasters (46% of the total of natural disasters globally) which killed 59, 0592 people and caused 342,836 million USD of economic losses (IFRC 2015). Floods can become catastrophic disasters in vulnerable places when they happen unexpectedly and/or with unpredicted intensity. Evidence shows that the frequency and intensity of floods (or hydro-meteorological disasters) have increased in Southeastern Asia countries, including Pakistan, India, and Bangladesh, over recent decades (Shah et al. 2017, 2018a; Hirabayashi et al. 2013). Pakistan experienced its most catastrophic flood in 2010, which affected more than 24 million people, damaged more than 2 million hectares of crops and 515 health care centers, and caused an economic loss of around 10 billion US dollars (Shah et al. 2017; Shabir 2013). Projections suggest that the frequency and magnitude of floods and their impacts on populations and property will increase in the future (GOP 2013) due to a combination of climate change and rapid and unplanned urbanization (Tariq et al. 2014).

Extreme weather-related events, such as floods, have dramatic effects on the environment and human health and put enormous pressure on health system. The Lancet Commission on climate change identifies that health systems in developing countries lack the capacity to respond effectively to the adverse effects of climate change due to their disorganization, inefficiency, and inadequate resourcing (Costello et al. 2009). One of the United Nations Sustainable Development Goals (SDG) is to build resilience and adaptive capacity so that societies can respond better to extreme weather-related events. As the first line of contact for disaster victims, health facilities are an essential component of disaster preparedness and response. Preparedness refers to the knowledge and capacities of individuals, including professionals, communities, and governmental and non-governmental organizations (NGOs) (UNISDR 2009). As such, it is important to understand the preparedness ability and functional capacity of health facilities to respond effectively to hydro-meteorological disasters (Farley et al. 2017).

Different health organizations and disaster epidemiologists define the concepts of risk and vulnerability in public health in different ways. The Society for Risk Analysis (SRA) defines risk as the negative impacts that arise as a result of risks on human lives, property, and health and estimates risk based on the probability and timing (Thompson et al. 2005). In public health, there is a dynamic relationship between the numbers of people and their distribution within a given area, their vulnerability and the skills of, and resources available to, medical and emergency personnel (Gillam et al. 2007). The 'vulnerable population' can be defined as those people who are more prone risks: those who live in flood-prone areas and/or have

inadequate housing, who are economically insecure, have a poor health status, and/or lack access to health care facilities (Weathers et al. 2004). The impacts of disasters can be complex. In addition to the loss of life and damage to property, infrastructure crops and livestock, they can damage the capacity of the health care system and other essential public services (AbouZahr and Boerma 2005; Greenough et al. 2001) and be the cause of acute stress (Waelde et al. 2001), depression (Tapsell et al. 2002; Reacher et al. 2004), anxiety, and posttraumatic stress disorder (PSTD). These impacts will depend on the nature and scale of flood disasters, the ability to return to a normal way of life, the presence of environmental contaminants, the evacuation procedures and preparedness measures in place, and assistance received (Tapsell and Tunstall 2006; Adeola 2003; Galea et al. 2005).

In Pakistan, health services can be classified into three categories: primary health care facilities (including basic health units, rural health centers, and civil dispensaries); secondary health facilities (district and tehsil headquarters hospitals), and tertiary health care facilities, which are mainly located in the major cities and affiliated with research and educational institutions (WHO 2013). When severe or prolonged emergencies occur in rural areas, the resources of primary health care facilities are quickly exhausted. According to the Federal Office of Rural Health Policy's document 'Rural Communities and Emergency Preparedness,' rural communities are highly dependent on the preparedness of emergency medical services. While such health facilities do exist, they are often unable to respond quickly and efficiently to flood disasters as they have limited funds and staff. In spite of the advances made by science and technology in the health sector, the majority of the rural population continue to be exposed to flood disasters. This can be attributed to the differential distribution of critical health facilities in the rural areas where the rural community are likely to use rural health facilities because such services are accessible to them and less costly. Therefore, it is worth examining the preparedness level and resilience of such facilities to disasters, as they can make a significant contribution to the socioeconomic and psychological recovery from catastrophic flood disasters (RHIhub 2017).

A considerable number of academic studies have been done on the preparedness for disasters of hospitals in different various countries. These studies have focused on the linkages, status, and capacity of hospitals' in responding to different types of disasters (Greenberg et al. 2002; Braun et al. 2004; Kaji and Lewis 2006). However, these studies have mostly focused on tertiary health facilities such as major hospitals in the cities, and little work has so far been done on the preparedness level of primary health facilities (Rural Health Centers (RHCs) in South Asia and there is a distinct lack of in-depth assessments of the preparedness of health facilities for flood disasters (Phalkey et al. 2012; Abaya et al. 2009).

In Pakistan, rural areas are often under-resourced in health care terms and lag behind in terms of the provision of health care facilities, with the rural poor lacking access to secondary and tertiary health facilities (Akram and Khan 2007). The only studies that have been done to date are limited to the preparedness level of secondary and tertiary level health care facilities (Khan et al. 2017; Ullah et al. 2017). There have (to the authors' knowledge) been no studies focusing on the

preparedness level of primary health facilities. Like many developing countries in South Asia, Pakistan faces challenges with its preparedness level for dealing with flood disasters. The United Nation Development Program (UNDP 2004) stated that Pakistan lacks integrated disaster management policies or a system for disaster preparedness. This highlights the need for effective structures, strategies, and policies for disaster management. This study hopes to go some way to fill the existing research gap with respect to the current preparedness level of primary health care facilities in flood-prone districts of KP province (and by extension the rest of rural Pakistan). It also applies a SWOT analysis, to evaluate the strengths, weaknesses, opportunities, and threats of the rural primary health care system in terms of preparedness for disasters.

16.2 Conceptual Framework

The conceptual framework of this study first describes the role that health care facilities can play in enhancing preparedness for, and in enhancing societal resilience to, floods disasters. The framework starts with flood disasters (Fig. 16.1), which negatively affect societies in different ways, having economic, social, physical, and psychological impacts. These impacts can be reduced by societal

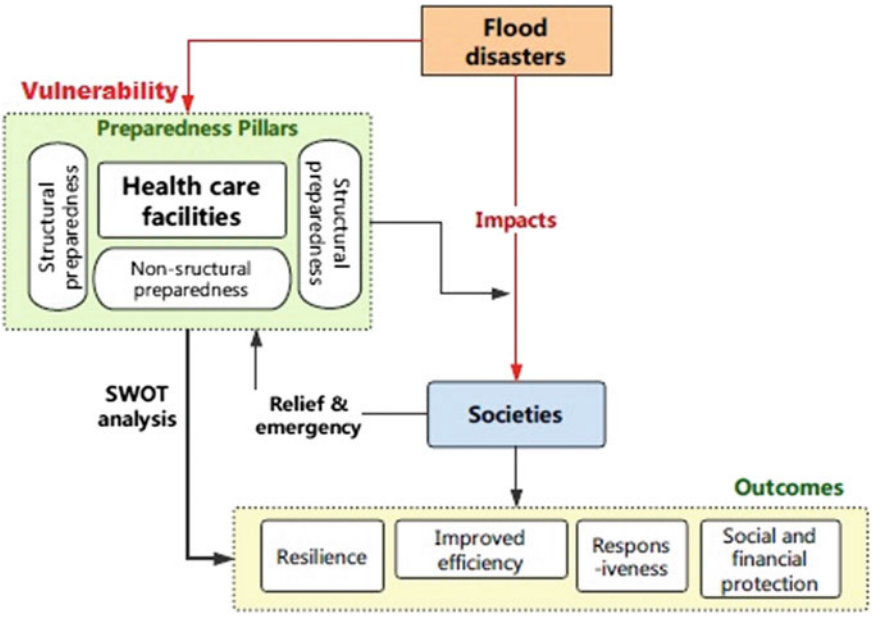

Fig. 16.1 The conceptual framework of the study (authors own construction)

adaptive capacity. One measure that can enhance societal adaptive capacity is to provide the necessary infrastructure to avert disasters or reduce their impacts. Here, basic health care facilities can play a key role in providing the necessary relief and emergency services at times of disaster. To do this, a health facility needs to be equipped with all the necessary infrastructure, structural, non-structural and to be functionally prepared for disasters. Without these tools, health care facilities are as vulnerable as the society that they are designed to serve. In order to assess the preparedness level and vulnerability of health care centers in Khyber Pakhtunkhwa (KP), this study considered three pillars of preparedness pillars: structural preparedness, non-structural preparedness, and functional preparedness. On the basis of this, we develop a SWOT analysis to assess the strengths, weaknesses, opportunities, and threats to health care facilities when serving communities during flood disasters.

16.3 Materials and Methods

16.3.1 Study Area and Sampling Method Description

The study was conducted in Khyber Pakhtunkhwa (KP) province to assess the preparedness level of health facilities across six districts in the flood-prone areas of KP. The province was selected purposively as it is one of the poorer provinces in the country, plagued by different natural disasters, especially floods and has a low adaptive capacity for coping with natural disasters (Shah et al. 2017, 2019). KP, which is divided into seven divisions and 25 districts, has 1583 primary health facilities including rural health centers (RHCs), basic health units (BHUs), and civil dispensaries (CDs); 125 secondary health care facilities, including district and tehsil headquarter hospitals and civil hospitals; and 11 tertiary care hospitals (IMU 2016). This research only focuses on the primary health care facilities, RHCs, which are open 24 h a day seven days a week across six districts of the province. For the current study, we have selected nineteen sample RHCs randomly from a list shared by the Khyber Pakhtunkhwa Health Department. The cross-sectional quantitative survey was done in July and August 2017. The questionnaire was pretested and corrected before the collection of final primary field data. Binary type questions were asked from the representatives of RHCs along with various cross-questions to assess the preparedness level of RHCs. Forty-eight respondents were selected randomly (including medical doctors, senior technicians, and lady health visitors) and interviewed for an in-depth assessment of their RHCs preparedness level. Table 16.1 provides the number of RHCs visited in study districts during field research.

Table 16.1 Total number of RHCs, sampled RHCs, and sampled respondents in the selected RHCs

District	# of RHCs	Sampled RHCs	Selected RHC	Sampled respondents
Charsadda	4	3	RHC Sherpao, RHC Jamal Abad, and RHCBattagram	07
Nowshera	5	4	RHC Kheshki, RHC Akbar Pura, RHC Pirpai, RHC Mankisharif, and RHC Dakismail Khel	12
Peshawar	5	4	RHC Gara Tajik, RHC Badaber, RHC Nahqi, and RHC Takht Abad	10
Mardan	4	4	RHC Palo Dheri, RHC Shergarh, RHC Gumbat, and RHC Manga	8
Swat	3	2	RHC Devlai, and RHC Chuprial	5
D.I.Khan	3	2	RHC Sidalian at Kot Joi, and RHC Karri Shamozi	6
Total	24	19		48

Source Corresponded from personal meeting with IMU Director, 2017

16.3.2 Three Pillars of Rural Health Centers' Vulnerability to Natural Disasters

In the study, we looked at three pillars of preparedness (structural preparedness, non-structural preparedness, and functional preparedness) to assess the vulnerability of RHCs to hazardous events, such as flooding. We discuss each of these pillars below.

- **Structural Preparedness**: Structural preparedness involves physical construction which will avoid or reduce the possible negative impacts of hazards, the adoption of engineering solutions and systems or structures that enhance resistance to hazards. Here, we primarily considered the construction of buildings and the infrastructure available for providing health and emergency evacuation facilities in case of floods or other hazards
- **Non-structural Preparedness**: Non-structural measures may be defined as non-structural short-term and small-scale measures that can reduce the health and societal impact of flood disasters. Here, we considered equipment and facilities, looking at the availability of medical gas facilities, sprinkler systems (in the case of fire), emergency exits, medical equipment, the safety of fixtures and equipment, and the availability of supplies in the case of flooding events.
- **Functional Preparedness**: This includes aspects such as accessibility, equipment, emergency supplies, communication and transportation systems, human resources, and the capacities of medical and auxiliary staff.

16.4 Results and Discussion

16.4.1 The Impacts of Disasters on Health Facilities and the Health Care System

The impact of flooding on the health sector brings a secondary, knock-on, effect, if health care facilities including primary level health care facilities (RHC) are damaged. The extent of such damage will depend on the nature and severity of the catastrophe and the vulnerability and resilience of existing health facilities (Mulyasari et al. 2013). The redevelopment of such facilities involves substantial financial investments for reconstruction and rehabilitation, which in turn will place be enormous pressure on the regional or national government's finances. In addition, the failure of health facilities to withstand flood disasters has indirect costs and social implications. People's morale can suffer as a result of the loss of loved ones, particularly elders and children (who are the most vulnerable to flood events), especially if this is the result of a failure of emergency services when they are the most needed (UN 2009). This can spill over and ignite political dissatisfaction (PAHO/WHO 2003).

The delivery of efficient emergency medical services to the people in a disaster situation is also highly dependent on having an efficient and effective coordination system among different levels of health facilities and with other emergency services. For instance, a lack of coordination among the primary, secondary, and tertiary levels of health facilities will lead to a loss of time, waste of resources, and overlapping of services. Coordination among all relevant stakeholders during times of emergency is considered to be an integral part of providing medical services (ADPC 2009). There are various literatures available on global initiatives to address the risks facing the health sector, including hospitals and another type of facilities. Bissell et al. (2004) examined the effectiveness of health sector preparedness in disaster response. Similarly, Khan et al. (2017) conducted a study on knowledge about disaster preparedness in tertiary level health care facilities in Lahore (Pakistan) and found that expertise regarding disaster preparedness is essential to improve the ability of the health system to perform efficiently in the time of disaster. Ullah et al. (2017) conducted a study on the challenges facing tertiary health facilities (hospitals) in terms of their preparedness for disasters (natural and man-made) in Quetta (Pakistan) and emphasized the need for the establishment of a crisis central command to coordinate emergency responses that can provide efficient and timely medical services.

Several global initiatives have been taken to enhance the preparedness level of health sectors for disasters. These include the Hyogo Framework for Action (2005–2015) by the United Nations International Strategy for Disaster Risk Reduction (UNISDR 2005), the World Disaster Reduction Campaign 2008–2009 by the United Nations (UN 2009), and the Asian Disaster Preparedness Centers (APDC 2009). Despite these efforts, which aim to ensure the safety of different levels of health facilities, there are still some countries where health care facilities from

tertiary (hospitals) to rural health centers are built in the vicinity of disaster-prone areas (UN 2009). In Pakistan, the 2010 floods had a massive impact on health facilities. Almost three thousand (out of 9721) of Pakistan's health facilities are situated in flood-affected districts. In KP province, 10.9% of the health facilities were damaged, either partially or entirely destroyed, by the 2010 flood. Most of the facilities affected were located in rural areas and while the secondary and tertiary level of health facilities were not overly affected by the flood, the severe disruption caused to primary health facilities led to secondary and tertiary institutions being overwhelmed by the demand for medical services (Shabir 2013).

16.4.2 Indicators for Assessing Rural Health Centers' Preparedness for Dealing with Flood Disasters

16.4.2.1 Structural Preparedness

The structural preparedness elements for the primary health care facilities (RHCs) include having structures that are resilient enough to withstand the impacts of floods or other hazardous events and enough space to accommodate people who are need of evacuation during an emergency. These structural preparedness elements should be appropriate to the location of health facility, the population which it serves and the frequency and severity of hazardous events. The location of health facilities may, in itself, make it vulnerable to hazardous events, particularly floods. Choosing sites away from the risk of inundation should be a priority as should the adoption of effective mitigation measures that will minimize damage to facilities' buildings and infrastructure. Table 16.2 shows RHCs' preparedness under the first pillar that relates to the vulnerability of buildings and infrastructure. It shows that just 36% of the RHCs that we sampled are adequately prepared in this respect. The low structural preparedness level of health facilities requires serious attention from local health departments which should take adequate measures for their buildings to be able to withstand the adverse impacts of floods and be able to continue to function and deliver medical services at times of flood disaster. These findings are in line with those of Hatami et al. (2017) who reported a similar level (44%) of resilient health facility structures in Iran. The literature that examines this phenomenon identifies the main reason for the low structural preparedness of health facilities as being a lack of adequate supervision by the relevant agencies during different phases of construction, in which guidance about structural mitigation mechanisms is often ignored (Seyedin et al. 2011).

Another important aspect of the structural preparedness and vulnerability element used in this study is the availability of enough space for safe evacuation during a flood emergency. Table 16.2 shows that, on average, 41% of the primary health facilities do not have any, or sufficient, space for safe evacuation within their health facilities. This is in strong contrast with Japan, where Mulyasari et al. (2013)

Table 16.2 Structural preparedness indicators

Preparedness pillar	Vulnerability indicators (%)	Charsadda	Nowshera	Peshawar	Mardan	Swat	D. I. Khan
Structural preparedness	*Building and infrastructure*						
	Resilient structure	34	33	37	40	40	33
	Space available for flood emergency evacuation	33	38	44	58	40	57

Source Derived from field survey data, 2017

found that great majority (80%) of health facilities have enough space available for emergency evacuation of the evacuees during disasters. The lack of availability of space for evacuees implies a low level of preparedness for such eventualities. In addition, the low number of primary health facilities that reported having a resilient structure (36%) (one of the structural preparedness vulnerability elements) could compromise the safety of people at risk of flooding events. Local government and the administrations of health facilities should be aware of the protocols and building codes in their jurisdictions and ensure that these protocols are correctly followed and implemented. The use of substandard materials is a particular problem, which together with the lack of availability of sufficient space for evacuees, limits the ability of many primary health care facilities to provide services during flood emergencies and could lead to a major tragedy.

16.4.2.2 Non-structural Preparedness

Non-structural preparedness, the second preparedness pillar of RHC facilities, covers vulnerability elements such as the availability of medical gas and fire suppression systems, the provision of emergency exits, the availability of medical equipment, and the safety of fittings, fixtures, equipment, and supplies (Table 16.3). These issues are all very crucial for the efficient operation of primary health care facilities, especially in times of disaster. Only 29% of RHCs have adequate storage for their *medical gas systems* and only 20% an adequately safe distribution system. Concerning the *fire suppression system*, 51% of the facilities sampled reported having an automatic fire alarm system and 45% said that their primary health facility has fire exits that are easily accessible in case of an emergency situation and an evacuation plan. However, only 20% of facilities have a portable fire extinguisher in each room, largely due to a shortage of funds to purchase such equipment. *Emergency exit systems* can play a significant role in reducing physical injury to patients and personnel during a flood or other emergencies. In total, 49% of the sample reported that the local health department in each district provided luminous directional exit signs to make it easier to evacuate the building during an emergency situation. These make it easier for people to see and follow the glowing signs to

Table 16.3 Non-structural preparedness indicators

Preparedness pillar	Vulnerability indicators (%)	Charsadda	Nowshera	Peshawar	Mardan	Swat	D. I. Khan
Non-structural preparedness	*Medical gas system*						
	Safe and appropriate location for storage of oxygen gases	30	28	31	22	37	25
	Safety of oxygen gas distribution system (valves, pipes, connections) is ensured	21	25	19	17	23	15
	Fire suppression system						
	Automatic fire alarm system	55	61	44	37	51	57
	Each room provided with portable fire extinguishers	11	17	10	13	17	15
	Fire exit and evacuation plan	45	51	33	42	50	47
	Emergency exit system						
	Provided luminous directional exit signs located	51	50	41	51	55	47
	Size of signs—plainly legible letters	67	73	64	59	70	55
	Medical equipment						
	Safe from flooding	33	41	67	83	81	77
	Adequate power supply	22	29	44	53	57	32
	Clean and orderly, free of dirt and infectious materials	56	61	55	64	71	45
	Safety of fixtures, equipment, and supplies						
	Proper segregation and storage of hazardous materials and chemicals	33	29	30	27	39	22
	Material safety data sheets	14	25	20	13	60	17
	Stocking available	29	33	30	38	40	21
	Contingency supplies available	10	16	9	13	22	11

Source Derived from field survey data, 2017

safely leave the building during an emergency. Sixty-five percent of the survey respondents reported that the size of signs was appropriate and the lettering was plainly visible. This would help patients to go in the right direction in case of an emergency.

The primary health care facilities in our sample generally fared much better in relation to *the availability of medical equipment*. Almost two-thirds of facilities (64%) kept their medical equipment safe from flooding (64%) and more than half (59%) kept it clean free from dirt and infectious materials. Some respondents volunteered that their facilities had adopted specific protection measures, such as wooden foundations for heavy equipment to protect it from damage. However, almost 40% of the facilities lack an adequate power supply to run such machines and equipment in times of emergency, thereby limiting the provision of emergency health care when it is needed the most.

Safety issues regarding fixtures and fittings, medical equipment, and supplies are crucial and merit separate consideration, for instance, improper handling of hazardous chemicals may people cause serious injury. When the respondents were asked about safety issues, just 30% of respondents reported that their RHC has a facility for storing hazardous chemicals and materials. It is also important that people receive appropriate training required for handling such chemicals. One-quarter of the total survey respondents said that they used material safety data sheets and encouraged the dissemination of important information about hazardous chemicals among medical practitioners, other emergency response providers, and sometimes the general public. Slightly under one-third (32%) of facilities in the sample reported having adequate stock of medicines for the patients, but in case of emergencies, only 14% of facilities said that they have contingency medical supplies sufficient to last for a maximum two or three days at a time of emergency.

16.4.2.3 Functional Preparedness

When considering the functional preparedness of RHCs, the aspects of vulnerability that we considered in this study include: accessibility, equipment, and supplies for emergency, communication and transportation systems, human resources, and the capacities of medical emergency staff. The functional preparedness of primary health care facilities can play a significant role in the provision of medical services during emergencies or disasters when emergency medical services are most needed. *The accessibility of rural health centers* (RHCs) is an essential factor in determining functional preparedness and the level of vulnerability. A large majority of the sampled facilities (79%) reported no obstructions on the roads that lead to their facility. The majority (percentage) also have alternative access routes that can be used in case of flooding or other disasters. This could also help to ensure the safe evacuation of people from inundated areas. The location of health facilities is another vital issue and it is imperative that facilities are built close to roads that can provide adequate transportation and preferably in proximity to other educational research institutes. And it goes without saying that facilities should not be

constructed in flood-prone areas as this will make them inaccessible at times of need and pose a significant threat to structural safety.

Table 16.4 also shows *the availability of equipment and supplies for emergency situations*. It shows that only 35% of primary health facilities in the sample have tents available in cases of emergency and only 45% have an in-house generator. These are both critical resources, especially emergency generators which are essential to provide electricity to the critical life-saving medical equipment in times of power outages (OSPHD-Electrical Requirement for Health Care Facilities 2011). Other supplies required for an emergency include a supply of clean drinking water inside the particular facility (which only 64% of facilities have), emergency food supplies (kept by 37%), folding beds for times when there are more patients than beds (54%), and wheelchairs for the aged and disabled people (54%). The large majority of primary health facilities (89%) lack triage facilities. Onsite triage of the patients and coordinated transfer will avoid the mismanagement of an influx of non-triaged patients into the trauma centers of health facilities (Ullah et al. 2017). All these types of equipment and supplies are essential for primary health centers to function effectively during emergencies, yet are lacking in many centers (PAHO 2000).

Communication and transportation are two other vital aspects when considering the vulnerability of primary health care facilities in times of emergency. Only 46% of the facilities sampled have a functioning emergency management information system (EMIS), although this varies enormously between the different districts. Facilities fare rather better in terms of having backup communication tools, such as mobile phones, or walkie-talkies (possessed by 80% of facilities); a vital back up should be the main communication tool break down (Aitken and Leggat 2012). Similarly, the higher average responses on the availability of ambulances to shift causalities from the field to nearby hospitals (72%), a list of all running ambulances (75%), and medical equipments and medical supplies details (81%) show that the primary health facilities in the sample are relatively well-prepared for emergencies in terms of communications and transportation systems, an important aspect of disaster preparedness (Mulyasari et al. 2013). *Human resources and capacity building* are the final aspects of functional preparedness for disasters that we considered. Those who are actively engaged (whether as medical officers, disaster risk management staff, or community members) in the provision of emergency medical services at times of disaster should be adequately prepared. By consideration of human resources preparedness, the respondents were asked their opinion about the Disaster Relief Management (DRM) coordination units at their health facilities. Only 36% of RHCs actually had a dedicated DRM unit and only 9% had staff with a specific responsibility for DRM activities. Twenty-four percent of the facilities have established a DRM health committee, which implies a worrying lack of community participation in health-related DRM (Chan 2014). This needs special consideration Alexander et al. (2015) showed that a lack of community engagement was one of the most important factors responsible for the scale and duration of the Ebola outbreak in West Africa. Another worrying feature is that less than one in ten (6%) of RHCs have a DRM health strategic plan, the lack of which often results in

Table 16.4 Structural preparedness vulnerability elements in the sampled area

Preparedness pillar	Vulnerability indicators (%)	Charsadda	Nowshera	Peshawar	Mardan	Swat	D. I. Khan
Functional preparedness	*Accessibility*						
	No obstructions on the roads leading to the RHC	73	85	87	71	69	89
	Access to more than one road (alternative routes)	80	87	81	67	57	90
	Equipment and supplies for emergency						
	Tents	29	33	40	38	40	33
	In-house generator	14	50	40	75	60	33
	Clean drinking water	70	68	61	70	80	33
	Food	29	58	30	38	20	50
	Folded beds	53	59	43	39	61	71
	Triage tags	4	17	6	9	13	17
	Wheelchairs	43	50	50	50	80	50
	Communications and transportation systems						
	EMIS	71	67	40	25	40	33
	Backup communications	81	83	85	89	71	69
	Ambulances for transporting casualties	61	71	73	69	79	81
	List of identified available and capable ambulances for use during emergencies	76	77	70	65	80	84
	Lists of available equipment, medical supplies, and emergency drugs	77	81	82	73	87	83
	Human resources						
	DRM coordination units among RHC	40	43	29	37	32	33
	DRM focal staff within RHC	5	17	10	0	20	0
	DRM health committees established	29	33	20	25	40	0
	DRM health strategic plans available	11	16	0	0	14	0
	Capacity building						
	Training availability for emergency medical staff	43	25	40	25	40	0
	Disaster drill for emergency medical staff conducted on an annual basis	29	33	30	38	60	50
	Disaster drill for patients conducted on an annual basis	7	9	2	0	3	0

Source Derived from field survey data, 2017

the fragmentation of health-related DRM activities and situations where RHCs may have more sources of command, sending out conflicting messages, and no concerted efforts to address the emergency (Olu et al. 2016). It is essential that all health facilities should have a defined command structure and be able to rely on it and clear-cut definitions of responsibility when a disaster does strike (Mulyasari et al. 2013).

There is also an essential need for staff to be trained in and prepared to deal with emergency situations. Yet in our sample, only 29% of emergency medical staff received such training. This is in line with the findings by Hsu et al. (2006), Tachibanai et al. (2005), and Bagatell and Wiese (2008) who all found a low level of preparedness and expertise among health professionals who are expected to actively engage in the provision of emergency medical services during times of disaster. Such gaps should be bridged through the provision of an advanced level of disaster preparedness training to emergency medical staff which defines specific activities and responsibilities to ensure an efficient response in times of disaster (Ullah et al. 2017). Other important aspects of training include disaster drills and exercises for emergency medical staff that should be carried out on an annual basis. Yet 60% of the sample did not carry out such drills for their staff and only 4% carried out such drills involving patients. Disaster drills are a critical component of functional preparedness to test the response of health facilities in simulated real time situations. The evaluation of these activities is essential to know the strengths and weaknesses of an institution's response to risk (Ahrq 2011).

16.5 SWOT Analysis of Primary Health Care Facilities (RHCs)

The key findings of all three-preparedness pillar of primary health care facilities can be categorized as internal (strengths and weaknesses) and external (opportunities and threats) (Shah et al. 2018b; Noordin et al. 2011) which can be analyzed through a SWOT analysis. A SWOT analysis examines and evaluates an organization's internal strengths and weaknesses, the opportunities for growth and improvement, and the threats that the external environment poses (Terzic et al. 2010). A SWOT analysis is often an important component of the planning process and can be practically applied in the field or to projects to estimate the level and extent of strengths, weaknesses, opportunities, and threats for achieving specific objectives. A SWOT analysis can also undertake a risk analysis to help organizations to recognize dangers, devise or adopt strategies for minimizing the risks, and identify coping mechanisms. As this study is focused on the flood disaster preparedness level of the health sector in Pakistan, following Table 16.5 presents a SWOT analysis for the health facilities preparedness for flood risks.

Table 16.5 SWOT analysis for Rural Health Centers in the study area

Strengths (S)	Weaknesses (W)
1. All the RHCs surveyed in this study are functional and provide primary health care services to their local communities	1. The RHCs are located in union councils and serve the community providing primary health services (treatment and medication). There are no secondary or tertiary health care services available. Patients requiring such services are referred to as Tehsil or District HQ hospitals
2. The local communities are able to avail themselves of the services of specialized emergency medical officers who provide primary health services to the rural population for	2. Rural communities are highly dependent on emergency medical services, and the existing health facilities do not have sufficient funds or resources to meet the health emergency needs of these rural communities. This is a serious weakness
3. The administrative and management responsibilities for all the health facilities covered by this study rest with government and the local community cannot interfere in their management and administration	3. Much equipment used in the rural health facilities is either outdated or out of order. This creates gaps in the delivery of health services
4. The government deploys financial and human resources, which if they were assigned to the community, could give rise confusion and opportunities for favoritism and nepotism in deploying resources	4. In Pakistan, there are 17 health service delivery and 17 health service management standards. The health facilities located in rural areas are rarely succeed in meeting these standards, which further contributes to poor health service delivery
5. Most of the health facilities in the study have alternate access routes that could be readily evacuated in times of emergency. These alternate access routes could also allow essential equipment to be removed from the premises (to be used elsewhere) if there was risk of flooding	5. There are no proper mechanisms of social accountability of the duty holders
6. Rural populations have easy access to health facilities to get treatment and medication as well as medical consultations at low or no cost on their doorsteps	6. There are no appropriate monitoring systems to monitor the duty hours', process, services delivery and use of resources
	7. Poor communication can lead to a waste of resources, especially in times of emergency
	8. The lack of disaster risk management mechanisms and health committees are further significant weaknesses of the health facilities
Opportunities (O)	Threats (T)
1. There is an opportunity for public and private partnerships in the vicinity of the health facilities. Specialized human resources	1. Many of the health facilities in our sample are located in flood-prone areas and are vulnerable to damage from flooding

(continued)

Table 16.5 (continued)

Strengths (S)	Weaknesses (W)
and experts could be deployed or encouraged to provide services at nominal costs, and the community could benefit	
2. Humanitarian organizations are already working in the flood-affected areas/districts of KP and other provinces of Pakistan. This provides an opportunity for local and district governments to engage these organizations in providing missing facilities, capacity building and meeting health care standards in the health facilities	2. Many of the structures are very old and, at the time of construction, no elements were incorporated to make them safe and resilient to flooding
3. Services provided at rural health facilities are either less costly or free which is an opportunity for the impoverished local community	3. As the structures are old and constructed with traditional materials and methods they are unlikely to be resilient to natural hazards such as floods
4. There is an opportunity for external training to build up the capacity of existing medical staff to provide deliver higher quality emergency health services	4. There is a lack of social awareness among rural communities and of a sense of ownership and responsibility on the part of the community to maintain a healthy and clean environment in these facilities
5. The existence of humanitarian organizations able to identify the gaps in health service delivery and to address such gaps and needs	5. Social inequalities regarding the provision of primary health services to community members which are often disbursed through favoritism and nepotism, which further increases social disparities
6. There are good opportunities for new construction as the many/most health facilities have enough space to permit the construction of flood protection measures and to provide additional (currently missing) facilities	6. The existing health facilities have inadequate provisions for maintenance due to a lack of funds and resources. This poses a severe threat to their sustainability
	7. Other than health standards, most facilities do not have access to standby ambulance services and only provide primary health care to patients. For patients with a severe condition, the lack of ambulance services for moving them to a secondary or tertiary hospital may be life threatening
	8. Lack of coordination between the primary health centers and the secondary, tertiary facilities are a threat to human and material resources

Source Authors own construction based on the field survey findings, 2017

16.6 Conclusion and Policy Implications

The general expectations of the people in flood-prone areas are that primary health care services are always prepared and ready to deal with flood emergency situations in an efficient manner. The primary purpose of this research was to assess the preparedness level and evaluation of rural health centers in flood-prone districts of KP province. The current study used three preparedness pillars (structural, non-structural, and functional preparedness). Structural vulnerability elements are crucial if primary health care facilities are to withstand the adverse effects of flood disasters, whereas the non-structural and functional indicators are essential for them to continue their routine operations. The findings of this research reveal that rural health care centers in flood-prone districts of KP province are at risk with low performance on all three indicators. At times of flood, or other, disasters, primary health care facilities should be the main organizations able to offer an effective response. Their preparedness and ability to deliver timely emergency medical services should play a significant role in reducing death tolls. Yet this study's findings show that the preparedness level of the majority of the sampled primary health care facilities in the flood-prone districts of KP province is inadequate. To be prepared to meet the challenges of providing an efficient and adequate emergency response at times of disaster, it is imperative that a fundamental review of the preparedness of RHCs in KP (and other parts of rural Pakistan) is undertaken and that measures taken, and resources devoted, to ensure that these essential public services are properly equipped so that they can be both safe havens and fully operational during disasters.

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