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ARTICLE

Vulnerability Factors of Afghan Rural Women to Disasters

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Abstract Disaster management is a global challenge, but disasters do not affect men and women equally. In most of the world's disasters, more females are impacted than males, and in Afghanistan the disparity between female and male victims is even greater. This study identifies and maps the relationships between the factors that make Afghan rural women more vulnerable to natural hazard-induced disasters. Data for this study were obtained through focus group discussions with rural women and men, as well as person-to-person interviews with employees of government and nongovernmental organizations at the national and local levels in Afghanistan. The study uses Grounded Theory and Interpretive Structural Modeling, not widely used before for this type of study, to analyze the data collected and to map the factors of vulnerability identified and their relationships. In agreement with previous studies, our findings show that insufficient disaster education, inadequate protection measures, and powerful cultural issues, both pre- and post-disaster, increase women's vulnerability during and after disasters. In particular, cultural issues play a role after disasters by affecting women's security, access to disaster aid, and health care. The study also found that perception regarding these cultural issues and how they affect women during disasters differs among men and women. Finally, by using Interpretive Structural Modeling, we show how the importance of the factors and their interrelationships change in pre-disaster and post-disaster situations. We conclude the article with some policy recommendations such as finding ways to allow women to participate in disaster planning activities and decision-making processes related to disaster risk reduction, as well as securing dedicated funds for the mainstreaming of gender in disaster risk reduction policies in Afghanistan.

Keywords Afghanistan · Disaster vulnerability · Gender roles · Grounded Theory · Rural area · Women's vulnerability

1 Introduction

Many studies highlight the fact that disasters do not affect people equally (Enarson and Morrow 1998; Mileti 1999). Women have been found to be more vulnerable than men to natural hazard-induced disasters by several studies (Enarson and Morrow 1998; Ariyabandu and Foenseka 2006; Gokhale 2008). Data from recent disasters around the globe show that the number of female victims in disasters is twice that of male victims (Enarson and Meyreles 2004), and women and children are 14 times more likely to die in a disaster than other groups, especially in developing countries. Lack of social connections, unequal power relations, limited knowledge and skills, rigid gender roles, inadequate access to health services, low economic development levels, minority nationality and language status, informal employment status, patriarchal family structure, a gendered burden of care-giving responsibilities, limited or no community support networks, and high illiteracy rates have been found to contribute to women's vulnerability during disasters (Ikeda 1995; Ariyabandu and Foenseka 2006; Gokhale 2008; Ariyabandu 2009; Saad

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2009; Enarson 2010; Isik et al. 2015). Furthermore, Enarson and Meyreles (2004) found that exclusion of women from the disaster management and decision-making processes, especially in developing countries, has contributed to the higher rates of female victimization in disasters.

Afghanistan exemplifies these problems. Based on the International Organization for Migration (IOM) report from 2012 to 2015, the number of female victims from disasters is considerably higher than for male victims (IOM 2015). As an example, 70% of victims during the 7.5 magnitude Hindu Kush earthquake on 26 October 2015 were women and young girls. Poverty, insecurity, cultural issues, and low literacy rate (18%) have put Afghan women at greater risk during disasters, and have marginalized them from all decision-making processes (Dupree 2002; Wakefield 2005). Because Afghanistan is subject to many kinds of natural hazards, it is important to understand what are the factors of disaster vulnerability experienced by women of the country.

The aim of this study is to better understand the barriers and factors that affect rural Afghan women in particular, and rural men as well, and that make females particularly vulnerable to natural hazard-induced disasters. The study has identified the factors that contribute to women's vulnerability before, during, and after disaster in a rural area of Afghanistan. To the authors' knowledge, Grounded Theory (GT) and Interpretive Structural Modeling (ISM) are used for the first time in an Afghani context to understand and map the inter-relationship between vulnerability factors.

To date few studies have been carried out concerning disaster risk reduction in Afghanistan, and there are no academic studies on gender and disaster related issues. This may be in part because the country has suffered more than three decades of civil war in addition to frequent natural hazard-induced disasters. These events have affected Afghanistan severely and have marginalized the country from many academic and scientific studies. Thus, this study represents a first attempt to understand the disaster vulnerability factors affecting rural Afghan women. What makes the study unique is that we explore the disaster vulnerability of women through the voices and perceptions of the residents themselves in a rural village in Afghanistan.

2 Background

A review of relevant academic literature shows that women are more vulnerable than men during disasters (Enarson and Morrow 1998; UNISDR 2009a; WHO 2011; Erikson 2014). This differential vulnerability primarily arises from the disaster itself, and is documented worldwide, for example in the Bangladesh cyclone in 1991 (Ikeda 1995), Hurricane Katrina of 2005 (Enarson et al. 2007), and the Haiti Earthquake in 2010 (Horton 2012). Vulnerability is increased by additional factors and conditions that originate from women's general position in society (Plan International 2013; Reyes and Lu 2015). The interplay of these factors is discussed in this section as are research approaches that have been used in gender studies that can also be applied in the study of women's disaster vulnerability.

2.1 Women's Disaster Vulnerability

Key issues that contribute to women's vulnerability include lack of education, limited access to resources, economic conditions, and cultural issues. Several studies have reported that women are more vulnerable because they have less access to education and information. Awareness and knowledge of hazards and the risk they pose is the first step in order to manage disaster risks (Mileti 1999; WHO 2011; Erikson 2014). Lack of knowledge may result in the creation of risk instead of the prevention of risk (Mileti 1999). According to Wakefield (2005), women in Afghanistan are marginalized by the education system due to a lack of female teachers or protection of schools from terrorist attacks. Lack of education or low levels of education has been found to limit women's access to services and the decision-making processes (Wakefield 2005).

Gender differences occur when unequal distribution of power and workload appears (Samiullah et al. 2015). Unequal opportunities, which include inadequate education and health care and unequal access to resources due to poverty, develop a complex situation for women such that at the time of a disaster they are more vulnerable than men (Irshad et al. 2012). For example, Neumayer and Plümper (2007) found that women usually have lower income and are more likely to be economically dependent than men. In times of food shortage and drought, such women will often give priority to their husbands. Neumayer and Plümper (2007) also determined that the socioeconomic status of women is related to gender-specific disaster vulnerability. The authors explained that those women with higher socioeconomic status will be less vulnerable, and enjoy longer lives than those who are living in a lower socioeconomic situation.

Enarson and Morrow (1998) revealed that single women and mothers are often the poorest people in a community, so response to and recovery from disasters are not easy for them. Wakefield (2005) observed that traditional practices often limit women's access to jobs, hence restrict their income. A survey carried out by the Asia Foundation (2016) noted that respondents felt that women should not be allowed to work outside their homes due to traditional practices and safety concerns. The survey also revealed that

women's contribution to household income is very low; single mothers and widows in particular have limited access to resources. This increases their disaster vulnerability.

Cultural issues can make women more vulnerable in disaster situations by increasing their risk. According to Krüger et al. (2015) culture cannot be understood as a defined set of social factors, but as a constantly changing and shifting configuration of social practices or as outcome of experiences, social arrangements, and so on, that are imbedded in society. Ariyabandu and Foenseka (2006) observed that the cultural constructs of a society lead to gender-based inequality and vulnerabilities in disasters, basically making vulnerable women "vulnerable within the vulnerable."

In broad terms, Krüger et al. (2015) say that culture includes ways of producing, perceiving, and dealing with risk that may not be understandable to outsiders, or may seem traditional or unnecessary. These cultural, behavioral, and design arrangements allow people to live with extreme risks, and may include religious beliefs, social organization, and adaptation in the built environment. One important point the authors make is that people may deal with risk by following expected behavior that cannot be avoided. Such behavior can include gendered attitudes and roles.

Culture influences attitudes towards risk, but also works through general social behavior and norms that put women at risk from disasters. Parkinson (2014) writes that often women do not have the courage to escape or evacuate from disasters without receiving permission and guidance from their husbands or other elders. This shows male privilege and discrimination against women as local cultural issues. Enarson and Morrow (1998) also discovered that women tend to have less power and privilege in decision making. Women's vulnerability to disasters is also rooted in their traditional gender roles (productive, reproductive, and social) and child care responsibilities. Women have responsibilities such as feeding the family and caring for the house that arise from their roles as mothers and wives. In another study from developing countries, Nelson et al. (2002) discussed similar problems. They found that women are at high risk because of culturally specific pre-disaster gender norms. These include unequal access to resources and information, household responsibilities, and child caring. Both Isik et al. (2015) and Gokhale (2008) maintain that women face greater risks in disasters compared to men.

In contrast, based on research concerning Middle Eastern countries, Saad (2009) argues that men in these countries will assist women and their families to move to a safer place. The important role of women as caretakers of the family is seen here, where women tend to secure their families, household assets, and other things needed for survival after a disaster. Men are expected to actively participate in controlling the impacts of natural hazard-induced disasters, and thus will assist women, children, and the elderly to move to a safer place. Due to religious beliefs, elderly mothers are given the best care.

2.2 Gender Disparity in Afghanistan

A few reports prepared by nongovernment organizations (NGOs) have noted that poverty, insecurity, and unsafe traditional practices are major factors that affect women disproportionately in terms of their accessibility to public services such as education, health, and other resources in Afghanistan (Dupree 2002; Wakefield 2005). Poverty and insecurity affect all people including men and women. The Afghanistan National Risk and Vulnerability Assessment report of 2005 (Afghanistan 2012) defined poverty as lack of access to basic human needs such as education, health, and food. This report shows that women, especially in rural areas, have limited access to education and health. The International Fund for Agriculture Development (IFAD 2012) specifies that widows and female heads of household are the poorest people in society. In the absence of a male relative in the family, it is difficult for single women and widows to survive in Afghanistan's patriarchy society.

One of the greatest challenges for women is access to education. The National Action Plan for Women of Afghanistan (NAPWA) reports that Afghan women have one of the lowest literacy rates in the world and the worst disparity with men (Afghanistan 2007). According to the United Nations Educational, Scientific and Cultural Organization (UNESCO 2018), based on the most recent data available from 2011, the literacy rate of Afghans 15 years and older was 32%. Among this literate population, just over 45% were men, while only 18% were women. The low literacy rate among women, particularly in rural areas, may be due to the lack of female teachers and insecurity problems (Wakefield 2005). Most girls in rural areas cannot go to school and thus they often are marginalized from all decision making and many opportunities throughout their life (Wakefield 2005).

NAPWA also reported that in Afghanistan infant and under-5 years mortality rates remained high at, respectively, 112.8 and 70.40 deaths per 1000 live births in 2016. The document focuses on women's health in addition to maternal health, and improving and expanding health services and infrastructure, particularly for rural women (Afghanistan 2008b). The United Nations Children's Fund in 2002 stated that Afghanistan has been ranked as the worst country in the world into which a girl may be born (UNICEF 2002). In 2011 experts from five continents gathered to rank countries by overall perceptions of danger

as well as by six risk factors: health threats, sexual violence, nonsexual violence, cultural or religious factors, lack of access to resources, and human trafficking. These experts recognized Afghanistan as the world's worst country for women (Reuters 2018).

Afghanistan also has one of the lowest life expectancies in the world at 43 years for women and 44 years for men. Unlike most countries, the life expectancy of women is shorter than for men. Barakat and Wardell (2001) explain that traditionally Afghan society has been characterized by conservative cultural norms with respect to women, which includes a strong gender-based division of roles and strict segregation between men and women. Wakefield (2005) contends that limited accessibility of women to formal education and other facilities, especially in rural areas, weakens their position within their household as well as in society, even if they have more experience and information. The personal experience of this article's lead author as an Afghan woman is that women, in most settings but especially in rural areas, are dependent on their husbands and wait for their decision, even if they have sufficient information and experience in a subject to act independently.

2.3 Gender and Disaster Risk Reduction in Afghanistan

The Afghanistan National Disaster Management Agency (ANDMA) produced its first Disaster Management Action Plan in 2012 and has updated it in response to the requirements of the Sendai Framework for Disaster Risk Reduction 2015–2030 (UNISDR 2015). However, the failure to include gender mainstreaming in general into the updated Action Plan is a major gap.

Empowering women through involving them in the disaster management process is important for reducing community vulnerability to natural hazard-induced disaster (UNISDR/UNDAW 2001). Considering the problems of Afghan society in terms of gender issues, there is a serious and urgent need for gender mainstreaming in disaster risk reduction (DRR) issues. Article 8 of the Disaster Mitigation Law of Afghanistan mentions that "protection of women, children, elders and disabled and other vulnerable are government's responsibility" (Afghanistan 2012, p. 2). The law assigned the Ministry of Women Affairs to take action in the before, during, and after disaster stages to protect women and girls in areas of high risk by implementing vocational training, health education, and provision of sanitation projects. Females were to receive the support of international donors such as UNICEF and the World Health Organization. As mentioned in the United Nation General Assembly (2005) document, in most of the world, women's ability to engage in mitigation, prevention, and recovery from disasters has not sufficiently been considered and it has not developed so far. According to the Afghanistan National Development Strategy, people who experienced natural hazard-induced disasters in the country became more vulnerable and poorer. In post-disaster periods, they tended to sell their assets, take their children out of school to work, and many (especially young men) migrate in search of work (Afghanistan 2008a). The Afghan government instructed all authorities and agencies with recovery responsibilities to address the important issues of inclusion and protection of internally displaced people (IDPs), gender, and environment. The government assigned the Ministry of Women's Affairs to help women participate in disaster response activities and to empower women in disaster response through undertaking special projects. They also required that action be taken to ensure the safety of women and girls in disaster-affected areas and to bolster women's access to essential services during and after disasters.

2.4 Research Approaches in Gender Studies

Studies have highlighted the usefulness of focus groups (FGs) for feminist and postmodernist research (Griffin 1986; Madriz 2003). Madriz pointed out that focus group discussion is a comprehensive cooperative method for feminist research and suggested those methods for feminist research rather than person to person interviews. Krueger and Casey (2000) mentioned that FGs are a good tool to generate a range of response that provides a greater understanding of the attitudes, behavior, opinions, and perceptions of participants. They argue that a focus group is not just people brought together to talk, but it is specialized in its purpose, size, composition, and procedure. Focus groups allow for good group dynamics and help researchers capture shared lived experiences; they generate data from multiple voices instead of one individual (Krueger and Casey 2000; Madriz 2003). According to Madriz (2003), by gathering and sharing with other women, participants have the potential to create actions and movements that promote social change. In this study FGs were used to understand women's concerns and challenges through the voices of women survivors of disasters. Focus groups also revealed the perspectives of the men in the community, as well as those of the disaster management staff of local government.

Grounded Theory (GT) was first introduced by Glaser and Strauss in 1965. They explored how theory could be obtained or understood through a systematic analysis of data (Glaser and Strauss 1967). Strauss and Corbin (1998) made further clarifications of the GT methodology. They described GT as a procedure that starts with finding key phrases or words in documents, which are then coded and

classified. This process allows the researcher to formulate theoretical frameworks. Grounded Theory has been found useful for analysis in feminist studies (Wuest 1995; Plummer and Young 2010). Thus, we selected GT for this study on women's vulnerability to disasters.

Grounded Theory is a method for coding and categorization of data (Jones and Alony 2011). Since its development by Glaser and Strauss, GT has evolved, and there are two approaches: Glaserian and Straussian. The Glaserian approach emphasizes an inductive approach in which theory emerges from data, while the Straussian approach stresses the need for a systematic approach that follows the method carefully. Both approaches have been discussed by other authors. Bowen (2006) pointed out that developing theory through the use of GT is powerful because it organizes the researcher's point of views and beliefs. Evans (2013) pointed out the usefulness of GT for feminist research because its methods ensure that women's voices are heard. In this study, which focuses on gender issues in the disaster management process, GT was used to explore barriers and other factors that make women more vulnerable to natural hazard-induced disasters.

Interpretive Structural Modeling (ISM) was proposed by Warfield (1974) to study complex socioeconomic problems. Attri et al. (2013) defined ISM as a methodology that assists researchers to identify relationships among elements of a complex problem or issue. They found this method to be very useful for studies that try to combine science with policy. At the inception of this method, Warfield (1974) was interested in developing tools to aid communication between scientists and the public while ensuring that there is meaning for all involved and providing a holistic view of the elements and their relationships in the system. Watson (1978) pointed out that in this method, with the help of the computer, we can develop graphic images of a system's structure.

The use of ISM has many advantages. Janes (1988) found that ISM is particularly useful for working with participants in a group. Some authors demonstrated that the use of ISM promoted focused debate, clear thinking, group learning, and team building (Warfield 1976; Janes 1988). Sushil (2012) reported that ISM can help clarify unclear and poorly expressed models of systems into visible and well-defined models. In a similar way, Sahu (2008) described how ISM identified and summarized relationships among specific variables that define a problem. In this study, we used ISM to analyze the responses of focus group participants, which have been coded and categorized by GT in order to identify new interrelationships and confirm relationships between them. Using Grounded Theory, we identify the categories or factors and their interactive relationships that impact the vulnerability of women in the case study area. Using ISM, we check the validity of the relationships among the factors and find new relationships. We also used ISM to map the vulnerability factors of women in disasters. This study used the above methods for data analysis based on data collected through focus groups in Sayad Village, Balkh Province, Afghanistan.

2.5 Sayad Village in Khulm District of Balkh Province, Afghanistan

Sayad Village is located in the Khulm District of Balkh Province in northern Afghanistan about 63 km from Mazar-e-Sharif. Khulm is an agricultural and farming district (Hashimi 2011), famous for its fine almonds and pistachios. The Khulm River is a tributary in the headwaters of the Amu Darya River, the biggest river in Central Asia. Because of extensive water withdrawals to sustain the intensive, irrigated, agricultural district around the city of Khulm, however, the river is called "Blind River." Only a dry streambed marks the former course of the Khulm River, which lacks sufficient streamflow to reach the Amu Darya. Khulm is an ancient and important place, famous for its lush garden, and the city has been declared a "town of art-historical significance" by UNESCO. The famous Silk Road passed through the Khulm area between the tenth and fifteenth centuries.

There are 1375 households living in 550 houses in Sayad Village. According to ANDMA officials, the total population of the village is 4500 people; of this total, 2000 are women. Like many rural villages in Afghanistan, Sayad Village has limited access to basic services such as electricity, safe drinking water, and health facilities.

Sayad Village was selected for the study because of its location in a high hazard area, in the middle of the mountains south of Khulm, on the banks of the Khulm River. Before the study, several areas were investigated. However, due to security reasons, Sayad Village was selected for the case study. Earthquakes, river floods, flash floods, and mass movements are hazards of major concern for people living in Sayad Village every year, causing loss of life, property, crops, and farm infrastructure. Figure 1 shows the location of the case study area. Most of the houses in the village are made of mud. For this reason, some of the houses are often damaged during floods, and have been the cause of injury and death of village residents, especially women.

3 Methodology

Data collection for this study included a review of the literature, person to person interviews, and focus group discussions in Sayad Village. The data collected through the

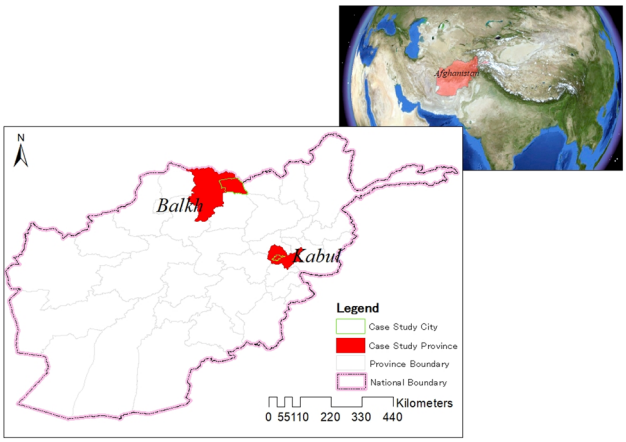

Fig. 1 Map showing the location of Khulm District in Balkh Province of Afghanistan. *Data source* OCHA services. https://data.humdata.org/dataset/afg-admin-boundaries

FGs were analyzed using Grounded Theory and Interpretive Structural Modeling.

3.1 Interviews

Interviews and meetings with officials of the Afghanistan Natural Disaster Management Agency (ANDMA) were conducted in Kabul and Balkh Provinces in Afghanistan. A total of three interviews were conducted in Sayad Village and Kabul. The discussions in these interviews focused on ANDMA office activities, challenges, and limitations. An initial meeting was held with the State Minister of Disaster Risk Management. He welcomed the study and research in Afghanistan and expressed his strong support and commitment to the research. He mentioned multiple gaps that the Afghan government is facing daily in handling natural hazard-induced disasters and stressed that ANDMA needs to work more on preparedness and mitigation. The author also interviewed senior staff of the regional office of the International Office for Migration (IOM) and the head of ANDMA office Mazar-e-sharif. ANDMA State Minister and head of regional office in Mazar-e-sharif introduced documents that have been developed to date, such as the Disaster Management Law and Disaster Management Policy and Strategy. To fulfill national commitments to international instruments such as the Sendai Framework, they have developed a specific Action Plan by conducting a nationwide workshop. Most activities and plans are implemented by DRR stakeholders IOM, OXFOM, Acted, DACCAR, Care international, and relevant UN agencies such as WFP, UNOCHA, and UN Habitat, in collaboration with ANDMA. ANDMA officials complained of insufficient financial resources to implement their activities in a better way.

3.2 Focus Groups

Qualitative data were collected through a total of three FG, two with residents from Sayad Village on 2 January 2017, and one with DRR professionals on 1 January 2017. In the DRR FG ANDMA staff in Mazar and IOM staff participated. The first author stayed 2 weeks in Afghanistan to collect data. In this period, she spent a day in the city of Mazar-e-sharif, Balkh Province, to conduct the DRR FG, and 1 day in Sayad Village carrying out focus groups with community members there. Due to high insecurity, an overnight stay was not possible. The Sayad FGs participants were chosen from previous studies undertaken by IOM and ANDMA. A female staff member of IOM who had extensive experience of working with communities in this region, including Sayad Village, accompanied the first author. The first author traveled in an IOM car (again due to security issues). The travel time each way between Mazar-e-sharif and Sayad Village was about 3 h. During the trip to Sayad Village, the IOM staff member briefed the first author about the community. The IOM staff person introduced the first author to the community leader and the women's group. This was the first step to gain the trust of the community with the research team. In all FGs in the case study area, the same questions were presented for discussion.

Participants for the FGs were community members who had participated in a previous survey conducted by IOM Table 1 shows the number of participants in each of the three focus groups. Two FG discussions were conducted in Sayad Village, one with women only and one with men only, in the home of the head of the village. The FG with DRR staff was held at the Balkh Province, Mazar-e-Sharif, ANDMA office. The women's FG was held with the help of the wife of the head of the village. All female participants were married women, aged between 20 and 45, except one 14-year old school girl.

The FGs lasted between 30 and 120 min. As Sherraden (1995) advocated, this is considered a desirable duration for a FG because a longer discussion time will result in loss of momentum. Participants in the FGs were asked if the

Table 1 Distribution of DRR participants in the focus group discussions in Khulm District of Balkh Province, Afghanistan

Place/group	Women	Men	DRR staff
Balkh Province			
Number of FGs	1	1	1
Number of participants	9	7	10
Totals by gender	Female: 9	Male: 7	Male: 9
			Female: 1

discussion could be recorded. However, they preferred not to be recorded. The first author facilitated the FGs with the help of the female IMO staff person.

Figure 2 shows a snapshot taken during the women's FG. Both the first author and the IOM female staff could speak the local language, Dari, so there was no need for translation. The women's focus group lasted about 2 h while the men's FG was limited to about 30 min. In the male FG, four middle-aged men (including the head of the community and the religious leader) and three young men of the village participated in our study. All participants were farmers, except one, who was a teacher in the village school. Men generally used short sentences, and did not elaborate much during the discussion of the issues. Traditionally, Afghan men prefer to talk with men rather than with women, and it was their first meeting with a female research team.

The research team gave participants time to discuss the issues, without stopping or interrupting them, and moved to another question once the discussion died down. The discussion points for the FGs included questions regarding the types of hazards and causes of disaster vulnerability, and the suggested prevention and mitigation of natural hazards in their community. Although the same topics for discussion were given to both male and female groups, the differences in their answers clearly revealed their distinctive social roles and problems. For example, the responses to the question "Why do you think women become victims of disasters more frequently?" were different between the female and male focus groups. Women said that before evacuating the house, they must collect household things including warm clothes for the children and food, along with their children. This delays their evacuation. Furthermore, women explained that in some cases, women will return to their homes to finish collecting necessary items, and become victims of floods.

Fig. 2 Photo taken during the focus group discussion with women in Sayad Village, Balkh Province, Afghanistan on 2 January 2017. Photograph by M. Hamidzada

The men expressed their feeling that women return home to get unnecessary items, while women as mothers are thinking these items (such as warm cloths, blankets, food items, and so on) are necessary for their children who will spend nights in the cold in an open space. The DRR focus group said that women do not have to collect all these things, but that they like to have all their personal property such as clothes and valuables with them when evacuating the home. Both the men FG and the DRR FG expressed similar issues regarding women's efforts to rescue themselves and their families from disasters.

3.3 Data Analysis Using Grounded Theory

We used GT for the initial data analysis. Transcripts were prepared from all FGs drawing upon field notes. The field notes were written during the FG discussions. Since the author could not record the FGs in Sayad Village, some details were missed at the time of analysis. The first author contacted the IOM female staff member several times for clarifications. In the case of the DRR FG, recording was allowed. All of the discussion notes and transcripts of the recordings were coded. Codes were selected from the data on the basis of multiple repeated themes and issues highlighted by each of the focus groups. The transcripts for each FG were reviewed and coded individually. More than 200 codes were identified.

Codes were then categorized. After reviewing all transcripts of FGs, many codes with similar meaning were incorporated into single categories. Table 2 shows some examples. Items of concern to one or more FGs, represented by similar themes, or codes, concerning knowledge and preparedness for disaster, were placed under the "disaster education" category.

The relationships between categories were also identified. The analysis included identifying phrases that linked two or more categories, such as: "at flood time we don't have any *transportation* and even after that, since all the roads are closed, for weeks we can't move from our village", and "Last year a *pregnant woman* who was due to deliver soon after the flood, was *at risk of dying because of lack of transportation to take her to a hospital*." The participants explained that as there was no midwife, some elder women at the village helped her to deliver the baby and possibly saved their lives. This example illustrates the relationship between "*transportation*" and "*access to health facilities*." Access to health care locally, and transportation to hospitals in neighboring towns or cities in the case of emergencies are very important.

Table 2 Example of some responses given by different focus group participants when asked what did you do when flooding occurred, and a sample of how the information can be coded

Focus group	FG response	Coded item
Women	"During floods, we left our homes but didn't know where to evacuate to. Some went to the hills and some to another safe place which is higher than our houses. We should learn how and where to evacuate"	We should learn (category: lack of disaster preparedness, lack of disaster education)
Men	"During the day we are not at home and women are staying with their children at home. *They should learn* how to take their children with them to a safe place"	They [women] should learn (category: lack of disaster preparedness, lack of disaster education)
DRR staff	Those women who are working in the field become victims of flooding more often because they are not aware of the flood hazard	They are not aware of flood hazards (category: lack of disaster preparedness, lack of disaster education)

3.4 Data Analysis Using Interpretive Structural Modeling

Following the categorization of vulnerability factors and identification of their relationships based on GT, we used ISM[1] to check the validity of the relationships among the factors, and to stratify their effects. According to ISM rules, we prepared a reachability matrix based on the factors identified by GT. Table 3 shows the prepared reachability matrix for this study. No effect between factors on each other results in a "0," and an observed effect is entered as a "1." The mathematics underpinning ISM always assumes that the contextual relation used is transitive, which permits transitive logical inferences to be made by the computer. The binary matrix that is constructed represents a binary relation of a set on itself. The results are discussed in the next section.

4 Results and Discussion

Data collected from FGs with women, men, and DRR staff groups were first transcribed and coded. Similar codes were put under the same category. Table 4 provides examples of discussion points showing different responses from the three FGs.

After analysis of all FG data, many categories emerged, which were then put into nine main categories. Categories were chosen according to the number of codes assigned to them by authors in their review of transcripts and field notes for each focus group. Table 5 shows the number of codes for each category by focus group. Disaster education, Lack of protection measures, and Cultural issues, which had a high number of codes, were marked as strong factors of vulnerability, as highlighted by all focus groups. The number of codes is not the same for each FG. For example, there were more codes regarding Cultural issues, Lack of access to safe drinking water, and Lack of access to health facilities in the women's FG than in the men's FG. Lack of coordination among DRR stakeholders[2] was pointed out only among the DRR FG.

The above analysis showed vulnerability factors of women before and after the occurrence of a disaster. The identified factors were then divided into pre- and post-disasters factors. Table 6 presents the list of categories that affect women's vulnerability in pre- and post-disaster situations. The table also shows the strength of the effect that was determined by the importance given to the issue by participants in the FGs. Factors that were repeatedly pointed out by all FGs participants and have more number of codes counted as factors with strong effect. Likewise, the factors with small number of codes were considered as low effect factors and medium effect factors. The analysis of FG data provided valuable information concerning factors that contribute to women's vulnerability to flood disasters, both vulnerability resulting in women being killed and to women becoming victims in the post-disaster period.

4.1 Women's Vulnerability Factors Pre-disaster Based on the Grounded Theory Analysis

The study found that the lack of disaster education for women, the insufficient protection measures, and cultural issues are the main factors of pre-disaster vulnerability for women. Furthermore, factors such as coordination among DRR stakeholders and economic and financial issues were also found to be contributing vulnerability factors.

The women's group expressed their concern for their limited knowledge about the hazards affecting their area, especially flood related events. They worry about their capacity to evacuate from flood threats, especially when they are alone at home during the day or while they are working in the fields. We found from the FGs that women

[1] It this study, ISM was applied using Microsoft Excel.

[2] The DRR stakeholders include governmental ministries and international agencies who are working in DRR with the government.

Table 3 Reachability matrix for Sayad Village of Khulm District, Balkh Province, Afghanistan

Factors	Vulnerability	Disaster education	Economic issues	Cultural issues	Lack of disaster management	Lack of coordination	Lack of safe drinking water	Lack of protection measures	Lack of transportation	Lack of health facilities
Vulnerability	1	1	1	1	1	1	1	1	1	1
Disaster education	0	1	0	0	0	0	0	0	0	0
Economic issues	0	1	1	0	0	0	0	0	0	0
Cultural issues	0	0	0	1	0	0	0	0	0	0
Lack of disaster management	0	1	0	0	1	1	0	0	0	0
Lack of coordination	0	0	0	0	0	1	0	0	0	0
Lack of safe drinking water	0	0	0	0	0	0	1	0	0	0
Lack of protection measures	0	0	1	0	0	1	0	1	0	0
Lack of transportation	0	0	0	0	0	0	0	0	1	0
Lack of health facilities	0	0	0	0	0	0	1	1	1	1

usually became victims of floods because they are helping their husbands in the field, and, when flooding occurs, they go back to their homes to pick up their children or some necessary emergency items such as blankets, food, and warm clothes. They mentioned that they do not know about flood severity since they have never attended any training about floods. According to the DRR FG, most women in rural areas are killed by flood on their way home from the field.

The female focus group also described a system that they have set up by themselves for flood early warning. This was an interesting finding, which demonstrated that they can take actions by themselves without relying on government staff to provide early warning. When a flood is coming, the women said that they usually receive an early warning call, generally by cellphone, from another community upriver on the other side of the mountain that informs them of the possible danger. The women regard the system as useful, but not always reliable. Since this village is surrounded by mountains, sometimes mobile phones do not have a signal for dialing and talking. They believe that they require a better system that can provide advance warning so that they may have more time to evacuate. They often do not have enough time to protect themselves and their children. In this case, some women become the victims of floods.

The DRR group and men's group said that some training and awareness-raising sessions were previously conducted in the case study area. Due to lack of female training staff, however, women could not participate. In rural areas in Afghanistan, women cannot sit in the same room with a male stranger, even for educational purposes. The DRR group pointed to the fact that they cannot send female training staff for several reasons including political instability and security issues—ANDMA cannot guarantee the protection of female staff due to ongoing conflict. Furthermore, female staff must be accompanied by a male staff member, which puts an additional burden on ANDMA's limited resources.

These examples highlight the effect of cultural issues on women's ability to receive disaster education in rural areas. The men's group was aware of the importance of disaster education. They said that women should learn what to do in the case of a disaster such as a flood, especially during the day when women are alone with their children. Generally, male FG participants expressed their concern about women's low level of knowledge regarding floods and other disasters. In these examples, the lack of and need for disaster education as well as early warning and disaster preparedness, which fall under the protection category, emerged as important factors of vulnerability for women under pre-disaster conditions.

Table 4 Example of discussion points showing different responses from the three FGs

Discussion points	Women FG	Men FG	DRR FG
Please discuss what was your initial reaction when the last disaster happened?	When I received call from other village about flood, I sent my son to tell a man to announce it in the mosque loudspeaker *Early warning, preparedness* (protection) Then I started to collect necessary warm blankets and clothes for children to prepare to escape *Preparedness* (protection) *social roles* (cultural issues)	I try to inform people by announcing through the mosque *Early warning, preparedness* (protection)	All the roads were closed, we contacted our main office in Kabul requesting support. We asked them to send us helicopter to go to the field. It took more than 20 h to receive assistance from Kabul *Lack of resources, bureaucracy, lack of clear emergency plans* (DRR staff disaster management) (lack of coordination)
What is the special need of you and your family during and after disaster time?	We need a safe evacuation center (protection) and safe drinking water (water)	We need money for reconstruction (economic and financial issues)	We don't have female staff, we should use female staff from other agencies (cultural issues)
Can you tell me how you think you can better protect yourself and your family?	If we received before flood some warning and information (disaster education)	If we have good system of canalization and transportation (protection) and (transportation)	If we have enough equipment and enough number of male and female staff (economic and financial issues) and (cultural issues)

Responses were then coded, and similar codes categorized. Categories are shown in parenthesis

Table 5 Categorization of codes: list of categories identified, and the number of codes falling under each category for the women, men, and DRR staff focus group discussions

Focus groups/categories	Women FG	Men FG	DRR FG
Disaster education	17	12	14
Protection measures	11	14	8
Cultural issues	14	1	6
Economic and financial issues	3	2	3
DRR staff disaster management	x	1	2
Insufficient transportation	2	2	1
Lack of access to safe drinking water	4	2	x
Lack of access to health facilities	2	1	1
Lack of coordination among DRR stakeholders	x	x	2

Table 6 List of the main categories of identified factors that affect women's vulnerability in pre- and post-disaster situations, indicating also the strength of the effect (O = effect identified; X = effect not identified; S = strong effect; M = medium effect

Categories or factors of vulnerability of women in disasters	Pre-disaster		Post-disaster	
	Effect	Strength	Effect	Strength
Disaster education	O	S	O	S
Protection measures	O	S	O	S
Cultural issues	O	S	O	S
Economic and financial issues	O	L	O	M
DRR staff disaster management	X	X	O	M
Insufficient transportation	X	X	O	L
Lack of access to safe drinking water	X	X	O	L
Lack of access to health facilities	X	X	O	M
Lack of coordination among DRR stakeholders	O	L	O	M

Absence of protective structural measures was also highlighted by both men and women groups. The lack of retaining walls to protect the village from rock falls was also discussed. Both Sayad groups stressed their concern about the lack of proper channels to steer flood water away from their homes and fields. Deficient structural protective measures and better early warning systems were both included under the protection category as they are indirect factors of vulnerability for both women and men in pre-disaster times.

The women's group explained that during a flood they want to protect their children and take them to a safe area. In addition to carrying their children, they also must gather food and many household belongings to bring with them so that they do not lose everything they have to the flood. Food and household belongings are needed if they must shelter somewhere else for any period following a flood. The women acknowledged that trying to save not only the children but also food and household items often puts them in great danger of losing their lives. Women in rural areas play three roles: work; family; and community. They are house managers at the time of disaster in their care of children and all household items and assume responsibility for taking food and blankets, warm clothes for children, and essential equipment to a safe place. Married women also work in the field beside their husbands, as do widows who must labor for other field owners in order to have a source of income for their families. The men in the village are also helping other families (women and children) by informing them when to evacuate. Furthermore, the men sometimes help at the evacuation shelter (open shelter or safe place) with cooking, taking care of small children and pregnant women, and said that they have even helped to deliver babies in the absence of a midwife.

Although women said they quickly take action when they receive an early warning, they are not the decision makers in terms of evacuation. In Afghanistan men are the head of households and all decisions depend upon them. Since this is an accepted culture, when women receive the early warning call, they immediately inform neighbors or the mosque, which announces the flood threat. Yet in the absence of their husbands, women cannot take the decision to evacuate by themselves unless they get the approval of men who are present in the community. Another problem concerns information and knowledge regarding where to evacuate. According to the women's group, they did not know where to evacuate with their children. They said, "We see any place which will be higher than our house, we are running to approach that place." Furthermore, they said that they do not know how severe a flood would be. That is why sometimes they return home to fetch things from their house, and thus they become the victim of a worsening disaster.

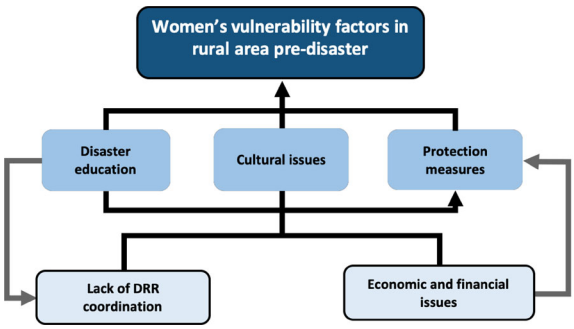

Fig. 3 Factors influencing women's pre-disaster vulnerability based on Grounded Theory (GT) analysis in Sayad Village, Balkh Province, Afghanistan. Colors indicate the strength of the factor effect on vulnerability based on GT where darker blue shows a strong effect, light blue a medium effect, and white a low effect. In this figure, low effect was not observed. The effect of one factor on another (the inter-factor effect) is shown with grey arrows, while the direct factor effect on vulnerability is shown with black arrows

An absence of evacuation shelters and emergency provisions for this community is a real problem that results in an additional burden for women and children. This problem exists in part because of their cultural roles as mothers and wives; but also the issue is rooted in the need to think ahead about how to survive after the disaster. This situation puts women at risk of losing their lives when they return to their home before the flood has crested. This shows a lack of knowledge concerning flood hazards, which falls under the Lack of disaster management category.

In interviews with IOM in November 2017, we learned that although evacuation shelters have not been built, certain areas in this community have been designated as safe for evacuation. However, there is generally no proactive stockpiling of relief goods at these sites. During the FG with DRR staff, the head of ANDMA office in Mazar-e-sharif said that they have asked a partner non-profit organization to send a female employee to help distribute emergency kits and carry out relief work during disasters. This activity has not always been possible in part due to lack of economic and human resources, as well as also conflict in the region. Presence of military groups and warlords threaten people's security and movement.

Women in this community are poor and for this reason, beside all their domestic responsibilities they often work as field laborers or engage in embroidery work to augment their household economy. We have included a financial and economic issues factor in Fig. 3 to account for these supplemental income activities. The lack of economic resources was also highlighted by the DRR group. These FG contributors explained that essential second income work hinders the ability of women to carry out disaster preparedness planning and to provide emergency response.

Figure 3 provides a diagrammatic representation of the major factors identified that affect women's pre-disaster

vulnerability and the factor relationships. The interaction between the factors are considered as internal effects and these are indicated by black arrows, while their effects on women's pre-disaster vulnerability are considered as external effects. In Fig. 3 the factors that are located in the upper bright blue layer show primary factors influencing women's vulnerability. Disaster education, cultural issues, and protection measures are located in this layer. The second lighter blue layer, which consists of health facilities and economic resources, shows factors with a medium effect.

The DRR focus group also talked about the lack of coordination among all DRR stakeholders including government agencies and nongovernmental organizations. Participants said that people are building their houses in areas designated by ANDMA as flood-prone zones with the permission of local authorities. According to the Disaster Mitigation Law of Afghanistan all ministries and governmental and nongovernmental organizations are obliged to coordinate and participate in DRR activities and plans in order to reduce natural hazard impacts and to eliminate their future negative effects (Afghanistan 2012, chapter 2, articles 8–15). Lack of coordination is a problem that has already been identified in the ANDMA Strategic Framework document that states: "Coordination across multiple ministries is difficult to manage, and a large number of stakeholders engaged in resilience activities in Afghanistan have no coordinated approach" (ANDMA 2010, p. 5). This lack of coordination between government organizations has contributed to putting people at risk of flood disasters. This lack of coordination among government organizations is a factor of vulnerability for both men and women in pre-disaster situations.

4.2 Women's Vulnerability Factors Post-disaster Based on Grounded Theory Analysis

Gaining more disaster information and knowledge could empower women in all disaster management cycles, from preparedness, to response, and into the recovery phase. The women's FG attendees said they have asked the DRR staff to conduct training specifically for women. In a recurring refrain, disaster education training for women was not possible due to too few female DRR staff.

Issues related to inadequate protection measures include the absence of retaining walls (slope failure resistance) and drainage systems (flood water removal), nonexistent evacuation shelters, lack of proper bridges (to connect with other villages), and so on. These factors significantly increase the local community's vulnerability post-disaster. The lack of an evacuation center in Sayad Village at the time of this study was a big challenge for all the community, especially women and children in the disaster aftermath. According to comments in the women's FG, evacuees usually spend multiple nights in an open space without a roof over their heads, or any other type of protection. Participants in the male FG said that the lack of proper drainage systems and channels to divert or remove flood water from their fields and homes results in damage to their mud houses and loss of field and tree crops. Long-standing water delays recovery, because farmers are not able to start working in the fields for some time. These problems affect families' economic situation. Thus, the lack of protection measures pre-disaster is related to post-disaster economic and financial vulnerability factors.

Cultural issues affect women post-disaster as well. The lack of female DRR staff means that often women cannot receive relief goods if these supplies are being distributed by men; they cannot see a male doctor for non-disaster health problems, and, in most cases, they lack emergency shelters, which means they have no privacy. In the Afghan context, women usually carry out their domestic activities in the privacy of their own homes and courtyards without being seen by men outside of the household. Not having shelters limits their activities, including breast feeding, bathing, and so on.

Flood waters also affect transportation routes and access to and from the village. The village residents use trees and stones to make a bridge across the river. After floods, the bridge is often damaged and villagers are cut off from other neighboring villages. The male FG commentators said that damage to transportation routes also affects their ability to take their products to neighboring markets. The lack of transportation affects families' already poor economic situation, deepening the poverty trap.

The DRR FG mentioned that due to lack of resources and insufficient funds they cannot implement their disaster management plans. This shows the relationship between the management and economic and financial issues factors, which are important factors of vulnerability of women in this area; economic and financial issues increase women's and men's vulnerability after a disaster. Women in their FG said that after a flood some widows and those women who are the head of a household are not able to reconstruct their houses due to limited economic resources. As a result, these women end up living with relatives and must find work either as herders, engaging in field labor, or doing embroidery at home.

Poor coordination among all stakeholders was cited by the DRR focus group as a factor in women's vulnerability. They said that in 2015, when a huge flood occurred in the village, all the roads were closed and the DRR staff could not go to the area to distribute emergency kits. They requested that the ANDMA head office send helicopters with relief goods. Due to the lack of coordination among offices, however, it took a long time before the relief goods

were shipped. Lack of relief goods affects both men and women, but puts women in a particularly vulnerable situation. This coordination disfunction thus appears as an important related factor affecting women after disaster.

Insufficient professional DRR staffing, particularly female staff essential to provide post-disaster help to female victims, and the general lack of preparedness and emergency planning to produce evacuation shelters, timely emergency response, and health facilities affect women and young girls disproportionately in this village.

Access to health facilities that have female doctors and staff following a disaster is a serious problem. The women's focus group members explained that health checks and health problems that affect only women require a female gynecologist and staff in Afghanistan's cultural context. Although the village did not have a health clinic, during normal times, women can and do visit doctors outside the village. After a disaster, damage to bridges and roads eliminates access to a clinic or hospital outside the village; this puts some women at risk of disease or even death.

Speakers at both women's and men's focus groups said that they usually use river water for drinking, but during and after a flood the river no longer provides safe drinking water. Women are in charge of fetching water. Following a disaster, they are obliged to carry it from a great distance, which is an additional hard chore for the women. Sometimes, in special circumstances, village residents have no option but to drink the unclean flood water. This practice can sometimes cause a variety of diseases that particularly affect children.

The results of both FGs highlight the observation that women's and men's perceptions, behaviors, and concerns stem from their social role. Women felt responsible for taking care of children, saving household items, preparing food, and maintaining some semblance of household normalcy in the aftermath of floods; men felt this was a self-imposed, often risky, responsibility assumed by women during floods. In another example, men and women agreed about a flood disaster's impact on transportation. But while males stressed impacts on their livelihood and market access, women emphasized the impact of interrupted access to hospitals and emergency health care.

Figure 4 illustrates and summarizes the main factors influencing Afghan rural women's post-disaster vulnerability. The lack of disaster education for women, the absence of protection measures such as retaining walls and drainage channels, and the inhibiting impacts of cultural issues influence the vulnerability of women post-disaster. The study also found a range of additional factors that make women vulnerable. These issues are related to the lack of health facilities, poor disaster management by DRR staff, damaged transportation infrastructure, lack of coordination among DRR offices, inadequate access to safe drinking water, and a general deficit in economic resources needed to facilitate post-flood recovery.

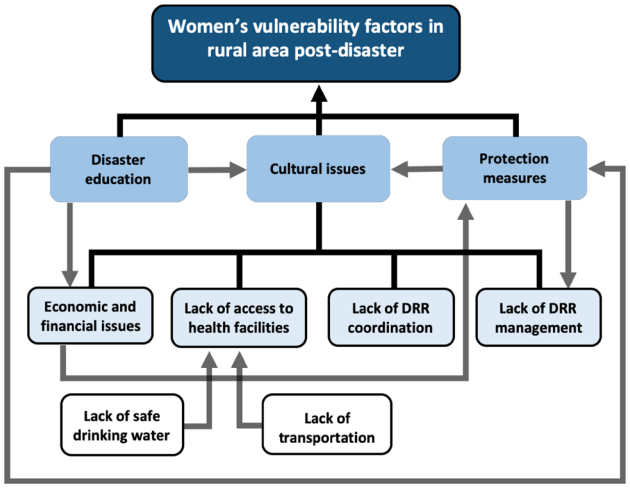

Fig. 4 Factors influencing rural women's post-disaster vulnerability in Sayad Village, Balkh Province, Afghanistan based on Grounded Theory (GT) analysis. Colors indicate the strength of the factor effect on vulnerability based on GT where darker blue shows a strong effect, light blue a medium effect, and white a low effect. The effect of one factor on another (the inter-factor effect) is shown with grey arrows, while the direct factor effect on vulnerability is shown with black arrows

Figure 4 also shows the interactions between these factors. Disaster education influences many factors and contributes substantially to the vulnerability of women in disasters. Culture, including traditional gender roles, is another important factor that affects women's post-disaster vulnerability. The male-dominated nature of emergency services has resulted in limited access for women to facilities such as health clinics with female doctors, and blocked distribution of special assistance due to lack of female DRR staff. DRR FG participants explained that shortage of female staff sometimes required borrowing a female staff member from partner NGOs to work in emergencies with their field team. In rural areas, culturally, women do not have the courage to speak to male staff and, specially, women cannot ask male staff to provide them with female specific items (such as hygiene cloths, maternity items, and so on). Women also cannot see male doctors for their gynecology-related problems (such as pregnancy or delivery). Women complained of lack of transportation at the time of disasters to carry the pregnant or lactated women with their babies to a health clinic or hospital. While in post-disaster situation all farmers lost their agriculture products and their economic condition deteriorated, women (widows and female head of households) specifically become poor, since they are able to reconstruct their houses or farms, thus they became more dependent on male relatives.

Table 7 Appearance of new relationships between factors (cells that contain "1" and italicized), after applying the interpretive structural model (ISM), that enhance women's vulnerability to disaster in Balkh Province, Afghanistan

Factors	Vulnerability	Disaster education	Economic issues	Cultural issues	Lack of disaster management	Lack of DRR coordination	Lack of safe drinking water	Lack of protection measures	Lack of transportation	Lack of health facilities
Vulnerability	0	0	0	0	0	0	0	0	0	0
Disaster education	0	0	0	0	0	0	0	*1*	0	*1*
Economic issues	0	0	0	0	0	0	0	0	0	*1*
Cultural issues	0	0	0	0	0	0	0	0	0	0
Lack of disaster management	0	0	0	0	0	0	0	0	0	0
Lack of DRR coordination	0	0	0	0	0	0	0	0	0	*1*
Lack of safe drinking water	0	0	0	0	0	0	0	0	0	0
Lack of protection measures	0	0	0	0	0	0	0	0	0	0
Lack of transportation	0	0	0	0	0	0	0	0	0	0
Lack of health facilities	0	0	0	0	0	0	0	0	0	0

4.3 Women's Vulnerability Factors Based on the Interpretive Structural Model

After applying the computer-aided calculation and analysis in ISM, some new relationships among the influencing factors emerged (Table 7). For example, disaster education had the same effect on protective measures and health facilities that the newly revealed relations of economic issues and poor interagency coordination had on health facilities, thus compounding the vulnerability of women in rural areas.

Based on the result of the ISM analysis, a new digraph emerges. The construction of the digraph follows the ISM rules. In ISM, all relationships are upward, thus all arrows are unidirectional going from level 1, at the bottom, towards the higher levels considering their effect on each other. Thus, the position of the factors is rearranged to show the upward influence of the structural relationships among them. The new relationships among factors identified by ISM are also added. After applying all the mentioned changes, a new map of vulnerability of women in rural areas emerges as shown in Fig. 5. Figure 5 shows the stratification of women's disaster vulnerability factors in the rural area. Disaster education shows a primary effect, hence it appears in the first layer. This shows the importance of disaster education according to the perception of the three FGs regarding women's vulnerability to disasters in Sayad Village. The digraph also shows that lack of access to health facilities plays an important role in the vulnerability of women during disasters in rural areas. These findings provide an enhanced picture of vulnerability for this rural community. It confirms that disaster education in this study is linked to many other vulnerability factors. In addition, we found that lack of health facilities is a serious problem for women.

The left-hand side of the figure shows five layers, where 1 (referring to level 1) indicates a strong effect. The colors indicate the strength of the effect as was identified previously using GT. Dashed lines indicate new relationships identified with ISM, while solid lines show relationships identified using GT.

4.4 Discussion

Our review of relevant literature highlighted lack of education, cultural issues, and insignificant protection measures as the main factors of women's vulnerability in disasters. By employing data from FGs, our study has confirmed the findings of previous studies. In our study community, women have not been able to participate in disaster prevention and training due to a lack of female DRR staff. This significant gap confirms the findings of Erikson (2014) and WHO (2011) that women are often

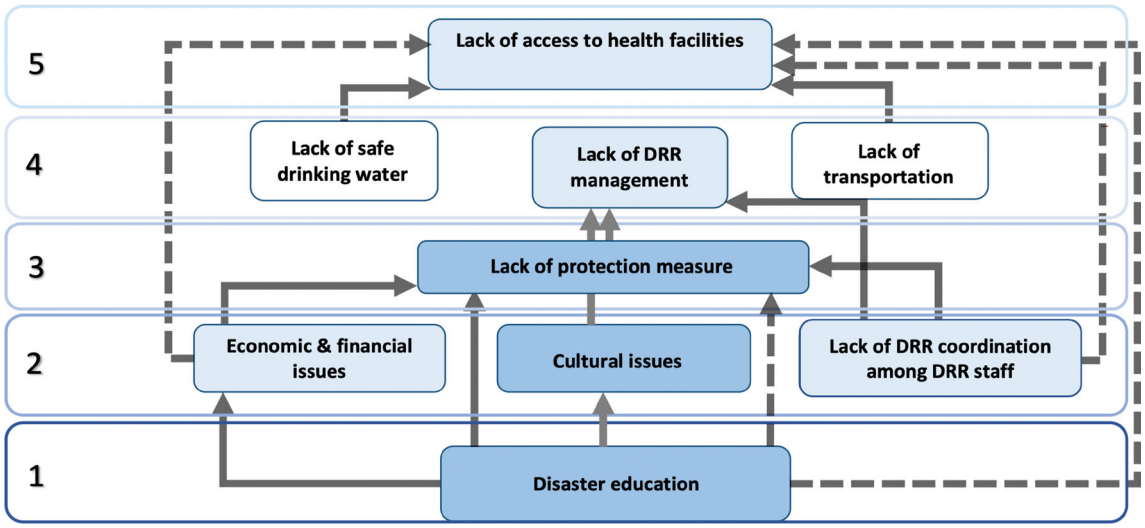

Fig. 5 Factors of vulnerability of women in Sayad Village, Balkh Province, Afghanistan exposed to disasters, based on the application of an Interpretive Structural Model. Colors indicate the strength of the factor effect on vulnerability based on GT where darker blue shows a strong effect, light blue a medium effect, and white a low effect. The effect of one factor on another (the inter-factor effect) is shown with grey arrows. Dashed grey arrows show new inter-factor effects identified after applying ISM. The figure layers from 1 to 5 indicate the factor effect strength based on ISM where 1 (referring to level 1) is strong effect, and 5 is weak effect

ignored in disaster prevention training, an exclusion that mirrors the limited access of women to education generally, and multiplies the influence of access to education as a factor in vulnerability.

The two focus groups in Sayad Village discussed how women's gender roles, and their roles as housewives and mothers, puts them at great risk during natural hazard emergencies. This increased vulnerability is particularly heightened when threats of flood and slope failure mandate rapid evacuation because women are tasked with removing survival supplies and crucial household belongings at the same time that they must try to guide their children and other household members to safety. These results agree with the findings of Enarson and Morrow (1998), Parkinson (2014), Isik et al. (2015), Fothergill (1996) and Gokhale (2008).

The present study found that unaccompanied women are the poorest residents in the village; after floods they must live with their relatives because they lack resources to rebuild their houses. This supports Enarson and Morrow's observation (1998) that single women and mothers tend to be poorer relative to men and may not have the resources to recover from disasters. Likewise, Gokhale's (2008) noted that the vulnerability of women is exacerbated by their limited access to resources in their own right. This occurs because rural women are usually working in the fields to help their husbands with agricultural work, an activity that does not generate any independent income. The household is financed by their husbands.

The main findings from this study show that the contributing factors to vulnerability, which have been mentioned in the Gender Standard in Disaster Risk Management of Afghanistan (GIZ 2010), still exist. These factors include: inadequate awareness and skills, absence of formal early warning systems and insufficient disaster preparedness, remoteness and poor connectivity to neighboring villages, poor mitigation capacity by public authorities, and a lack of public services in hazard-prone areas. The study shows that limited access to education and health facilities for women, lack of safe drinking water after a disaster, unsafe places for evacuation (not having a proper evacuation center), and restrictive socioeconomic structures all increase the vulnerability of women. These issues were recognized and highlighted in the FGs in Sayad Village, as was the need for improved flood management systems (for example, building of flood channels, retaining walls) and awareness-raising sessions for both men and women within their communities. Providing more female DRR trainers and female employees remains a major challenge.

The Afghan government, through ANDMA, tries to play an active role in disaster response, but has not been able to advance pre-disaster management due to limited human and economic resources. The Disaster Risk Management office staff in Kabul and Mazar-e-sharif expressed their concern about managing all disasters in recent years because the government does not have, nor does it allocate, enough resources to fund and train staff to prevent, mitigate, and respond to disasters.

Despite the limitations and problems identified in Sayad Village, which make women more vulnerable to disasters, it is important to illustrate the greater levels of

independence and increased knowledge and actions on disaster prevention in this rural area. For example, local people have mobilized to build a small bridge by themselves using local materials such as trees and stones from the surrounding mountains. They also built rudimentary water channels, often initiating the work and then, in later stages, receiving assistance from nongovernmental organizations to complete the work. These actions helped them to reduce the damage from disasters in their village, even if only for a short time as the channels get eroded by repeated flooding events. The rural community was also able to successfully establish a basic early warning system for itself by connecting with another community located upstream. These examples show that Sayad villagers have acted to protect themselves from disasters, but much more needs to be done.

4.5 Limitations of the Study

This study has provided valuable insights into the views and perceptions of local women, men, and DRR staff in Afghanistan regarding women's vulnerability to disasters. However, the study findings have limitations. First, the participants were not selected randomly; rather the participants of the FGs were recruited, informed, and gathered, prior to the research team's arrival in the community, by IOM female staff. IOM had already conducted work in the community and so we relied on their support given the high insecurity in the country due to the armed conflict by nongovernment military groups and warlords. For the same reasons, it was not possible to visit the community several times. Everything needed to be done in the presence of IMO personnel, who were accepted and respected by the community.

Participants in the male FG may not have openly talked and discussed the issues in detail because a female facilitator was present. It is culturally uncommon that a woman participates in a discussion with a male-only group. Furthermore, it is possible that the presence of the head of the village and the religious leader may have inhibited young men to speak more freely, in particular because the facilitator was a woman stranger. Thus, we believe the men may not have shared fully all the information they had, or there could be some bias in their responses. The FGs notes lacked some details about women's conditions; the authors had to contact the head office and IOM staff in Mazar by email and phone several times to obtain additional data. Nonetheless, given the limited information available and restricted access to rural areas of Afghanistan, the authors believe that this article is valuable as it presents a first glimpse of the problems faced by women in Afghanistan concerning disaster risks.

5 Conclusion

The main aim of the study was to better understand the barriers and factors that affect rural Afghan women and make them vulnerable to natural hazard-induced disasters. The study identified lack of disaster education, insufficient disaster protection measures, and cultural issues as the main factors of women's vulnerability pre-disaster. Furthermore, poor coordination among DRR agencies and economic and financial issues were identified as contributing factors of vulnerability of women pre-disaster. The study also found that all the factors of vulnerability of women pre-disaster also affect the vulnerability of women post-disaster. Inadequate disaster risk management, poor access to safe drinking water, interrupted access to transportation, and inaccessible health facilities were important factors in disaster vulnerability of women post-disaster.

The study showed that Sayad Village women play an active role in disaster situations by evacuating their children and elderly family members to higher ground and by rescuing household goods needed for their survival during the onset of a disaster. The women have taken their own initiative to set up an early warning system, and men in the village have also contributed to DRR by rebuilding the village bridge to the outside world and by digging drainage channels to divert water away from their homes. The study also found that these actions are insufficient, however, and that the various focus groups agreed that much more needs to be done. The establishment of a better early warning system, and disaster education and training for both men and women are needed. The main constraints for inclusion of women in disaster management activities are lack of an engendered DRR policy and strategy that should include the allocation of special budget for ANDMA's gender mainstreaming activities.

UNISDR (2009b), through its "Policy on Gender Mainstreaming in Disaster Risk Reduction (DRR)" called for gender sensitive sustainable environment policies. Explicit gender mainstreaming in DRR government policy in which women receive specific attention in disaster consideration through disaster education and the full disaster risk management cycle is urgently needed. Inclusion of women in disaster education, planning activities, and decision making for DRR can help reduce loss of life, property, and reduce poverty, as well as promote sustainable development. Therefore, gender mainstreaming in disaster risk reduction policies should be promoted to reduce women's vulnerability to disasters and improve women's role in DRR.

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References

Afghanistan, Islamic Republic of. 2007. The national risk and vulnerability assessment 2005: Afghanistan. Kabul: Ministry of Rural Rehabilitation and Development and the Central Statistics Office. https://reliefweb.int/sites/reliefweb.int/files/resources/BF0DA64F0CCA5CE4C1257648004551AC-Full_Report.pdf. Accessed 30 May 2019.

Afghanistan, Islamic Republic of. 2008a. Afghanistan national development strategy (ANDS) (2008–2013). https://www.undp.org/content/dam/afghanistan/docs/ANDS_Full_Eng.pdf. Accessed 10 Jun 2019.

Afghanistan, Islamic Republic of. 2008b. National action plan for the women of Afghanistan, 2008–2018. Kabul: Ministry of Women's Affairs. http://ago.gov.af/Content/Media/Documents/NAPWA382016145514117553325325.pdf. Accessed 10 Jul 2018 (in Dari and English).

Afghanistan, Islamic Republic of, Ministry of Justice. 2012. Afghanistan disaster mitigation law. Islamic Republic of Afghanistan, Ministry of Justice Official Gazette. Issue No. 1089 (in Dari and Pashto languages). Afghanistan, Islamic Republic of, Ministry of Women's Affairs. 2017. National action plan for the women of Afghanistan 2007–2017 (NAPWA). http://extwprlegs1.fao.org/docs/pdf/afg149120.pdf. Accessed 15 Mar 2108.

ANDMA (Afghanistan National Disaster Management Authority). 2010. Afghanistan national disaster management strategic plan. http://www.andma.gov.af. Accessed 10 Jun 2019.

Ariyabandu, M. 2009. Sex, gender and gender relations in disasters. In *Women, gender, and disaster: Global issues and initiatives*, ed. E. Enarson, and P.G.D. Chakrabarti, 5–17. Thousand Oaks, CA: Sage.

Ariyabandu, M., and D. Foenseka. 2006. Do disasters discriminate? In *South Asia network for disaster mitigation: Tackling the tides and tremors*, ed. D. Nivaran, 23–40. South Asia disaster report, 2005, Islamabad.

Asia Foundation. 2016. *A survey of the Afghan people 2016.* https://asiafoundation.org/wp-content/uploads/2016/12/2016_Survey-of-the-Afghan-People_full-survey.Apr2017.pdf. Accessed 28 Jun 2019.

Attri, R., N. Dev, and V. Sharma. 2013. Interpretive Structural Modelling (ISM) approach: An overview. *Research Journal of Management Sciences* 2(2): 3–8.

Barakat, S., and G. Wardell. 2001. Capitalizing on capacities of Afghan women: Women's role in Afghanistan's reconstruction and development. Geneva: International Labour Organization.

Bowen, G.A. 2006. *Grounded theory and sensitizing concepts*. Cullowhee, North Carolina, USA: Western Carolina University.

Dupree, N.H. 2002. Cultural heritage and national identity in Afghanistan. *Journal Third World Quarterly* 23(5): 977–989.

Enarson, E. 2010. A gendered human rights approach to rebuilding after disaster. In *Rebuilding sustainable communities for children and their families after disasters: A global survey*, 13–28. Cambridge Scholars Publishing in association with GSE Research.

Enarson, E., and B.H. Morrow. 1998. Why gender? Why women? An introduction to women and disaster. In *The gender terrain of natural disasters: Through women's eyes*, ed. E. Enarson, and B.H. Morrow, 1–8. Westport, CT: Praeger Publishers.

Enarson, E., and L. Meyreles. 2004. International perspectives on gender and disaster: Differences and possibilities. *International Journal of Sociology and Social Policy* 24(10/11): 49–93.

Enarson, E., A. Fothergill, and L. Peek. 2007. Gender and disaster: Foundations and new directions for research and practice. In *Handbook of disaster research,* ed. H. Rodríguez, W. Donner, and J.E. Trainor, 205–223. New York: Springer.

Erikson, C. 2014. *Gender and wildfire: Landscapes of uncertainty.* New York: Routledge.

Evans, G.L. 2013. A novice first author's first walk through the maze of grounded theory: Rationalization for classical grounded theory. *Grounded Theory Review: An International Journal* 12(1): Article 37.

Fothergill, A. 1996. Gender, risk and disaster. *International Journal of Mass Emergencies and Disasters* 14(1): 33–56.

GIZ (Deutsche Gesellschaft für Internationale Zusammenarbeit) Afghanistan. 2010. *Gender standards in disaster risk management in Badakhshan, Afghanistan*, 2010. http://www.solutionexchange-un.net/repository/af/gen/DRMGenderStandardBadakhshan-GovernorOffice-01Aug2013.pdf. Accessed 20 Apr 2019.

Glaser, B.G., and A. Strauss. 1967. *The discovery of grounded theory: Strategies for qualitative research*. New York: Aldine.

Gokhale, V. 2008. Role of women in disaster management: An analytical study with reference to Indian society. In *Proceedings of the 14th world conference on earthquake engineering*, 12–17 October 2008, Beijing, China.

Griffin, C. 1986. Qualitative methods and female experience: Young women from school to the job market. In *Feminist social psychology: Development theory and practice,* ed. S. Wilkinson, 173–191. Milton Keynes, England: Open University Press.

Hashimi, S.K. 2011. A case study on Horticulture and Livestock Project, Ministry of Agriculture, Irrigation and Livestock. University of Applied Science, the Netherland.

Horton, L. 2012. After the earthquake: Gender inequality and transformation in post-disaster Haiti. *Gender and Development* 20(2): 295–308.

Ikeda, K. 1995. Gender differences in human loss and vulnerability in natural disasters: A case study from Bangladesh. *Indian Journal of Gender Studies*. https://doi.org/10.1177/097152159500200202.

IFAD (International Fund for Agriculture Development). 2012. Afghanistan: Rural microfinance and livestock support programme—Mid-term review report. https://operations.ifad.org/documents/654016/2d474d2a-e32a-4cc6-8670-a5d4172cae1a. Accessed 22 Feb 2018.

IOM (International Organization for Migration). 2015. Humanitarian response. http://afg.humanitarianresponse.info/. Accessed Jul 2016.

Irshad, H., Z. Mumtaz, and A. Levay. 2012. Long-term gendered consequences of permanent disabilities caused by the 2005 Pakistan earthquake. *Disasters* 36(3): 452–464.

Isik, O., N. Ozer, and F. Ozcep. 2015. Are women in Turkey both risks and resources in disaster management? *International Journal of Environmental Research and Public Health* 12(6): 5758–5774.

Janes, F.R. 1988. Interpretive structural modelling: A methodology for structuring complex issues. *Transactions of the Institute of Measurement and Control Journal* 10(3): 145–154.

Jones, M., and I. Alony. 2011. Guideline to use of Grounded theory in doctoral studies: An example from the Australian film industry. *International Journal of Doctoral Studies* 6: 95–114.

Krueger, R.A., and M.A. Casey. 2000. *Focus groups: A practical guide to applied research*, 3rd edn. Thousand Oaks, CA: Sage.

Krüger, F., G. Bankoff, T. Cannon, B. Orlowski, and E.L.F. Schipper. 2015. *Cultures and disasters. Understanding cultural framing in disaster risk reduction*. London: Routledge.

Madriz, E. 2003. Focus groups in Feminist research. In *Collecting and interpreting qualitative data,* ed. N. Denzin and Y.S. Lincoln, 363–384. Thousand Oaks, CA: Sage.

Mileti, D.S. 1999. *Disaster by design: A reassessment of natural hazards and disasters in the United States.* Washington, DC: Joseph Henry Press.

Nelson, V., K. Meadows, T. Cannon, J. Morton, and A. Martin. 2002. Uncertain predictions, invisible impacts, and the need to mainstream gender in climate change adaptations. *Gender & Development Journal* 10(2): 51–59.

Neumayer, E., and T. Plümper. 2007. The gendered nature of natural disasters: The impact of catastrophic events on the gender gap in life expectancy, 1981–2002. *Annals of the Association of American Geographers* 97(3): 551–566.

Parkinson, D. 2014. Women's experience of violence in the aftermath of the black Saturday bushfires. Doctoral dissertation. Monash University, Australia. https://au-east.erc.monash.edu.au/fpfiles/7682236/monash_153836.pdf. Accessed 30 Jun 2018.

Plan International. 2013. *In double jeopardy: Adolescent girls and disasters.* The seventh report in Plan International's annual State of the World's Girls series. Surrey, UK: Plan International.

Plummer, M., and L.E. Young. 2010. Grounded theory and feminist inquiry: Revitalizing links to the past. *Western Journal of Nursing Research* 32(3): 305–321.

Reuters. 2018. Reuters world news. 15 June 2011. Afghanistan is most dangerous country for women. https://www.reuters.com/article/us-women-danger/afghanistan-is-most-dangerous-country-for-women-idUSTRE75E31R20110615. Accessed 30 Jan 2018.

Reyes, D.D., and J.L. Lu. 2015. Gender dimension in disaster situations: A case study of flood prone women in Malabon city, Metro Manila. *Journal of International Women's Studies* 18(4): 69–86.

Saad, S.G. 2009. Environmental management and disaster mitigation: Middle Eastern gender perspective. In *Women, gender and disaster: Global issues and initiatives*, ed. E. Enarson, and P.G.D. Chakrabarti, 89–98. Thousand Oaks, CA: Sage.

Sahu, G.P. 2008. Interpretive structural modeling. Allahabad, India: School of Management Studies, Motilala Nehro National Institute of Technology.

Samiullah, A. Rahman, and R. Shaw. 2015. Gender and disaster risk reduction in Pakistan. In *Disaster risk reduction approaches in Pakistan*, ed. A. Rahman, A.N. Khan, and R. Shaw, 379–394. Tokyo: Springer.

Sherraden, M. 1995. How to do focus groups. In *IDA evaluation handbook: A practical guide and tools for evaluation of pioneering IDA projects*, ed. M. Sherraden, D. Page-Adams, S. Emerson, S. Beverly, E. Scanlon, L.C. Cheng, M.S. Sherraden, K. Edwards, and L. Johnson, Section 5.1. http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.591.2297&rep=rep1&type=pdf. Accessed 10 Jun 2019.

Strauss, A., and J. Corbin. 1998. Grounded theory in practice: Data management and analysis methods. In *Collecting and interpreting qualitative materials*, ed. N.K. Denzin and Y.S. Lincoln, 259–310. Thousand Oaks, CA: Sage.

Sushil. 2012. Interpreting the interpretive structural model. *Global Journal of Flexible Systems Management* 13(2): 87–106.

UNESCO (United Nations Educational Scientific and Cultural Organization). 2018. Afghanistan. Montreal, Canada: UNESCO Institute of Statistics. http://uis.unesco.org/country/AF. Accessed 16 Apr 2019.

UNICEF (United Nations Children's Fund). 2002. Afghanistan is among worst places on globe for women's health. Press release. https://www.unicef.org/newsline/02pr59afghanmm.htm. Accessed 10 Jun 2019.

UNISDR (United Nations International Strategy for Disaster Reduction). 2009a. The disaster risk reduction process: A gender perspective. Geneva, Switzerland: Gender and Disasters Network. https://www.preventionweb.net/search/pw#query=the+disaster+risk+reduction+process:+gender+perspective%26hits=20%26sortby=default%26view=pw. Accessed 24 May 2019.

UNISDR (United Nations International Strategy for Disaster Reduction). 2009b. Making disaster risk reduction gender sensitive. https://www.unisdr.org/files/9922_MakingDisasterRiskReductionGenderSe.pdf. Accessed 24 Jul 2017.

UNISDR/UNDAW (United Nations International Strategy for Disaster Reduction/United Nations Division for the Advancement of Women). 2001. Environmental management and the mitigation of natural disasters: A gender perspective. Report of the Expert Group Meeting, Ankara, Turkey, 6–9 November 2001. New York: Division for the Advancement of Women, Department of Economic and Social Affairs.

UNISDR (United Nations International Strategy for Disaster Reduction). 2015. *Sendai framework for disaster risk reduction 2015–2030.* https://www.unisdr.org/we/inform/publications/43291. Accessed 9 May 2019.

United Nations General Assembly. 2005. GA/10384. Steps to reform UN should unite, not divide, international community. https://www.un.org/press/en/2005/ga10384.doc.htm. Accessed 20 May 2019.

Wakefield, S. 2005. *Gender and local level decision making: Findings from a case study in Mazar-e Sharif.* Kabul, Afghanistan: Afghanistan Research and Evaluation Unit.

Warfield, J.N. 1974. Developing interconnection matrices in structural modeling. *IEEE Transaction on Systems, Man, and Cybernetics* SMC-4(1): 81–87.

Warfield, J.N. 1976. Implication structure for system interconnection matrices. *IEEE Transactions on Systems, Man, and Cybernetics* SMC-6(1): 18–24.

Watson, R. 1978. Interpretive structural modeling-A useful tool for technology assessment? *Journal of Technological Forecasting and Social Change* 11(2): 165–185.

WHO (World Health Organization). 2011. Gender, climate change and health. Geneva: Public Health & Environment Department (PHE), Health Security and Environment Cluster (HSE), World Health Organization (WHO).

Wuest, J. 1995. Feminist grounded theory: An exploration of the congruency and tension between two traditions in knowledge discovery. *Qualitative Health Research* 5(1): 125–137.