

Socio-economic and Health Impacts of Floods in a Trans-Himalayan Ecosystem

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Abstract

The present study aims to explore the aftermath of the September 2014 floods in some areas of Srinagar. A questionnaire based survey was conducted in three severely impacted areas of Srinagar (Bemina, Rajbagh, Shivpora). Although there were no cases of bereavement but majority of the families suffered huge loss of economy. However, Bemina suffered from huge loss of livelihood (50%) as compared to other study areas. As the flood fury was believed to occur almost after 100 years, the pre-preparedness was not thus well executed. Post flood health problems were primarily caused due to contact with the contaminated water, growth of mould and dampness in buildings resulting in physical injuries, acute illness (gastro intestinal problems, skin infections, respiratory problems), chronic diseases (hyper tension, asthma, diabetes) and ill mental health (agitated behaviour, depression, anxiety, sleeplessness, suicidal thoughts, upsetting thoughts/dreams and over smoking).

Keywords: Natural disaster; Flood; Socio-economic; Health; Psychological disorder; Srinagar

Introduction

A disaster has been defined as a disruption of human ecology that exceeds the capacity of the community to function normally [1-5]. India has a unique geophysical setting and socio economic conditions with five distinct regions, the Himalayas, the plains, the hilly parts of peninsula, the coastal zone and the deserts [6] which are highly vulnerable to different kinds of disasters [3,7-10]. Similarly, Jammu and Kashmir has a long history of disasters owing to its peculiar topography; rugged terrain, extreme weather conditions, under developed economy and the commonly occurring disasters include earthquakes, landslides, cloudbursts, avalanches and floods [11,12]. One of the commonly occurring disasters is flooding [13] which usually occurs when a river bursts its bank or when there is a great deal of heavy rainfall [14]. It has some principal types: Areal type floods can happen on flat or low lying areas when water is supplied by rainfall or snowmelts [15], riverine type floods occur in all types of rivers and mostly flash floods occur in small rivers [16,17], estuarine and coastal type occur along sea shores due to breaching of bank shores [18].

In September 2014, Jammu and Kashmir suffered from disastrous floods across many parts of its districts [19] caused by torrential rainfall coupled with rise in the levels of Jhelum River. Environmentalists have claimed deforestation in the catchment areas of rivers, unplanned construction in flood plains, rampant dumping of garbage in the rivers, weak embankments of the River Jhelum and over use of chemical fertilizers by farmers as the main and indirect causative agents of the floods in the state [20].

Study area and study sites

Srinagar city (Figure 1) has a geographical extension of 34°05'24"N and 74°47'24"E, average elevation of 1585 m (a.m.s.l) and is spread out in an area of 294 km² with a total human population of 1,273,312. Floods occurred in almost all parts of City centre, but the most adversely affected areas were Bemina, Rajbagh and Shivpora which were thus selected as the study sites. The study sites were inundated for a considerable period of time (25-28 days) making them suitable for conducting the survey so as to fulfill the requirements of the paper (Table 1).

Site Name	Geographical Location			
	Latitude (N)	Longitude (E)	Elevation (m)	Distance From the City Centre (Km)
I. Bemina	34°04'45"	74°46'18"	1576	4
II. Shivpora	34°03'58"	74°49'30"	1592	3
III. Rajbagh	34°04'10"	74°49'30"	1592	3.2

Table 1: Geographical characteristics of study sites.

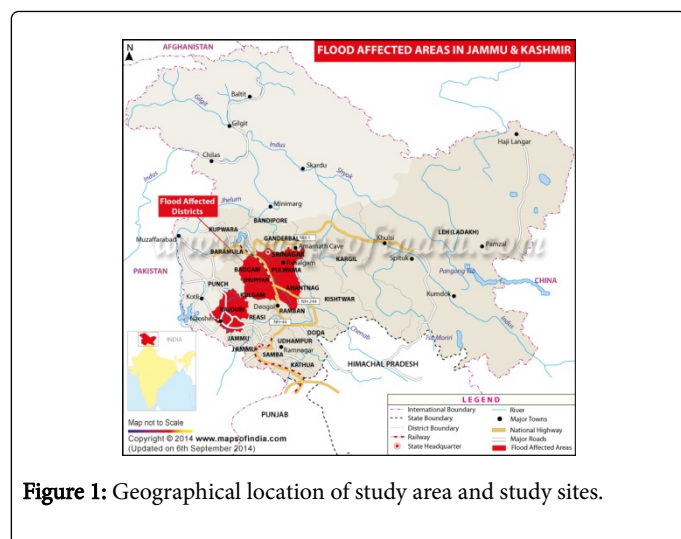


Figure 1: Geographical location of study area and study sites.

Methodology

A survey based on door to door knocking of 30% of the households was conducted at different study sites by interviewing the locals [21], considering different parameters [22], the data of which was collected with a purposefully designed questionnaire [23].

Results and Discussion

For the purpose of the paper, data regarding various parameters was collected from various sources and the following results were derived:

S. No.	Parameter	Bemina	Shivpora	Rajbagh
1	Flood warning	40	83	16
2	Evacuation	50	86	100
3	Rescue by emergency services	13	50	17
4	Pre preparedness	25	33	07
5	Bereavement	0	0	0
6	Loss of Property and possessions	100	100	100
7	Loss of Livelihood	50	26	23
8	Restoration works	56	46	66

Table 2: Flood Preparedness and post flood response with losses suffered.

The data in Table 2 and Figure 2 clearly reflects that the majority of the population that received flood warning was Shivpora (83%) owing to the fact that they had stayed back till the receipt of the warning and took the warning seriously. Flood warning is a message given when there are predictions that further heavy rains are still possible and it is provided via radio stations, door knocking, announcements and telephone calls to selected residents [24]. The process of evacuation was more effective in Rajbagh (100%) out of which 40% vacated on their own to the safer places and others were evacuated by locals or rescue services. During evacuation people should usually tend to move to safer places because of the fact that their buildings would flood [24,25]. Rajbagh residents had to evacuate as their houses were inundated while as the reason behind least evacuation in Bemina (50%) was that the families stayed in the first floors which were not flooded. The rescue operations were effectively carried in Shivpora (50%) while as least help from rescue operations was provided in Bemina (13%) owing to the fact that the residents had safe upper storey's and were relatively safer than other two areas. Emergency services are usually provided by the collaboration of government, private sectors, NGO's [26]. Further, the pre preparedness was reported to be effective among the residents of Shivpora (33%) as they shifted their valuable possessions to higher levels, parked the vehicles to the safer areas while as the residents of Rajbagh could least to protect their

homes (7%) as the water gushed their houses in late hours. Disaster pre preparedness is an initiative that is intended to increase readiness and knowledge among various stake holders regarding the risks, preventive measures and other disaster related information [27,28].

The data further reveals that there were no cases of bereavement in the study sites, the reason being healthy evacuation and least contact of individuals with the stormy whirl of flood water. All the study sites suffered from damage of property and possessions (100%) but the severity of damage was more prominent in Rajbagh as it is a high flood risk area. During floods, there is loss of material and non-material assets and the effects of damage to life and property are severe for several years, resulting in livelihood vulnerability [29,30]. The loss of livelihood was worst in Bemina (50%) as the residents owned many shops/business units in the vicinity which were completely damaged affecting them occupationally. Livelihood affects people occupationally and it comprises the assets that determine the living gained by the individual/household [31,32]. The renovation works were carried in Rajbagh on a large scale (66%) as it was worst hit during the floods, making it a necessity to initiate the restoration works at an earliest. Restoration means to jump back [33,34] and it is the adaptive capacity of individuals that enables households to learn and self-organize,

which forms the core of livelihood resilience, its structure and functions [35,36].

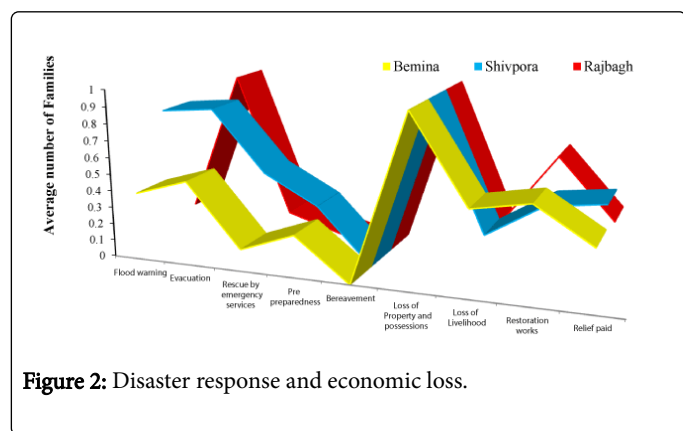


Figure 2: Disaster response and economic loss.

S. No.	Parameters	Bemina	Shivpora	Rajbagh
Health Issues				
1	Physical injuries	15	14	09
2	Acute illness	08	09	11
3	Chronic diseases	02	09	03
4	Post-Traumatic Stress Disorder	55	56	47
5	Other Psychological problems	06	60	60

Table 3: Health status of the impacted population during and after floods.

A perusal of data in Table 3 and Figure 3 deals with the health issues faced by the flood victims and it shows that the cases of physical injuries were dominant in Bemina (15%) which included cuts, abrasion, fracture, amputation, sprains/strains. Evacuation, post flood cleaning activities and slipping into pits were the main reasons behind the occurrence of physical injuries among the individuals. Flood related injuries may occur as individuals attempt to remove themselves or their family from danger resulting mostly in strains, lacerations, abrasions or bruises [37] and the most common reasons for flood infected non-fatal injuries are cuts, falls, being struck by objects [38]. The cases of acute illness were reported to be highest among individuals of Rajbagh (11%) and it included conjunctivitis, dehydration, skin infections, fever, diarrhea, vomiting, joint or muscle pain, respiratory problems (congestion, cough, sore throat). The residents complained of these illnesses because of exposure to moulds and dampness in their buildings, unhygienic conditions, polluted water supplies, deteriorated air quality. One of the categories of diseases after a flood is bodily exposure to water which includes eye infections, respiratory illness, fungal skin diseases [39] and during the flood events earache, gastro intestinal infection, asthma, skin diseases, psychological distress are commonly seen [40]. The cases of chronic diseases were mainly prevalent in residents of Shivpora (9%) which included hyper tension and asthma. Hyper tension was reported primarily among the elderly people while as asthma was enhanced among the asthma patients, these diseases were credited to the damage faced by the people and the accumulation of dust post floods. Most of

the flood associated adverse health effects are non-infectious such as injuries, skin effects, carbon monoxide poisoning and exacerbation of chronic diseases due to lack of access to health care, medication and safe drinking water [41] while as the quality of air is likely to decrease after the flood has receded leading to increasing incidences of asthma and other respiratory diseases [42].

The dominant health issues during the floods was the mental ill health and it prevailed in almost all the families of the study sites with Shivpora having the maximum cases of post traumatic stress disorder (56%). It erupted due to the losses faced by the people, emotional breakdown and by the reminders of the incident. The post-traumatic stress disorder included agitated behavior, anxiety, depression, suicidal thoughts, sleeplessness, drug intoxication (sedatives and anti depressants), nightmares. Mental ill health is usually brought up by geographical displacement during the floods [43], anxiety is characterized by excessive worry, restlessness, irritability as well as physical symptoms [44], depression is the second most common condition to arise in the aftermath of a disaster [45] and the other factors noted in the literature includes inability to control or predict the event, the possibility that the disaster will reoccur [46]. The other psychological problems faced by the people were reported from all the study sites (60%) which included over smoking, constant thoughts of the incident and complicated grief. Psychological health effects after a flood include anxiety, depression, lethargy, sleeplessness, anger, mood swings, suicidal thoughts, alcoholism/over smoking, nightmares [47] and survivors are likely to have had a greater exposure to life threat, create additional stressors and provide a constant reminder of the incident [46].

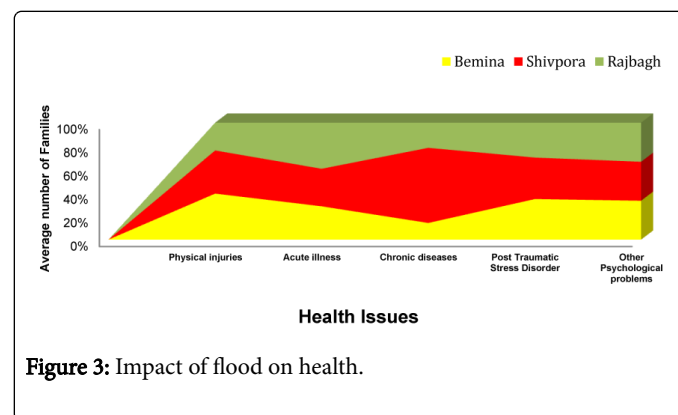


Figure 3: Impact of flood on health.

Conclusion

The floods overall had a huge impact on livelihood, property and possessions in all the study sites which mainly erupted due to delay in issuance of flood warning or the non-serious approach of households towards any such warning, improper evacuation process, lack of rescue operations and pre-preparedness among the individuals. As far as the health is considered it was deteriorated by certain factors like dampness in buildings, contact with contamination, lack of access to health care's and post flood cleaning activities. The health issues included physical injuries, acute illness, chronic diseases and mental ill health which were prevalent during post floods scenario. The impacts of the floods could have been lessened by issuing a timely flood warning and proper pre-preparedness plan, apt evacuation process, proper medication and a suitable management or rehabilitation plan.

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