Review of Literature

The literature review explores natural hazards and the human responses to those hazards by disaster victims. The review keeps in mind the perspective of research problem with many facets and brings into focus the problem enabling the design of an appropriate survey. Where information is lacking in journals or books the researcher has presented information from secondary data reports or the minutes of meetings held with the experts in disasters from the community.

Introduction

Natural and human caused calamities are common globally. Disasters are one of them which come without prior warning with increased, magnitude, complexity, frequency and economic impact. A hazard through disaster poses threats to people, community and nations. More than 200 times the earth had faced natural disasters, recording loss of around millions of people and property. Damage as % of GDP was greater in developing countries. India because of its geographical structure is considered worst among disaster prone country. Poor topographical features, dense population, pollution give access to manmade and natural disasters. (Srivastava, 1997)

No one expects Disasters, but when they happen, they create havoc around the world. Every year, millions of people face and experience the bitter and terrifying consequences of disaster. As a result it affects the community and finally the country faces loss of its habitants, communities and most of all the emotional hurt of bruised nation, leaving survivors to suffer its post affects by living in constant fear, depression and stress. (Clark, 1997)

Man has given access to natural disasters by creating hazardous environment causing escalated frequency and severity of natural disasters. Deforestation, concrete jungle, and playing with natural resources to satisfy the hunger of becoming rich has made a man to forget the value of earth and its benefits. (Rao, 1997)

During the time span of last thirty years, India had been hit by 431 major disasters. Prevention web statistics around one hundred and fifty crores were have

witnessed the wrath of disasters in last three decades, costing almost forty eight hundred crores loss of property and other valuables**.** (Srivastava, 1997)

Disaster creates an imbalance between social, health, economic, and environmental condition. 'Floods are traumatic events that are experienced by many people and may result in a wide range of mental and physical ailments'. (Norriset al., 2002).

Children, pregnant ladies, aged humans, malnourished human beings and those who're sick or immune compromised, are in particular prone when a disaster moves and take a highly excessive percentage of the sickness burden related to emergencies. Poverty and its common outcomes including malnutrition, homelessness, poor housing and destitution – is a first-rate contributor to vulnerability. (WHO, 2014)

Wide range of health problems, deaths and diseases are caused by calamities. Cloud bursts are particularly devastating disasters and have huge physical and psycho-social impacts on human life. Cloud burst in hilly areas are very common during rainy seasons, costing damage of human life and property specially the agricultural land. (Noij,1996) Disasters stimulate threatening conditions to one's life and the impact is lifelong. (Berg et al., 2008)

India is hit by one major natural disaster or the other almost every year whereas; the loss of life is accompanied by losses of the magnitude that is difficult to comprehend. (Sharma, 2005)

Disasters in Uttarakhand

During the last one hundred years, there have been a series of disasters in the Himalayan belt, earthquakes, flash floods and landslides being the major ones. (Nanda et al., 2015)

Talking about northern region of Uttarakhand, it's covered with mountains, extended in 53,483 square kilometres, composing landmass of 63 percentages of Indian sole. (Sing, 2008)

Climatic conditions are evidently different in Uttarakhand region. Alternation in temperature can be seen in different altitude. The wide range of area could be very hot during summer season and at the same time in other part of the region one can enjoy the snow fall. According to national wetland Atlas January is considered the coldest month. (National Wetland Atlas, 2012)

"The state consists of 320 km lengthy stretch of the mountains among the Kali river forming the Indo-Nepal border in the east and the lots-Pabar valleys forming the border of Himachal Pradesh within the west". (Nanda et al., 2015)

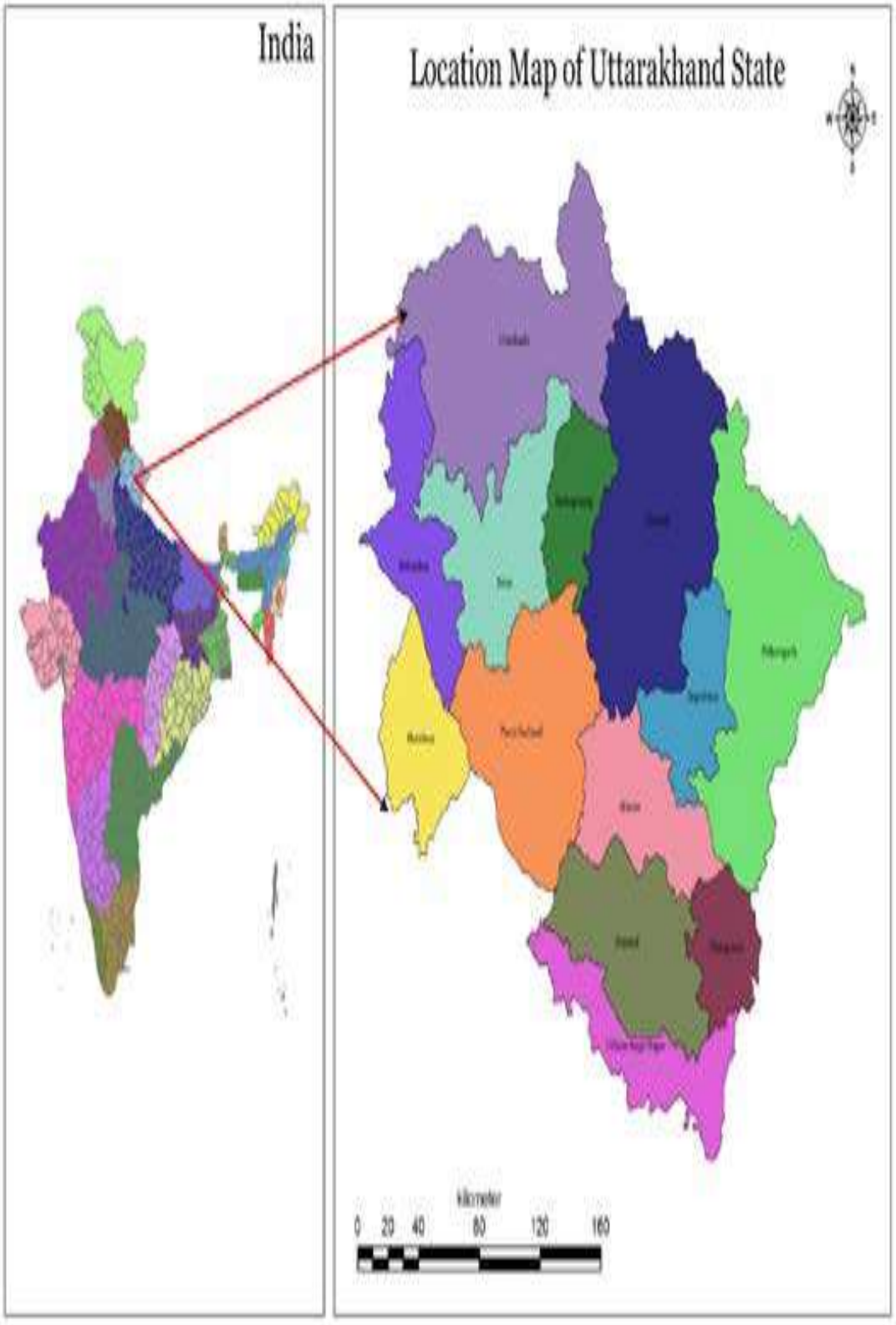

Figure No: 6Location Map of Uttarakhand in India

As a state of river and mountains all around, the state has always been living under climatic threat of cloud burst, floods, landslides and flash floods etc. The incidents of disaster has increased with growing deforestations. Flood in 2013 is one of the great example of natural disasters but the loss was more because of illegal constructions at upper regions. It was a multiday cloudburst affected by massive flash floods. The history will remember the days of 14th June to 17th June (Das, 2013)

"A massive landslide (in the north-east region of the Kedar valley) and heavy rainfall (in the north-west of the Kedar valley) occurred at the same time and formed a small lake". (Kumar, 2013)

"About 14 km pedestrian route between Gaurikund and Kedarnath was completely washed away; maximum damage occurred in Kedarnath, Guiaya, Lenchuri, Ghindurpani, Rambara, Gaurikund and downstream area up to Rudrapryag; total of 5000 human lives were lost over 5400 people were reported missing; the numerous side effects of the rainfall destroyed the state's economic lifelines over 9000 km of roads and 225 bridges were damaged and 61 hydroelectric power plants, 465 km distribution lines and 377 transformers were destroyed". (Nanda et al., 2015)

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"If 292 proposed and under construction dams in Himalayas are built, then Ganga basin would have the highest number of dams (1/18 km of river channel dammed) in the world, followed by the Brahmaputra (1/35 km) and the Indus (1/36 km)" (Kumar, 2013)

Figure No: 2 Landslides in Rudraprayag - Guptkashi road

Post Disaster Health Assessment

To provide holistic care to disaster survivors, detailed information regarding health must be obtained. Deep insight and prevention majorly depends on post disaster assessments tool. (Berg et al., 2008)

Disaster controls have to no longer only recognise on acute health care but different outcomes also that can affect the health of the populace and encompass economic issues evaluation. (Berg et al., 2008)

Research studies have brought to attention the fact that bodily signs and symptoms, except intellectual fitness troubles are part of the distress response following annoying publicity**.** (Berg B et al., 2008) (Lang et al., 2007)

A well being outcome evaluation after disaster allows to discover the group of survivors chance to develop chronic health troubles and occurrence of continual mental problems including post-traumatic strain disease than the others. (Grievink et al., 2004)

Studies with more insights in psychological aspects with physical health will help to improve less causality during and after disaster. (Berg B et al., 2008)

Sharma et al 2014 in a study reported that people died because of rainfall, chilling nights, scarce resources for medical help, food water and shelters. Approximately 4200 villages lost its road connectivity. (Sharma et al., 2014)

PTSD

During disasters, many more people are affected. The impact may not be immediate but studies shows the positive relationship between disaster and psychological problem. (Galea et al., 2005), (Norris et al,. 2001), (Rubonis & Bickman, 1991)

“One of the most debilitating effects of traumatic experience is a condition called Posttraumatic Stress Disorder (PTSD)”. “This disorder is very common among victims/survivors of tormented exposure”. “The current literature suggests that factors contributing to increased risk of developing PTSD can be caused by many variables, including exposure to traumatic events”. (Lang et al., 2007)

“PTSD is characterized by intrusive thoughts, nightmares and flashbacks of past traumatic events, avoidance of reminders of the trauma, hyper vigilance and sleep disturbance”(Ahmadizadeh, 2010)

“The diagnosis of PTSD (as with all psychiatric disorders) is ideally made by a trained mental health professional following the criteria established in the DSM”. “Many post disaster studies make use of structured screening tools that have been shown to be valid instruments for the assessment of PTSD either by clinically trained persons or by laypersons”.(American Psychiatric Association, 1980) (Galea et al., 2005)

It's not unusual for many behavioural responses for disasters and catastrophic events. The height of the mental issues amongst survivors happens within the first

year after the onset of the catastrophe. The mental troubles because of disaster might also last for years if not dealt with early. (Norris,et al., 2001)

Young & Breslau, 2004 study reported that “The sample raw mean ± SD for 24-hour dopamine levels was 381.5± 34.8 µg/24 h; epinephrine, 11.0 ± 9.1 µg/24 h[60.1 ± 49.7 nmol/d]; and nor-epinephrine, 50.3 ± 8.2 µg/24h [297.3 ± 48.5 nmol/d]”. “There had been sizeable consequences of group membership at the 3 catecholamine ranges”. “The group with PTSD had higher implied degrees of all 3 urinary catecholamine’s as compared with the uncovered to trauma without PTSD and no exposure groups”. “Group wise comparisons also discovered tremendous differences among the uncovered to trauma without PTSD and no exposure groups in dopamine (P = .02) and epinephrine (P = .02) ranges, despite the fact that inside the contrary direction from the expected (i.e. lower in the uncovered to trauma without PTSD group than inside the no exposure organization)”. “Subjects with beyond vs current PTS did no longer range extensively on any catecholamine measure (*P*>.25)”. (Young & Breslau, 2004)

In a study by Nasar A, Zulqarnain S, Inayat A, Khan M N S (2016) study results showed that most common disorder found among flood victims was Posttraumatic Stress Disorder (PTSD) followed by Generalized Anxiety Disorder and Major depressive Disorder. After a typhoon disaster 61.93% of the victims showed positive results in screening for psychological stress symptoms and 399 (7.8%) were tested for having apparent PTSD symptoms.(Guo et al., 2016)

Health -QOL of Disaster Victims

In a study Norris, et al., 2001stated that comparing the two different locations close to the epi-center of the earthquake, the closest location group "reported poorer physical health as measured by WHOQOL-BREF and more psychological symptoms in terms of somatisation and anxiety".

Quality of life (QOL) according to WHO 1995 is "individuals perception of their position in life in the context of the culture and value systems in which they live and relation to their goals, expectations, standards and concerns"

In a region that has been significantly tormented by a drought, mortality may also increase sharply due to protein malnutrition (kwashiorkor) or calorie malnutrition (marasmus). Vitamin deficiencies, such as a lack of nutrition A, can result in particular outcomes such as xerpohthalmia and infant blindness. Long standing malnutrition can accelerate the problems result in expanded rates of disorder and mortality and restriction of the overall populace's functionality. (Dotto, 2002)

Xiangdong W, Huabiao Z, Chengzhi Z , Yucun S, Naotaka S 2011 reported that victims closes to the locations of an earthquake had poorer wellbeing as measured with the aid of standardized instruments and greater mental signs in terms of somatisation and tension.

The veterans in Gulf War reported physical health complaints and the results showed that the most common symptoms were back pain (mean = 1.96, SD = 0.97),

fatigue (mean = 1.90, SD = 0.88), muscle pain (mean = 1.69, SD = 0.85) and difficulty falling asleep (mean = 1.53, SD = 0.91). (Engel et al., 2000)

Post – disaster assessments could be helpful to plan the interventions for the individual suffering physically and mentally. It is also helpful to aid the community as a whole, by assessing the perception and depth of injury. (Chou et al., 2004) (Wang et al., 2000)

PTSD & H-QOL of Disaster victims

"Veterans with co-morbid PTSD were more likely to have clinically higher T-cell counts, hyper-reactive immune responses on standardized delayed cutaneous hypersensitivity tests, clinically higher immunoglobulin-M levels and clinically lower dehydroepiandrosterone levels; the later clinical evidence confirms the presence of biological markers consistent with a broad range of inflammatory disorders, including both cardiovascular and autoimmune diseases" (Boscarino, 2004)

"Compared with non-PTSD survivors, survivors with PTSD have been greater than two times as probably to be recognized by using their own family practitioners with vascular problems, even when adjusted for non-public traits, immigrant status, smoking conduct and pre-disaster vascular issues (OR = 2.12)". "Survivors with PTSD had been also frequently identified with dermatological and musculoskeletal problems than survivors without PTSD". "Compared with without PTSD, survivors with PTSD pronounced on common a large quantity of physical health". (Dirkzwager et al., 2007)

Rick Nauert (2011) identified that symptoms tied to heightened arousal which include sleeping problem, irritability and vigilance were associated with decrease quality of life among PTSD sufferers. Anxiety and depression have been additionally related to lower first-rate of life.

"Significant negative relation between stress and quality of life; and significant positive correlations between support from family as well as support from friends with quality of life". "Stress and support from family were found to be significant predictors that influence the quality of life among flood victims". (Marzuki et al., 2015)

Posttraumatic stress and depression confirmed considerable poor relations to QOL; in comparison. Consequently, individuals who stated the catastrophe brought approximately advantageous private adjustments did no longer document higher stages of QOL. (Jennifer et al., 2008)

Factors contributing Development of PTSD symptoms and H-QOL of Disaster Victims

"Less food & accommodation facilities and less health care facilities caused higher prevalence of PTSD". (Wen et al., 2012)

Males had a better level of social support, psychological wellbeing and quality of life as compared to females. This reveals the fact the females are more prone towards developing psychological symptoms and ailments like PTSD. (Dirkzwager et al., 2007)

Another study showed that the people belonging to low socioeconomic status were not prone to developing stress reaction as well as symptoms of Post-Traumatic Stress Disorder (PTSD). This can be due to the fact the people living in the community sample had approximately the same level of income annually so no distinction could be made in their income status. (Nasar A et al., 2016)

Jia Z, et al. (2010) conducted "a population based study and observed that the loss of a member of the family, being injured because of the disaster and witnessing someone being killed or injured by the earthquake have been contributory factors development of PTSD signs".

Three years after Wenchuan Earthquake, survivors stated that maximum stress subscales negatively correlated with age, persistent illnesses, injury because of the catastrophe, domestic damage and family earnings had very strong negative relationship psychological well being of the earthquake victims. (Wen et al., 2012)

Signs and symptoms of PTSD had been considerably larger amongst circle of relatives of people, houses, residences or witnessed a person being killed or injured in the catastrophe; similarly to women, the displaced, and the injured. (Wen et al., 2012)

In Greece among wildfire catastrophe victims was observed that "those with damages to their homes had a worse satisfactory of existence as compared to those without any damages within the domains of mental health, social relationships and environment, whilst those with complete lack of assets had a lower pleasant of existence simplest in the environment domain" (Ootegem & Verhofstadt 2016)

Disaster Preparedness and Mitigation

Catastrophies are hard to plan and anticipate due to the fact they may be innately exclusive from commonplace emergency activities. At the same time as it's far proper to assume that each can result in large quantities of casualties and loss of belongingness.

The “aim of disaster preparation is to be able to reduce the immediate mortality and morbidity with a better prepared, well equipped service”. “The preparation includes early warning systems for seasonal changes in climate and risk of flood or drought such as electronic information systems and satellites that can provide information over large regions and continents”. “Separate systems are needed to cater for the agricultural sector, cities and people in rural or remote communities”. “The public health infrastructure is particularly important for the immediate measures needed and for public information on reducing the health risks” (Sena & Woldemichael, 2006)

“Disaster sufferers who had the trauma of the flood events and had been fearful of experiencing some other flood event, also had a great bad impact on their preferred quality of existence”. (Van Ootegem, L, Verhofstadt E, 2016)

Uttarakhand authorities need to focus on minimizing the damage to existence, belongings and surroundings before the catastrophe moves. At the prohibition degree, diverse schemes should be drafted for controlling the losses to lives and assets, to limit the results of disaster. There are numerous techniques to embark upon this level in which the disaster has not came about, in which there may

be a call for being better prepared and to have an effective of caution mechanism prior to the catastrophe. (Varghese & Paul, 2013)

"Equipped with the information about the hazards and their spatial distribution, the disaster managers in Uttarakhand may undertake certain preventive and alleviate trials for further strengthening and streamlining the Disaster Management System in the state and pave the way for similar activities in other states of India". (Pande, 2010)

Even as restoring the state to normalcy, it is also equally necessary to ensure that if unluckily the disaster revisits, the volume of harm is lesser. Recovery includes help, rehabilitation and reconstruction. "Similarly to this, many protective steps could be taken to prevent if identical calamity recurs anyways". (Varghese & Paul, 2013)

It's very important that without delay after receiving slightest trace of a catastrophe, the information must reach the complete threat-susceptible area. The case of Uttarakhand in Flash flood catastrophe, it became visible that the country disaster management authority did not have a scheme with a purpose to curtail the catastrophe nor had the warnings issued through the meteorology department taken critically. (Varghese & Paul, 2013)

"Disaster Mitigation and management Centre at Dehradun (self reliant institute under the aegis of state authorities' branch of Disaster Management) is answerable for formulating suitable guidelines and strengthening the abilities of both

the management and local population to manage up with all elements of catastrophe occurrence". (Bhan, 2013)

The readiness, at the governmental, social and personal levels, to face the catastrophe effectively needs to be addressed early and it consists of sensible disaster-layouts. The nearby residents in conjunction with the state officials need to be sensitized regarding the measures taken in the course of disaster, such as landslides, floods, earthquakes and many others. So in case of such emergencies they can take necessary action. (Varghese & Paul, 2013)

Environmentalists blame the unplanned and unabated initiatives in the area particularly, hydel-energy initiatives for the existing crisis in the country. In uttarakhand "Reports stated forty five that hydropower tasks with a complete capability of >3,000 Mega Volts are operational inside the territory and around two hundred large and "small projects are proposed or below manner". "In the Alaknanda-Bhagirathi basin alone, almost sixty nine hydropower projects with a complete ability of approximately 9,000 MW are underway". "The implementation of those tasks is predicted to have an effect on about 65% of Alaknanda and 80 % cent of Bhagirathi River". (Mukul P, 2013)

The immediate need is to ensure that the forewarning should reach to the native in prone-disaster area. In Uttarakhand, "despite the Indian Metrological Department issuing warnings well in advance, the government did not disseminate the disaster warning until June 16". "Despite that, the pilgrimage was not stopped till the bridges finally collapsed". "Education and awareness about natural hazards and risk mitigation should be a priority for all – decision makers and to the public". "The

subject needs to be given precedence, for negligence will only result in another disaster". (Bhan, 2013)