

A REALISTIC STUDY ON ASTONISHING RISK FACTORS WHICH INDUCES PHYSICAL AND PSYCHOLOGICAL STRESS CONSEQUENCES IN CHENNAI FLOOD DISASTER 2015

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Abstracts: *The recent floods disaster in Chennai has thought a lesson to improve the urban planning and improve city governance, which is essential for future. Mainly the region have caused extensive damage to all parts of the city and peoples were suffered enormously from inconvenience due to displacement of their homes, short supplies of basic necessities, including milk, water and vegetables, higher price as logistical difficulties, loss of their family members, property damages, document thrashing etc.. Therefore the main purpose of the study to overview the flood disaster and to frame the physical & psychological problems faced by the peoples in the largest part affected areas in Chennai city. The data has been collected from 120 respondents to analyze the mental issues for the disaster. The study used various statistical methods to deliver the result using SPSS statistical software which delivers the result precisely as the analysis is fully based on factor analysis result and the KMO(Kaiser-Meyer-Olkin) Measure stated the sampling adequacy is 0.279 as accepted and the approximate value of chi-square represents the value of 764.702 which as per the table value greater than 200. Finally the results confirm that disasters mainly affect the people who are more vulnerable than others and suffer in different ways and to different extents. So the consequence delivers the acknowledgment in the level of significance.*

Keywords: *flood disaster, risk factor, physical stress, psychological stress, humanity, kindness.*

1. INTRODUCTION

Natural hazards and flood occurrences are the part of nature. Some of the floods are generated by dams and river overflows, landslides, lack of drainage system, reducing the size of a river into basins, lack of constructing dams, occupying the slum areas, constructing apartments and buildings in water logging areas, covering riverside's for industrial organizations. In addition,

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unplanned, illegal urban development, aging public infrastructure and poorly designed drainage systems, has resulted in an increased frequency of severe flooding. The recent floods disaster in Chennai has thought a lesson to improve the urban planning and improve city governance, which is essential for future.

India being a peninsular country and surrounded by the Arabian Sea as well as Indian Ocean & Bay of Bengal is quite prone to several disasters. Disasters are ubiquitous but most large-scale disasters occur in the tropic of Capricorn & cancer which encompasses most of the developing nations. Due to the geography and topography, India has faced serious large-scale natural disasters like droughts, cyclones, flood, and earthquakes. Indian statistics survey from 1737 -2015 attempted to severe damages due to natural calamities and also shows that the number of disasters per year is increasing and also the numbers of people were affected and lose their lives due to uncertainty. Most of the people lost their lives and properties, and billions of people were displaced to secure their lives.

Table 1
Indian statistics survey from 1737 -2015

<i>S.no</i>	<i>Name of Disaster</i>	<i>Year</i>	<i>Fatalities</i>
1	Bengal earthquake	1737	3,00,000
2	Bengal cyclone	1864	60000
3	The great famine of southern India	1876- 1878	5.5 million
4	Maharashtra cyclone	1882	1,00,000
5	The great Indian famine	1896-1897	1.25 million – 10 million
6	Kangra earthquake	1905	20000
7	Bihar earthquake	1934	6000
8	Bengal cyclone	1970	5,00,000 include Bangladesh and Pakistan
9	drought	1972	200 million people affected
10	Andhra Pradesh cyclone	1977	10000
11	Latur earthquake	1993	7928 death and 30000 injured
12	Orissa super cyclone	1999	10000
13	Gujarat earthquake	2001	25000
14	Indian ocean Tsunami	2004	10749 deaths and 5460 missing
15	Kashmir earthquake	2005	86000 deaths includes Kashmir and Pakistan
16	Southern flood disaster in Chennai, Cuddalore, Pondicherry.	2015	500, killed 15 billion property losses and damage, 1.8 million displaced

The recent floods disaster in Chennai has thought a lesson to improve the urban planning and improve city governance, which is essential for future. Mainly the region have caused extensive damage to all parts of the city and peoples were suffered enormously from inconvenience due to displacing of home, short supplies of basic necessities, including milk, water and vegetables, as logistical difficulties, loss of their family members, property damages, document thrashing etc.. When compared to expected consequences of climate, the incidents like changes in weather condition, overflow of seas, melting glaciers, summer hot are known and it can be predicted in nature. In a case of the cyclone, flood due to water logging as a flood

disaster which induces greater burden on vulnerable population is unpredictable events. Even though the flood act as a natural phenomenon, the activities such as drainage system, agricultural practices, industrialization, building construction are the events competed by the man-made innovations. At the same time exposition to risk and vulnerability in flood prone keep on growing constantly.

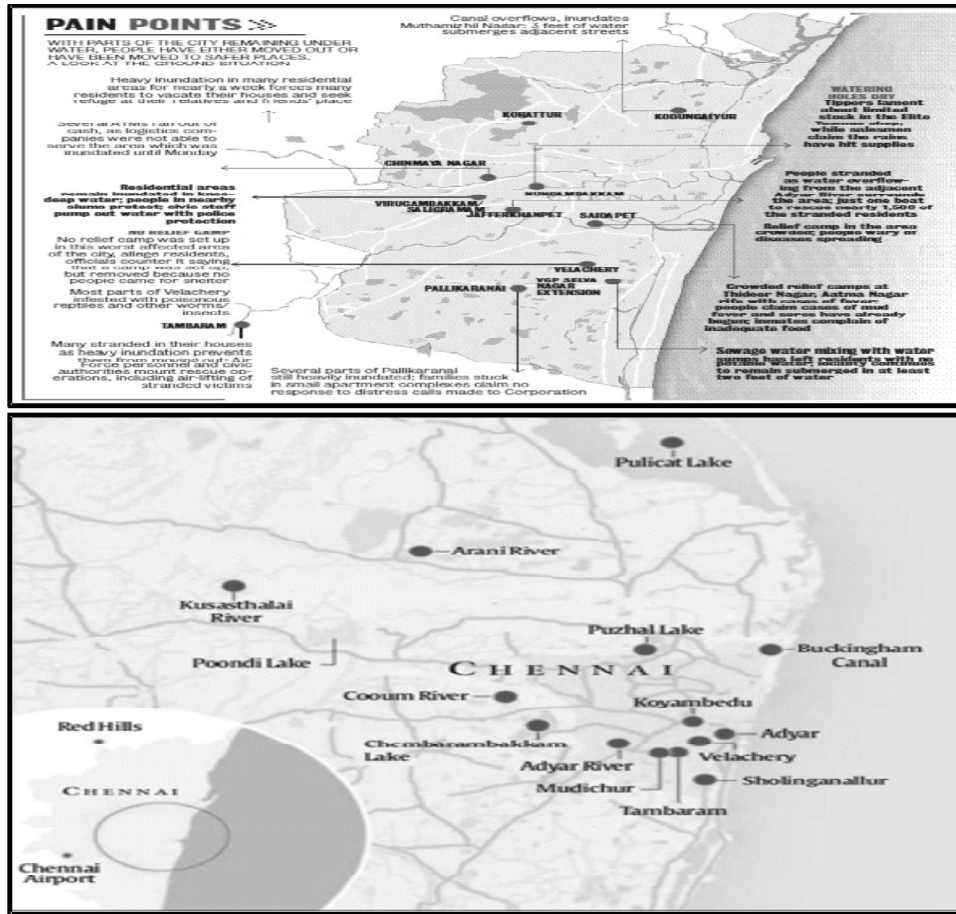
1.2. Chennai flood disaster overview

The influence of an active North-East monsoon and also the effect of cyclone “Roanu” resulted in continuous rainfall which triggered the flood situation in several parts of Tamil Nadu and Andhra Pradesh and the city of Chennai particularly hard-hit. More than 400 people were killed and over 18 lakhs people were displaced. With the estimates of damages and losses ranging from 50000 crores (US\$7 billion) to 100000 crores (US\$15 billion), the floods are the costliest to have occurred in 2015 and are among the costliest natural disasters of the year. The city of Chennai alone experienced five major floods between 1943 and 2005, with 1943, 1978 and 2005 floods causing particularly severe damage. In addition, unplanned and often illegal urban development has led to many wetlands and natural sinks being built over; this, along with aging civic infrastructure and poorly designed drainage systems, has resulted in an increased frequency of severe flooding. South of Chennai, heavy rains and flooding persisted into the second week of December. In Kancheepuram district, Chengalpattu, Guduvanchery, Perungalathur, Tambaram, Mudichur, and Anakaputhur were inundated in floodwaters up to 7 meters deep by 5 December, which washed away roads and severed rail links; 98 people from the district were reported to have died. Rainfall started and it continuous alternatively. Chennai receives 50% rainfall as every year of 30%. Prior rainfall ended on 24th November but the climate was cloudy and gloomy. Rainfall developed and brings additional rain. Indian meteorological department predicted heavy rain until the end of the week.

Heavy rainfall dropped 490mm of rainfall in 24 hours. Chennai received totally 1,049 mm of rainfall for a couple of days. Continuous rain led to shutting down all the day functioning. Everlasting rainfall in Chennai received 200 mm of rainfall in 5 hours. Chembarambakkam Lake has overflowed and released 29400 cusecs into an Adyar river. By afternoon, 60% of the city is suspended from the power supply and several hospitals were stopped functioning. Even southern railway canceled 24 major train service from Chennai central and Egmore. Chennai was officially declared a disaster area on the evening of 2 December. First-time popular newspaper did not print edition because of workers unable to reach their office. After continuous rainfall over a month Chennai turned to slow rainfall condition but the people were under the unsecured manner and they were kept in certain school and camps with volunteers to support them. The system dropped 490 mm of rainfall at Tambaram in 24 hours starting 8:30 am on 1st December heavy rains led to flooding across the entire stretch of coast from Chennai to Cuddalore.

1.3. Remarkable effects of flooding

There are several types of effects in case of the flooding which can be divided into primary, secondary and tertiary of long-term effects. The primary effects can be in the form of physical damage to any type of structure like buildings, bridges, roads, cars and sewer systems. The



other form is of casualties where people and livestock die because of drowning. Secondary effects are water supplies which can be contaminated, water-borne diseases, crops and food supplies shortage and other species of trees which are non-tolerant can die from suffocation. Tertiary or long-term effects are of an economic nature – there is a decline in tourism, rebuilding costs, food shortage which normally leads to price increases, etc.

World Health Organization (WHO) (2002: 2-3) supports the effects of floods by saying there are direct and indirect health effects caused by floods. Direct effects are mortality from drowning, heart attacks and injuries and indirect health effects include infectious diseases, poisoning, and post-traumatic stress disorders. A specific flood in a reach can result in flood damage depending on the position of human activities in the floodplain, the type of human activities in the floodplain and the structural and non-structural flood control. There is what we call primary flood damages and they are categorized into direct and indirect losses. The direct losses include municipal property and public lands, residential and other buildings in urban areas, moveable equipment in buildings in urban areas, the property of other public authorities, agricultural land, crops and harvest, livestock and other animals, fixed improvements and other

equipment on farms. The indirect losses are in productive manpower, returns from resources like agricultural land and delays in transportation and other services.

1.4. Review of Literature

In one of the significant study (**Peijun. S., Xu Yang and Jing'ai. W., 2016**) developed a new measures for the substantial reduction in both mortality from and the number of people affected by natural hazards by 2030 are two principal targets that can be measured to assess global progress toward meeting the goals of the Sendai Framework for Disaster Risk Reduction 2015–2030 (SFDRR). Constructed and framed existing research of expected annual multi-hazard intensity (M_h) of 11 hazards at the $0.5^\circ \times 0.5^\circ$ grid scale in the *World Atlas of Natural Disaster Risk*, including earthquake, volcanic eruption, landslide, flood, storm surge, tropical cyclone, sand and dust storm, drought, heat wave, cold wave, and wildfire, a vulnerability model involving M_h and GDP per capita was developed to estimate the mortality level and scale of affected populations in 2005–2015 and 2020–2030. Global mortality and affected population risks were then mapped at the $0.5^\circ \times 0.5^\circ$ grid scale and the mortality and affected population rates were ranked at the national scale. Finally the results delivers that most of the countries can achieve the target of reducing the mortality and affected population rates. Countries with increasing rates such as Bangladesh and Madagascar, where the coping capacity for natural hazard risks cannot keep pace with the increase of M_h and the growth of exposure, should be the “hotspots” of concern in global disaster risk reduction. While reviewing the literature (Amina, AS., Virginia, M and *et al.* 2016) described the evolution of the role of science and technology in the policy process building up to the sendai framework adoption that resulted in an unprecedented emphasis on science in the text agreed on by 187 United Nations member states in March 2015 and endorsed by the United Nations General Assembly in June 2015. Contributions assembled by the Conference Organizing Committee and teams including the conference concept notes and the conference discussions that involved a broad range of scientists and decision makers are summarized in this article. The conference emphasized how partnerships and networks can advance multidisciplinary research and bring together science, policy, and practice; how disaster risk is understood, and how risks are assessed and early warning systems are designed; what data, standards, and innovative practices would be needed to measure and report on risk reduction; what research and capacity gaps exist and how difficulties in creating and using science for effective DRR can be overcome. The Science and Technology Conference achieved two main outcomes: (1) initiating the UNISDR Science and Technology Partnership for the implementation of the sendai framework; and (2) generating discussion and agreement regarding the content and endorsement process of the UNISDR Science and Technology Road Map to 030.

After the disaster, constructive measures and significance levels were emphasized under (**Bernard, M., 2016**) including 187 countries that adopted the Sendai Framework for Disaster Risk Reduction 2015–2030 at the March 2015 UN World Conference on Disaster Risk Reduction included most African countries. Many developing regions of the world, particularly in Asia and Latin America, made considerable progress in implementing the previous Hyogo Framework for Action 2005–2015. But, despite the fact that Africa is one of the region as most vulnerable and least resilient to disasters, which continue to be exacerbated by poverty, climate change, rapid urbanization, and structural transformation, it saw only slow progress. Mainly the based

on considers the challenges Africa faces in implementing the Sendai Framework and recommended that the “Africanizing” must deliver the Sendai goals and strengthening the region’s political commitment to disaster risk reduction (DRR), Africa should also develop a single framework that integrates DRR, sustainable development, climate change adaptation, and conflict prevention. Equally important is the need for a strong recognition that disasters are created endogenously as well as exogenously, and thus require local solutions and local investment. **(Virginia, M., Amina, A.S and Kevin, B., 2015)** described the disaster reduction programme to explore the role of public health systems before, during, and after disasters, particularly within the scope of the United Nations Post-2015 Framework for Disaster Risk Reduction. It also examines the role of scientific and technological developments in assisting with improving the resilience of public health professionals and the communities they work in. In addition, it explores how the wide-ranging activities in public health have already contributed to the improved management of disasters and a decrease in associated risks. The article identifies areas of synergy in five key areas of recent policy and practice in public health (the health systems approach, risk assessments, the WHO/UNISDR/HPA Disaster Risk Management fact sheets, chronic disease and disasters, and mental health impacts following disasters) and finally suggested to identify from the previous (2005) global disaster risk reduction framework. In particular, the use of scientific evidence that addresses health and disaster risk simultaneously to increase the effectiveness of policy and practice in disaster risk reduction, health, and public health. **(Abul, K.A., Khondoker, M.H and Mahbuba, N., 2013)** study examined the flood-inducement vulnerabilities among women in northern Bangladesh. It clearly observed that the poor and disadvantaged women are more vulnerable to disasters than men due to the conditions that predispose them to severe disaster impacts. Women suffer from physical injuries and are often evicted from their dwellings due to floods. Difficulties in finding adequate shelter, food, safe water, and fuel for cooking, as well as problems in maintaining personal hygiene and sanitation, prevent women from performing their usual roles at home. All of these are problems related to women’s gender identity and social roles. Many poor and destitute women remain unemployed during and after floods. Women also suffer from domestic violence and are subject to harassment when taking shelter or refuge at community centers. These are the specific vulnerabilities and problems interrupt women’s mitigation efforts and adaptation capacities in disaster risk reduction. In the series of research programming **(Badrudin, A., and Rahman, N., 2012)** explored the central resolution of the directive is to create systematic coordination among agencies involve in disaster management as well as relief and rehabilitation activities. It was issued by The Prime Minister in 1997 to provide clear and appropriate guidelines on the management of disasters which include the responsibilities and functions of the various agencies involved in the process. Reported that disasters are extreme environmental events that adversely affect all areas in the world. A natural or manmade disaster causes excess morbidity and mortality in both predictable and unpredictable ways. It is now becoming a global threat to all nations hence challenges and mechanism in handling and managing them becomes more imperative than ever with the collection of total 15 agencies covering 9 districts and the population of the study in which 120 respondents were selected based on proportionate stratified sampling. The hypotheses are whether there is a relationship between knowledge and practice of Directive 20 and do both factors explain the variance in disaster preparedness. The other hypothesis is whether there is a significance difference between all districts in terms of disaster preparedness level. The findings

confirm that all agencies involved in DMRC at district level in Kedah had good knowledge of the Directive 20 and also had good practice of it. That will help to promote disaster preparedness in almost all districts in the state of Kedah.

A number of studies pertaining to flooding in Chennai under IWRM concept were undertaken at the Centre for Water Resources, Anna University (**Ramsundram 2008; Shimola 2010; Arivarasi 2010 and et. al. (2006)**) investigated the Public perception of flood risk and community-based disaster preparedness. The results of their study showed the factor that affects acceptance of flood risks was related to trust in administrative bodies. When an occurrence of flood disasters is accepted, some damage reduction measures, including buying insurance policies and making houses waterproof, can be undertaken at an individual level. (**Charles ervick, 2008**) concluded that disaster relief is one of the most basic and important transfers of wealth between developed and developing countries. Given correctly, disaster assistance can smooth shocks to poor countries that might otherwise be debilitating. However, it can distort incentives or be manipulated by self-interested leaders. The paper suggested that policy makers should voluntarily involve in craft natural disaster relief in order to minimize these distortions and manipulations. The “natural” side of disasters is tragic enough that domestic policies and the actions of international relief should be designed to mitigate, rather than exacerbate, the wrath of nature. (**Dacosta. An et al. 2013**) identified the disaster management during flood period with the intervention of conducting a survey titled as risk perception and disaster management in the savannah region of (**Ghana.shougi.s et al. 2014**) attempted a real study by interviewing representatives of the Saudi decision-makers and administrators responsible for disaster control in Jeddah before, during and after flooding in 2009 and 2010. (**Duangrudee. P 2015**) investigate the mental condition of youth flood victims in southern Thailand with 500 youths purposively selected from those who had suffered flood disaster in southern Thailand in 2011. The instruments used in their consisted of a researcher-created four-point rating scale questionnaire on the mental condition of youth flood victims in southern Thailand. The main purpose of the study to overview the flood disaster and to frame the physical & psychological problems faced by the peoples in most affected areas. (**Ministry of Natural Resources and Environment., 2011**) A crucial instance in point of flood disaster that hit the area of the four provinces of southern Thailand during March-April 2011, considered to be the most severe flooding during the past 50 years. The area worst hit by the flood is Nopphitam District in SuratThani Province, where villages, roads and bridges were swept away by landslide, heavy rainfalls and sea of mud causing damage to the lives and properties of the villagers. Hundreds of homes, rubber plantations and fruit orchards were totally destroyed. Anxiety disorder is a state when a person is affected directly by simultaneous fright caused by the disaster and is associated mainly with loss. Depression is a short-term feeling, emerging subsequently one month after the occurrence of the disaster (**Pensri.U., 2006**). When the problems are lessened, they will get better. Generally, those who experience disasters will adjust themselves to a normal state within 4–6 weeks (**Sirisak Chitdilokrat, 2009**). Depending on self-adjustment of the victims who can accept the reality and problems and find ways to solve them either by themselves or with assistance from other people.

1.5. Physical effects

There are health effects in terms of the consequences of flooding and they are categorized into those happening during or immediately after the flooding, those that develop in the days or early

weeks after the flood and the longer effects which appear after or would last for months or years. The social aspects of vulnerability to floods can be used as tools to develop policies that can minimize risk and maximize the ability of communities to anticipate and adapt to the flood hazard. Investigations into the past floods impact will characterize the social aspects of the vulnerability of individuals and communities. It is difficult to generalize the relationship between the scale of the event and the actual or the potential hardships suffered because the same event may have different effects on the adjacent households. If communities have to adapt to the flood hazard, there is a long-term increase in coping capacity which can arise from combined changes in individual behavior, resources, infrastructure and functions of individuals and their communities. There are health effects in terms of the consequences of flooding and they are categorized into those happening during or immediately after the flooding, those that develop in the days or early weeks after the flood and the longer effects which appear after or would last for months or years (WHO 2002: 2).

1.6. Psychological impact

One of the effects of a disaster is that tens of thousands lose their lives and those that survive suffer pain and disability according to (Ehrenreich (2001):5). The obvious short-term effect is emotional, and grief may also be long term. There can be longer-term responses that are interpersonal, societal and economic in nature. The psychological effects of a disaster are created by direct social and economic effects. In the wake of a disaster, people grieve for their loved ones, treasured personal memorabilia, lost documents and lost familiar neighborhoods. Following a disaster, a wide variety of emotional disturbances occurs with chronic grief, depression, anxiety or guilt. After it has happened, some people have difficulty in controlling anger, suspiciousness, irritability and hostility and others get withdrawn or avoid people. Disturbed sleep by nightmares and flashbacks of disasters may occur in other people. Some of these feelings lead people to drug abuse or alcohol. There are victims that are forced to take refuge in a shelter after a disaster has happened. They are confronted by personal and material losses, loss of privacy, community, independence, familiarity of the environment and certainty with respect to the future. Very often or always family roles and ordinary work roles are disrupted. In addition to the above, poor sanitation, inadequate shelter, contaminated water and food may produce epidemics which spread illnesses that result in death. In most cases women are raped and assaulted. All these bring distress to the victims of a disaster. Victims may show psychological effects in the hours immediately following a disaster, over weeks or even a year or two after the event. Other people show unexpected reappearance of symptoms during anniversaries of a disaster. Reactions of a disaster have to be resolved so that they are not the source of distress and dysfunction for individuals, families and society. Quantification of intangible usually poses major problems; these include fear, anxiety, annoyance, distress, insecurity, ill health and ultimately loss of life.

2. MATERIALS AND METHODS

Based on the demographical details of the respondent includes as 48 males and 72 females as their age groups are divided into four divisions as below 20, 21 – 30, 31 -40 and above 40. Most of the respondents are basically literate up to school level. On the other part, research survey distributed the hypothesis were mainly rejected the null hypothesis and it delivers the level of significance is less than 0.05 , which indicates that gender group, educational level, marital

status, distribution of members, female members, and number of school going students were the main factors rejected the null hypothesis.

Table 1
Hypothesis test summary

<i>S.no</i>	<i>Null hypothesis</i>	<i>Test</i>	<i>Sig</i>	<i>Decision</i>
1	The distribution of gender group is the same across categories of do you get affected from flood and water logging in your area?	Independent Samples Mann-Whitney U Test	.003	Reject the null hypothesis
2	The distribution Of educational qualification is the same across categories of do you get affected from flood and water logging in your area?	Independent Samples Mann-Whitney U Test	.000	Reject the null hypothesis
3	The distribution of marital status is the same across categories of do you get affected from flood and water logging in your area?	Independent Samples Mann-Whitney U Test	.000	Reject the null hypothesis
4	The distribution of members in family is the same across categories of do you get affected from flood and water logging in your area?	Independent Samples Mann-Whitney U Test	.000	Reject the null hypothesis
5	The distribution of female members is the same across categories of do you get affected from flood and water logging in your area?	Independent Samples Mann-Whitney U Test	.000	Reject the null hypothesis
6	The distribution of children in family is the same across categories of do you get affected from flood and water logging in your area?	Independent Samples Mann-Whitney U Test	.013	Reject the null hypothesis

Source: primary data

Table 2
Demographic profile

<i>Demographic details</i>	<i>N</i>	<i>Mean</i>	<i>Std. Deviation</i>	<i>Kurtosis</i>
	<i>Statistic</i>	<i>Statistic</i>	<i>Statistic</i>	<i>Statistic</i>
Gender group	120	1.60	.492	-1.860
Age group	120	2.50	1.085	-1.273
Educational qualification	120	2.17	1.082	-.976
Marital status	120	1.73	.742	-1.044
monthly income	120	1.92	1.026	-.490
members in family	120	1.78	.688	-.866
female members	120	1.94	.626	-.406
children's in family	120	1.68	.467	-1.386
Schoolgoing students	120	1.60	.492	-1.860
children lost their test books and stationaries	120	1.28	.453	-1.070
pregnant lady in your home	120	1.63	.484	-1.715
sickness person	120	1.91	.898	-1.748
Valid N (listwise)	120			

Source: Primary data

As per the table 2 research survey collected the personal details of the respondent where divided into a different segment. It includes 120 respondents as 48 males and 72 females. The age groups are divided into four divisions as below 20, 21 – 30, 31 -40 and above 40. Most of the respondents are basically literate up to school level. Based upon their income come under below 5000 per month who mainly live in slum areas. In order to identify their personal stress, study survey gathered the female and children in their family and also gathered the sickness patient's details to view their stress in peak level. In order to find out the entire risk factor of the respondent which includes the questionnaire with details related to gender, age group, their educational qualification, marital status, monthly income, total members who are in their family, a survey of female members of the family. Research study undoubtedly indicates the demographical details of the respondent who mainly affected by recent flood disaster in and around Tambaram in Chennai city.

Table 3
Psychological Rick Factor

<i>Psychological Rick Factor</i>	<i>Test Value = 120</i>				
	<i>t</i>	<i>df</i>	<i>Sig.</i> <i>(2-tailed)</i>	<i>Mean</i> <i>Difference</i>	<i>95%</i> <i>Confidence</i> <i>Interval of</i> <i>the Difference</i> <i>Lower</i>
Whether you feel comfortable while sleeping in the displace location during flood period?	52.395	119	.000	1.825	1.76
Do you think you are safe during flood in displaced place?	30.860	119	.000	1.342	1.26
To what extend you suffer while transferring from one place to another place	24.234	119	.000	1.542	1.42
Mode of transportation during flood and water logging with the help of	24.057	119	.000	2.600	2.39
How long it will take you to forget this feelings and incident during flood period?	35.699	119	.000	2.408	2.27

Source: Primary data

Above table represents the paired comparison of two variables to deliver the significant level and confidence level. Test value of the psychological risk factor indicates the 120 respondent and their degree of freedom is 119. The two variables include how they feel while sleeping displaced location mainly female respondent may feel uncomfortable and how they feel whether they are safe. Based on the finding results represents the level of significance is 0.000 with a reduction of than P value 0.005 is accepted and also compared the risk while transferring from affected place to safer place it also showed the significant level of 0.000 and it delivers the mean value and standard deviations. The test was intercepted with the two sample question as such as whether the respondent affected from flood and how deep they are affected by the water logging around their living. On the other hand, in flooding period, they have received the food items and analyzed how much they are satisfied with their food packets from the donators.

Table 4
ANOVA

<i>Risk factor</i>		<i>Sum of Squares</i>	<i>Df</i>	<i>Mean Square</i>	<i>F</i>
Do you feel lonely and loosed everything while displaced?	Total	73.867	119		
Whether you feel comfortable while sleeping in the displace location during flood period?	Between Groups	5.513	1	5.513	55.067
	Within Groups	11.813	119	.100	
	Total	17.325	120		
Do you think you are safe during flood in displaced place?	Between Groups	9.339	1	9.339	62.426
	Within Groups	17.653	119	.150	
	Total	26.992	120		
To what extend you suffer while transferring from one place to another place	Between Groups	23.472	1	23.472	80.704
	Within Groups	34.319	119	.291	
	Total	57.792	120		
Mode of transportation during flood and waterlogging with the help of	Between Groups	108.113	1	108.113	217.376
	Within Groups	58.688	119	.497	
	Total	166.800	120		
How long it will take you to forget this feelings and incident during flood period?	Between Groups	49.089	1	49.089	364.244
	Within Groups	15.903	119	.135	
	Total	64.992	120		
whether your earnings will retain the loss and damages	Between Groups	11.250	1	11.250	118.000
	Within Groups	11.250	119	.095	
	Total	22.500	120		

Source: Primary data

The Anova delivers the results by gathering the psychological factor which causes more stress in each and every situation. Based on the first factor which induces stress as they feel lonely and suffers a lot of while viewing the property damage and several financial losses. It also collected the grievance how long it will take to forget such incident and whether their future earning will retain their belonging as soon as possible. The results show the unhappy situation in their daily life and most of them were reported that future earning will not retain their property damage and loss of their home appliances, vehicles, documents etc..

3. RESULTS & DISCUSSION

The following table clearly delivers the result precisely as the analysis is fully based on factor analysis result and the KMO (Kaiser-Meyer-Olkin Measure) stated the sampling adequacy is 0.279 as accepted and the approximate value of chi-square represents the value of 764.702 which as per the table value greater than 200. So the consequence delivers the acknowledgment in the level of significance. The rate of the degree of freedom indicates the value of 561 and finally, the result confirms that the level of significance 0.00 which is less than the p-value 0.05.

Table 5
KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.279
Bartlett's Test of Sphericity	Approx. Chi-Square	764.701
	df	561
	Sig.	.000

Source: primary data

Table 6
Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1.	3.359	9.880	9.880	3.359	9.880	9.880
2	2.894	8.513	18.393	2.894	8.513	18.393
3	2.800	8.234	26.627	2.800	8.234	26.627
4	2.369	6.968	33.595	2.369	6.968	33.595
5	2.256	6.636	40.231	2.256	6.636	40.231
6	2.086	6.134	46.365	2.086	6.134	46.365
7	1.955	5.750	52.114	1.955	5.750	52.114
8	1.852	5.448	57.562	1.852	5.448	57.562
9	1.585	4.660	62.223	1.585	4.660	62.223
10	1.485	4.368	66.591	1.485	4.368	66.591
11	1.285	3.778	70.369	1.285	3.778	70.369
12	1.149	3.379	73.748	1.149	3.379	73.748
13	1.011	2.974	76.722	1.011	2.974	76.722
14	.920	2.706	79.428			
15	.871	2.561	81.989			
16	.744	2.187	84.176			
17	.682	2.006	86.182			
18	.673	1.979	88.161			
19	.601	1.767	89.928			
20	.514	1.512	91.440			
21	.447	1.315	92.755			
22	.375	1.102	93.857			
23	.358	1.053	94.910			
24	.339	.997	95.907			
25	.267	.785	96.692			
26	.226	.666	97.357			
27	.199	.586	97.943			
28	.163	.480	98.423			
29	.143	.421	98.844			
30	.127	.375	99.219			
31	.109	.320	99.538			
32	.078	.230	99.768			
33	.052	.153	99.921			

Extraction Method: Principal Component Analysis

Figure 2



The above table -5 delivers the complete component and the total variance of the risk factor of both physical and psychological factors. The research study analyzed the situations of the people with different segmentation based on their stress in their problematic situations. the results were calculated based on the factors which mentioned the cumulative total results for the functioning. On the other part the graphical presentation shows the scree plot with the eigenvalues and components were classified as per the risk factors.

The research survey analyzed physical stress as well as psychological stress during flood period it resulted most of the people were affected psychologically rather than physically. The study demand the government to make remedial measures and precautions over drainage system and to provide enormous space for the water resources, restrict for building construction in water resorted areas to end with the risk factor were highly involved during flood disaster period but the human behavior were slightly satisfied by the people to think and feel the expressive due to several corporate have come forward to contribute their share for relief and rehabilitation of people affected by the recent rains in the State. It definitely shows the humanity and kindness to the people who suffered from continuous disaster in Chennai city.

Testimony to the power of humanity crisis





4. CONCLUSION & FUTURE RECOMMENDATION

Chennai, a coastal mega-city is fourth largest metropolis in India, has a history of over 350 years of growth. Meteorologically there is no major upward or downward trend of rainfall during 200 years, and a decrease in last 20 years with a contrast record of increasing floods have been experienced. Analysis of land-use changes over the temporal and spatial scale has been undertaken for Chennai city in order to understand the patterns on green cover, built-up area and consequences on hydrological settings. Land-use issues like decreased natural areas, loss of water bodies, encroachment of river/streams and other drainage channels, uncontrolled multiplication of built-up areas, have been identified as contributory factor to flood risk in Chennai. In order to perform early relief activities quickly in the event of a disaster, it is necessary to make local disaster prevention efforts on a daily basis. The public as well as the administrative authorities also need to participate and cooperate to protect their communities so that their efforts should be reflected in administrative planning. In order to find ways to involve local residents in disaster-prevention activities, there is a need of conducting a study to identify factors contributing to the participation of local residents in disaster prevention activities.

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This paper is fully based on the physical and psychological problems, which has been faced by each and every person during heavy flood disaster in and around Chennai city. It mainly concentrated and selected only the major affected part of flood are with high risk and stress. We greatly appreciate the reviewers for their valuable comments and suggestions to improve the quality of the article.

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