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Pre and post vulnerability of floods to mental health among the residents of Srinagar City, J&K-India.

Pre y post vulnerabilidad de las inundaciones a la salud mental entre los residentes de la ciudad de Srinagar, J & K-India.

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Abstract

Health effects occur directly through contact with flood waters or indirectly from damage to infrastructure, ecosystems, food and water supplies or social support systems. They can be immediate or can appear days, weeks or months after the floods have receded. Two thirds of flood related deaths worldwide are from drowning and one third from physical trauma, heart attacks, electrocution, carbon monoxide poisoning or fire. The main of this paper was to assess the Pre and post vulnerability of floods to mental health among the residents of Srinagar city. For the collection of primary data, sample of 200 respondents were randomly selected from various areas of the Srinagar city. A well structured questionnaire was employed for collecting primary data. The study reveals that Maximum number patients were found during post floods (974). During pre floods out of the total 418 patients, maximum were found in the month of July (116 patients) followed by August (107 patients). However in post floods out of 974, maximum cases were found in January (281 patients) followed by march (273 patients). Females were found more vulnerable in both cases but in pre flood 62 percent females were found exposed to different mental health problems which increased to 77 percent after floods of September, 2014.

Key words: Flood, Mental Health, Srinagar, Vulnerability

RESUMEN

Los efectos sobre la salud se producen directamente a través del contacto con las aguas de las inundaciones o indirectamente por daños a la infraestructura, los ecosistemas, los suministros de agua y alimentos o los sistemas de apoyo social. Pueden ser inmediatas o pueden aparecer días, semanas o meses después de que las inundaciones hayan retrocedido. Dos tercios de las muertes relacionadas con las inundaciones en todo el mundo se deben a ahogamientos y un tercio a traumas físicos, ataques cardíacos, electrocución, intoxicación por monóxido de carbono o incendios. El principal de este documento fue evaluar la vulnerabilidad pre y post de las inundaciones a la salud mental entre los residentes de la ciudad de Srinagar. Para la recopilación de datos primarios, se seleccionó al azar una muestra de 200 encuestados de varias áreas de la ciudad de Srinagar. Se empleó un cuestionario bien estructurado para recopilar datos primarios. El estudio revela que se encontró un número máximo de pacientes durante las inundaciones posteriores (974). Durante las inundaciones previas del total de 418 pacientes, el máximo se encontró en el mes de julio (116 pacientes) seguido de agosto (107 pacientes). Sin embargo, en las posteriores a las inundaciones de 974, el máximo de casos se encontró en enero (281 pacientes) seguido de marzo (273 pacientes). Las mujeres se encontraron más vulnerables en ambos casos, pero antes de la inundación, el 62 por ciento de las mujeres estaban expuestas a diferentes problemas de salud mental que aumentaron al 77 por ciento después de las inundaciones de septiembre de 2014.
Palabras clave: Inundación, Salud mental, Srinagar, Vulnerabilidad.

INTRODUCTION

Natural disasters, including flooding have been reported to have a wide range of psychosocial and mental health impacts, including psychological distress, anxiety, depression, somatisation and post traumatic stress disorder (PTSD) (Ahern 2005, McFarlane 1997). Floods cause direct physical harm and fatalities due to drowning and acute trauma (Alderman, K et al., 2012; Jahan, 2015;); injuries (Lane et al., 2015; Boyd., 2011) and toxic exposure (Fox et al., 2009; Cox et al., 2008). Floods are the most frequent and intense type of disaster in both developed and developing countries, with recent events occurring in the United Kingdom, the United States of America, Australia, South East Asia, Europe and Africa (Ahern et al., 2005). The adverse human health consequences of flooding are complex and extensive including drowning, injuries and an increased incidence of common mental disorders (Hajat et al., 2005). The disease burden following a flood event ranges from psychopathology (depression, anxiety disorder and substance abuse) to physical injury and systemic illness (Cook et al., 2008). It is accepted that floods take a

heavy toll on the mental health of the people involved, those who mostly live in developing countries where the capacity to deal with the event is extremely limited (McCarthy, 2001). Most of the studies on the impacts of flooding on mental disorders are from high or middle income countries like Australia, Poland, the United Kingdom and the United States (Ahern et al., 2005). The decade 2001-2010 was the second wettest since 1901. Floods have been the most frequently experienced extreme events over the course of this decade (Halmovaet al., 2015).. Eastern Europe was particularly affected in 2001 and 2005, India in 2005, Africa in 2008, Asia (notably Pakistan, where 2000 people died and 20 million were affected) in 2010, and Australia, also in 2010 (Ashraf, 2017). During the decade 2001-2010, more than 370,000 people died as a result of extreme weather and climate conditions, including heat waves, cold spells, drought, storms and floods (Wilhite et al., 2014). According to the 2011 Global Assessment Report, the average population exposed to floods every year increased by 114% globally between 1970 and 2010, a period in which the world's population increased by 87% from 3.7 billion to 6.9 billion. In the past decade (2002-2011), about 2.2 billion people in the Asia-Pacific region were affected by disasters and almost 750,000 were killed (Arguez, et al., 2011). The number of deaths in the region during this period is almost four times higher than the number of deaths during the previous decade, i.e., 1992-2001 (Atkinson, 2014). The number of disaster related fatalities is higher in this region due to dense populations, geographical features (low-lying coastal areas), low resources and the poor infrastructure in place to deal with the natural disasters (Donner & Rodríguez, 2008). Many studies that have assessed post-flood water-borne disease outbreaks found increased cases of cholera (Mosarwana, 2015), diarrhoeal diseases (Abaya et al., 2009; Schwatz et al., 2006), cryptosporidiosis (Katsumata et al., 1998), poliomyelitis (Rekand, 2009), rotavirus (Fun et al., 1991), typhoid and paratyphoid (Albert, 2004), and hepatititis A and E (Watson et al., 2007; Aggarwal and Krawczynski., 2000). Flood is not new in J&K. Every year, flood of various magnitudes occurs in many parts of the state. In Kashmir floods have occurred at regular intervals in the past like 1903, 1905, 1909, 1928, 1948, 1950, 1951, 1953, 1954, 1956, 1957, 1959, 1962, 1963, 1964, 1969, 1972, 1973, 1976, 1986, 1992, 1995, 1996, 2006 and 2014 (I&FC, J&K govt.). Out of all these floods, the floods of 1903 & 1959 and 2014 are considered to be the most severe and 2014 flood being the most destructive till date as the magnitude of the flood was such that the flood water lasted for 10-12 days in Srinagar city.

MATERIAL AND METHODS

Study Area: Srinagar city is located between 33º53´49´´-34º17´14´´N latitudes and 74º36´16´´- 75º01´26´´E longitudes. The city has cradled along this river over a length of 29 Kms. and an average depth of about 6 Kms. on either side of the river. The city as well as its hinterland is encircled by the natural wall of mountains (the sub-mountain branches of the *Pir Panjal* range) whose height varies from 1800 to 4300 meters above the mean sea level (Fig:1).

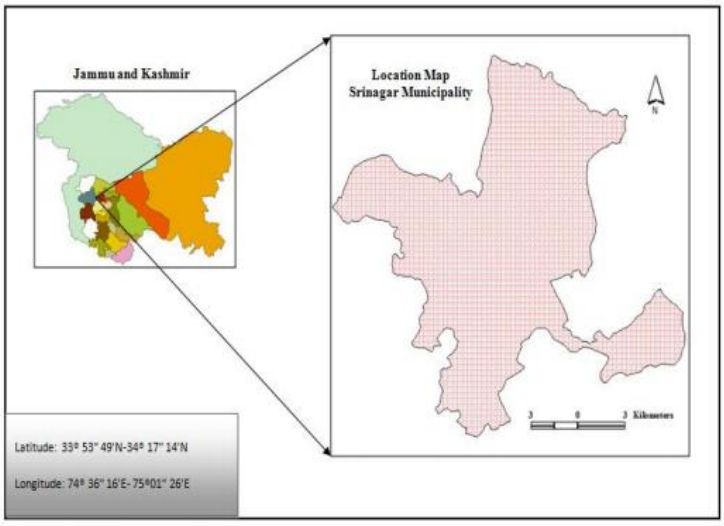

Fig:1 Location map

Apart from these physical diversities the serpentine river Jhelum traverses the city from the south-east to north-west , meandering for about 29 kilometres dividing the city into two parts which are so well interwoven by different bridges (13 in number) over the river Jhelum that they represent two in one. All these features add considerably to its significance and it is because of these picturesque physical features, lakes and waterways which have bestowed unparallel scenic beauty to Srinagar that it is often called, "The Vince of the East". Srinagar City is famous throughout the world for the tourist attraction.

Study methodology: the main purpose of the study was to assess the impact of mental health problems among people of Srinagar city. Though whole Kashmiri has got affected psychologically by the flood but it is presumed that a greater percent is of those people who are affected directly by the flood (victims themselves) or the close relatives of the victims (family members). Both primary and secondary data was used in the present study. For the collection of primary data, sample of 200 respondents were randomly selected from various areas of the Srinagar city. A well structured questionnaire was employed for collecting primary data. The investigator surveyed the various areas of Srinagar City and tried to gather information about victims. The information about such

victims was gathered from different people like community heads and psychiatrists through random sampling. Secondary data was collected from department of psychiatry, SMHS hospital Srinagar, institute of mental health and neurological sciences Srinagar and chamber of commerce and industry, Srinagar. Besides various reports, research papers, articles, journals were consulted in order to gauge out the objectives. After collecting all relevant data, it was analyzed, tabulated by applying various statistical techniques.

Table: 1 Gender wise distribution of respondents (primary data)

S. No.	Sex	No. of Respondents	Percentage
1	Male	41	20.5
2	Female	159	79.5
Total		200	100

Table: 2 Gender wise distribution of secondary data

S. No	No. of registered patients	Male	Female
October, 2014	640	147	493
November, 2014	1180	538	602
December, 2014	1184	530	654
January, 2015	1932	421	1511

RESULTS AND DISCUSSION

September, 2014 Floods: September 2014 unprecedented floods in Jammu & Kashmir tell the tale of human misery not witnessed by this state in over 100 years. The devastation caused by the flood is colossal. It claimed over three hundred human lives and destroyed everything that come in its way-residential houses, schools, colleges, hospitals, paddy fields, orchards, government establishments and businesses. Across the State, 125,000 families have been affected, 5642 villages were affected across the State and 800 villages remained sub-merged for over two weeks. More than 350000 structures (residential houses) have been damaged.

Rainfall pattern of Kashmir valley during September,2014: Climatologically, September is not a rainy season for Kashmir. The average monthly rainfall of Srinagar city based on data from 1901 to 2014 in Sept. is only 33mm. The highest monthly rainfall recorded in September at Srinagar is 184.8mm during 2014 thus breaking the previous

records of 180.8mm in 1909 and 141.9mm in 1928. There has been only 9 years in a span of 114 years (Fig. 2) when Srinagar received monthly rainfall of over 100 mm in Sept.

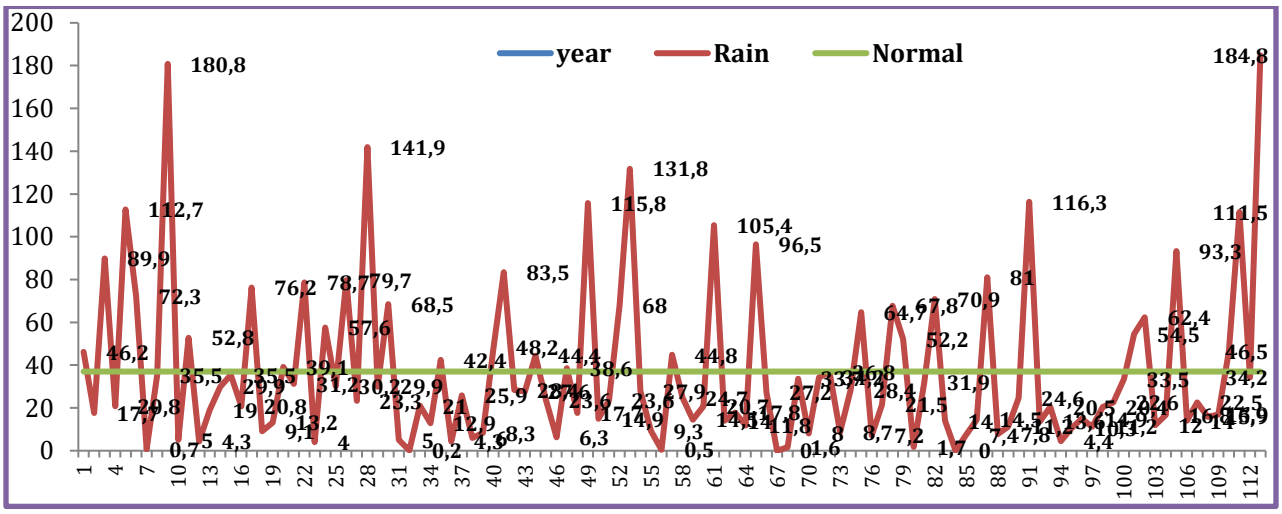

Fig. 2 Month's total rainfall at Srinagar (1901-2014)Source: (IMD)

Table:3 Pre and post flood (gender wise) scenario of Patients in Srinagar city

Pre-Flood, 2014				Post-Flood, 2014			
Month	Total Patients	Male	Female	Month	Total Patients	Male	Female
May	93	32 (34.41)	61 (65.6)	December	217	61 (28.11)	156 (71.8)
June	102	43 (42.16)	59 (57.8)	January	281	72 (25.62)	209 (74.3)
July	116	53 (45.69)	63 (54.3)	February	203	43 (21.18)	160 (78.8)
August	107	31 (28.97)	76 (71.0)	March	273	49 (17.95)	224 (82.0)
Total	418	159 (38.04)	259 (62.0)	Total	974	225 (23.10)	749 (76.9)

Source: Field Survey, 2015

The analysis of table 3 and 4 reveals Pre and post flood (gender wise and age wise) scenario of Patients in the study area. Maximum number patients were found during post floods (974). During pre floods out of the total 418 patients, maximum were found in the month of July (116 patients) followed by August (107 patients). However in post floods out of 974, maximum cases were found in January (281 patients) followed by march (273

patients). Females were found more vulnerable in both cases but in pre flood 62 percent females were found exposed to different mental health problems which increased to 77 percent after floods of September, 2014.

Table: 4 Pre and post flood (Age wise) scenario of Patients in Srinagar city

Pre-Flood, 2014									
Month	Total Patients	Age Structure (Years)							
		0-17		17-44		45-66		>66	
		Male	Female	Male	Female	Male	Female	Male	Female
May	93	6	9	15	33	7	11	4	8
		(6.45)	(9.68)	(16.13)	(35.48)	(7.53)	(11.83)	(4.30)	(8.60)
June	102	9	12	21	29	7	8	6	10
		(8.82)	(11.76)	(20.59)	(28.43)	(6.86)	(7.84)	(5.88)	(9.80)
July	116	11	16	28	26	11	12	3	9
		(9.48)	(13.79)	(24.14)	(22.41)	(9.48)	(10.34)	(2.59)	(7.76)
August	107	5	15	15	29	7	14	4	18
		(4.67)	(14.02)	(14.02)	(27.10)	(6.54)	(13.08)	(3.74)	(16.82)
Total	418	31	52	79	117	32	45	17	45
		(7.42)	(12.44)	(18.90)	(27.99)	(7.66)	(10.77)	(4.07)	(10.77)
Post-Flood, 2014									
December	217	17	34	28	59	10	24	6	39
		(7.83)	(15.67)	(12.90)	(27.19)	(4.61)	(11.06)	(2.76)	(17.97)
January	281	18	52	37	73	11	43	6	41
		(6.41)	(18.51)	(13.17)	(25.98)	(3.91)	(15.30)	(2.14)	(14.59)
February	203	15	40	13	61	7	29	8	30
		(7.39)	(19.70)	(6.40)	(30.05)	(3.45)	(14.29)	(3.94)	(14.78)
March	273	10	59	19	73	12	49	8	43
		(3.66)	(1.61)	(6.96)	(26.74)	(4.40)	(17.95)	(2.93)	(15.75)
Total	974	60	185	97	266	40	145	28	153
		(6.16)	(18.99)	(9.96)	(27.31)	(4.11)	(14.89)	(2.87)	(15.71)

Source: field survey, 2015

Table :5 shows Pre and post flood (Disease wise) scenario of Patients and Change in the study area. The diseases which were found most prevalent include MDD,GAD,OCD ,Anxiety and Panic attack. During Pre flood GAD (98 patients) were found more prevalent followed by MDD which includes 33 male patients and 61 females. However during Post

floods the patients got increased from 418 patients to 974 patients.MDD (257 patients) and GAD (198 patients) were found more prevalent.

maximum change were found among females as compared to males.

Table: 5 Pre and post flood (Disease wise) scenario of Patients and Change in Srinagar city

MDD							
Pre-Flood, 2014			Post-Flood,2014			Change	Change
Months	Male	Female	Months	Male	Female	(Male)	(Female)
May	9	17	December	19	39	52.6	56.4
June	8	15	January	22	59	63.6	74.6
July	11	13	February	14	38	21.4	65.8
August	5	16	March	13	53	61.5	69.8
Total	33	61	Total	68	189	51.5	67.7
			GAD				
May	5	9	December	13	32	61.5	71.9
June	12	16	January	16	40	25.0	60.0
July	13	15	February	9	32	-44.4	53.1
August	10	18	March	10	46	0.0	60.9
Total	40	58	Total	48	150	16.7	61.3
			OCD				
May	6	13	December	10	27	40.0	51.9
June	9	11	January	9	29	0.0	62.1
July	7	8	February	7	26	0.0	69.2
August	5	15	March	6	39	16.7	61.5
Total	27	47	Total	32	121	15.6	61.2
			Anxiety				
May	7	8	December	8	23	12.5	65.2
June	6	9	January	12	24	50.0	62.5
July	9	11	February	5	23	-80.0	52.2
August	4	13	March	8	34	50.0	61.8
Total	26	41	Total	33	104	21.2	60.6
			Panic Attack				
May	5	10	December	7	26	28.6	61.5
June	5	8	January	10	35	50.0	77.1
July	9	10	February	6	24	-50.0	58.3

August	6	10	March	7	37	14.3	73.0
Total	25	38	Total	30	122	16.7	68.9

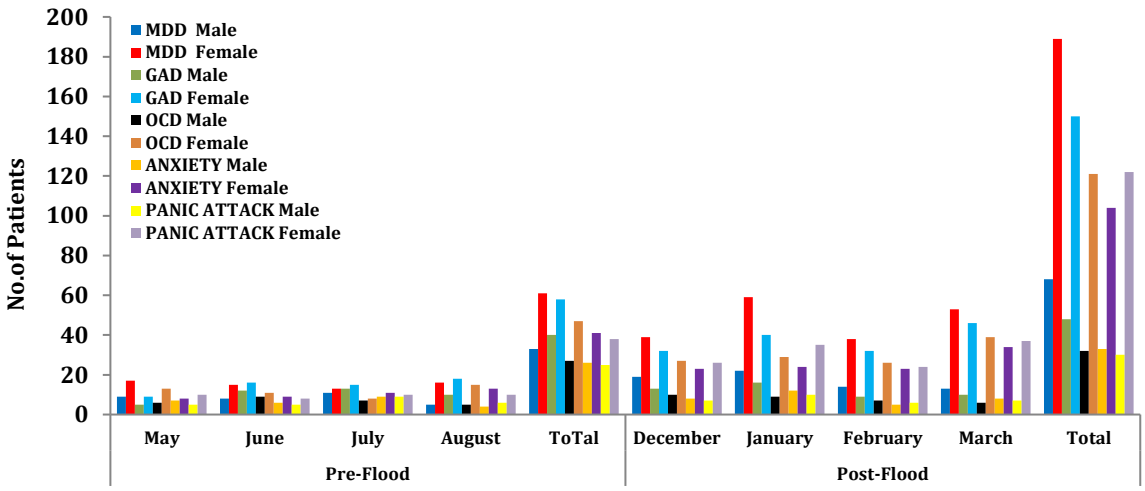

Fig. 3

Table: 6 Pre and post flood Total Change in Srinagar city

Gender	Pre-Flood, 2014	Post-Flood, 2014	Change (%)
Male	159	225	66 (29.33)
Female	259	749	490 (65.42)
total	418	974	556 (57.08)

As conclusion, the health consequences of floods depend upon the vulnerability of the environment and the local population. Improved disaster management, including mitigation and preparation has contributed to a reduction in flood-related deaths. the vulnerability of mental disorders were found maximum in post flood phase. Females were found more exposed to different disorders as compared to men. The diseases which were found most prevalent include MDD,GAD,OCD ,Anxiety and Panic attack. During Pre flood GAD (98 patients) were found more prevalent followed by MDD which includes 33 male patients and 61 females. However during Post floods the patients got increased from 418

patients to 974 patients.MDD (257 patients) and GAD (198 patients) were found more prevalent. maximum change were found among females as compared to males

Compliance with Ethical Standards

We all authors are submitting a research paper,"Pre and post Vulnerability of Floods to Mental Health Among the Residents of Srinagar City, J&K-India ". This is to state that this is our original research work and is not under consideration for publication elsewhere, and that its publication in the present form has been approved by all authors.

Conflict of Intrest: The authors are not having any conflict of interest to the previous studies.

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