Mental Health, Social Support and Fatalism in Victims of the 2008 Flood in Juarez City Mexico

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Abstract

This study analyzed symptoms of depression, anxiety, and PTSD in flood victims from Juarez City Mexico. In July of 2008, heavy rain caused floods in several areas in Juarez, where hundreds of people experienced loss of their belongings and damage to their properties. A sample of 756 participants, interviewed in August and September of 2008, were used to compare flood victims and non-victims in levels of depression, anxiety and PTSD. The results indicated that flood victims had statistically significant higher levels in all or the variables mentioned above. In the 392 flood victims, levels of depression, anxiety, and PTSD were correlated with social support and fatalism related factors. It was found that social support and fatalism factors have a small or no relationship with mental health variables of flood victims.

Floods in Juarez

Floods are natural disasters that occur in a relatively short period of time, and most of the times people fail to perform preventive actions, often causing loss of property and human lives. These type of events usually produce psychological sequels in those who experience such events, which can range from feelings of loss, guilt or low self-esteem that can affect in the quality of life. Some of the psychological consequences we have analyzed as result of floods, are the symptoms of depression, anxiety and Posttraumatic Stress Disorder (PTSD).

On July 26, in Juarez Mexico, heavy rains and a bad sewer system, caused several areas in Juarez to flood. More than 200 neighborhoods and

hundreds of families were affected by this natural disaster. Schools, churches and recreational centers were used as shelters for all of those people that could not stay home, and even armed forces helped in the community to evacuate dangerous zones (Olivas, 2008). A similar flood occurred two years earlier, in 2006, with hundreds of people suffering for their losses, and victims from that flood reported having symptoms of anxiety and depression. For this reason, in 2008, when the city was flooded again, our research time wanted to measure the psychological consequences of this natural disaster in order to help the victims and analyze other variables related to anxiety and depression.

Psychological Consequences of Floods

A flood in Kentucky damaged more than 6,000 houses in 1984 and a sample of 222 participants reported that after eighteen months of the floods, participants still showed significant levels of depression, anxiety and somatic symptoms (Phifer, 1990). Another study with 209 participants who witnessed the flood of Mississippi, in 1993, where approximately 70,000 people suffered the loss of their households, the results indicated that those who suffered greater losses also reported higher levels of psychological distress, loss of psychological resources, and physical symptoms (Smith & Freedy, 2000). In 1993, a storm caused damage to 23,000 houses in Iowa, and there was a necessity to evacuate about 10 thousand people to protect them. As a consequence of this natural disaster, victims reported symptoms of depression, anxiety and PTSD in a sample of 1,735 participants (Stimpson, 2005). Also, children who witness floods also report symptoms of depression accoding to a study done in children who witnessed a flood in Tenessee, in 2010 (Felton, Cole, & Martin, 2013).

Studies in Latin America report similar results. The Mexican city of Villahermosa suffered a serious flood in 1999, and in a study with 666 victims, symptoms of depression, anxiety and PTSD were found (Norris, Slone, Baker and Murphy, 2004). Symptoms of acute stress disorder and depression were found in victims of floods in the City of Tingo de María, Peru (Rojas-Medina, Vargas, & Trujillo, 2008). Flood victims from Santa Fe, Argentina, reported high levels of anxiety and were treated for these symptoms with eye movement desensitization and reprocessing therapy (Adúriz, Bluthgen, & Knopfler, 2009). Other studies that have analyzed the psychological consequences of floods in other parts in the world like Gangneung City South Korea (Chae, Kim, Rhee, & Henderson, 2005), Quebec Canada (Maltais & Lachance, 2011), Brisbane Australia (Alderman, Turner, & Tong, 2013), Jeddah Saudi Arabia (Maghrabi, 2012), Bahraich India (Wind, Joshi, Kleber, & Komproe, 2013), Bédarrides France (Verger et al., 2003), Victoria Australia (Bei et al., 2013), report symptoms of

depression, PTSD, anxiety, somatic, substance consumption, and psychological functioning, even after five and eight years (Verger et al., 2003).

Social Support and Floods

Social support, specifically subjective support and support utilization, helps flood victims reduce symptoms of PTSD (Dai, 2016). Social cohesion and having family nearby affects positively resilience levels in flood victims, and resilience helps overcome psychological distress (Greene, Paranjothy, & Palmer, 2015). Even in children, social support is a variable that correlates negatively with symptoms of PTSD (Martin, Felton, & Cole, 2016).

Social support, as an individual psychosocial resource, can help flood victims to cope with their problems, but social capital, which refers to the presence of community linkages, help people even more in these natural disasters (Wind & Komproe, 2012). Social support that has been received makes people interact with others that also need help (Bockszczanin, 2013). When natural disasters happen, young and adult people receive help but also give help bringing social cohesion to the community. Support groups can supply aid to people that have been flood victims, especially if victims have pre-existing networks before natural disasters happen. The problem that people report is that even if they have these social support networks, if they don't know how to help, then the aid is limited (Smith, Davies-Colley, Mackay, & Bankoff, 2011).

Fatalism in Mexicans

Latinos, including Mexicans, have been linked to the construct of fatalism where researchers argue that they tend to be more fatalistic (Anastasia & Bridges, 2015; Espinosa & Gallo, 2011; Bermúdez, Kirkpatrick, Hecker, & Torres-Robles, 2010) than other cultures. However, fatalism is a construct that even though has been widely used, the definitions and scales used to measure it are different across studies.

The Multidimensional Fatalism Scale is a scale developed from the analysis of the most important fatalism scales that attempts to bring order to this construct (Esparza, Wiebe, & Quiñones, 2014). As a result, five factors have been identified where one of them has items that represent the core construct of fatalism, and there are another four factors that some have used to measure fatalism but are measuring other constructs: pessimism, internality, luck, and divine control. In this study the MFS was used to assess possible correlations with symptoms of depression, anxiety and PTSD.

Psychological Effects of Floods Scale

To measure mental health in flood victims, a brief scale was developed in Spanish to measure symptoms of depression, anxiety and post-traumatic stress disorder in the Mexican population (Esparza-Del Villar, Carrillo-Saucedo, Motañez-Alvarado, & Quintana-Moye, 2011). The scale was based on the criteria for depression, anxiety and PTSD of the Diagnostic and Statistical Manual of Mental Disorders (4th ed., text rev.; DSM-IV-TR; American Psychiatric Association, 2000). The purpose of the scale was not to diagnose the psychological disorders, but to measure the levels of the symptoms of these disorders. The main objective of the scale was to provide a validated instrument and of short duration that could be useful for research. The factor structure of the scale was analyzed and it had a two factor solution. One of the factors included items of depression, and the other factor included the items of both anxiety and PTSD, but most of the items of this factors reflect symptoms of PTSD related to floods. Convergent validity and internal reliability analysis indicated that this scale was a valid measure to be used with Mexicans (Esparza-Del Villar et al., 2011).

The present study analyzed symptoms of depression, anxiety and PTSD with the validated scale previously discussed and it was expected to find higher levels of them in flood victims when compared to non-victims. Based on previous findings, it was expected that social support would correlate negatively and that fatalism would correlate positively with these mental health factors.

Method
Participants

The sample consisted of 756 participants from different areas of Juarez, Mexico, where 364 were victims of the 2008 flood and 392 were non-victims. The heavy rains occurred in the last days of July of 2008, and the participants were interviewed in August and September of 2008, a few weeks after the flood. The mean age for the total sample was 34.98 (SD = 13.21) years, 60.8% reported being female and 39.3% male. With respect to marital status, 57.2% reported being married, 24.8% single, 13.3% living common law, 1.9% widowed, 1.9% divorced and 0.4% separated. The range for years of education was from never been to school to a master's degree with a mean of 10.25 (SD = 3.81) years of school education, the mean of people living at the house was 4.12 (SD = 1.81) people, and the mean of years living in Juarez was 20.73 (SD = 13.66) years. There are no statistically significant differences between victims and non-victims in demographic variables (see table 1).

Table 1
Demographic Information by Groups

		Non-flood victims	Flood victims	t or χ^2 (p)
N		364	392	
Mean age (SD)		34.44 (13.27)	35.48 (13.15)	-1.08 (0.28)
Mean years of education (SD)		10.46 (3.95)	10.05 (3.67)	1.48 (0.14)
Mean years of living in Juarez (SD)		20.04 (12.67)	21.33 (14.45)	-1.25 (0.21)
Mean of people living at house (SD)		4.15 (1.66)	4.10 (1.94)	0.36 (0.72)
Gender				
	Female (%)	61.9	59.7	0.38 (0.54)
	Male (%)	38.1	40.3	
Marital Status				
	Single (%)	27.1	22.6	3.83 (0.57)
	Married (%)	57.1	57.3	
	Living Common Law (%)	11.9	14.7	
	Divorced (%)	1.4	2.3	
	Widowed (%)	2.2	2.6	
	Separated (%)	0.3	0.5	

Instruments

Psychological Effects of Floods Scale (PEFS). This scale was designed to measure symptoms of depression, anxiety and PTSD in people who have been victims of floods (Esparza-Del Villar et al., 2011). It has 20 items with a Likert-type answer format of five options (from "nothing" to "too much") and a factor structure composed of two factors: one factor with symptoms of depression and a second factor with symptoms of anxiety and posttraumatic stress disorder (APTSD). The scale has adequate convergent validity and internal reliability values, α = 0.85 for depression and α = 0.88 for APTSD (Esparza-Del Villar et al., 2011).

Multidimensional Fatalism Scale (MFS). This instrument has 30 items with a five options Likert-type response scale (from "strongly disagree" to "strongly agree") and is composed of five factors: fatalism, pessimism, internality, luck and divine control (Esparza et al., 2014). The MFS has been validated in both English and Spanish and has adequate reliability and validity properties (Esparza et al., 2014).

Social support. Two types of social support were assessed: social support received and given (Stimpson, 2005). The response options were "yes" and "no". There are four items that assessed social support received

that included items like "Since the start of the flooding, if you had an important decision to make, has there always been someone whose advice you would likely to ask and rely on?". The social support given was assessed with four items that included items like "Has there been anyone who has relied on you for this type of advice since the start of the flooding?". The internal reliability for the first part of the scale was KR-20 = 0.81, and for the second part was KR-20 = 0.72 in this sample.

Economic hardship. This scale was composed of four items with "yes" and "no" response options and it measures economic hardship in the last 12 months (Stimpson, 2005). It evaluates if the person has had substantial decline in their income, problems paying bills on time, using savings to get by financially and having been laid off from their job. The internal reliability for these four items was KR-20 = 0.59 in this sample.

Impact on family and job. Impact on family and job was measure with two items developed by the authors. These items are "How much did the flood affect your family?" and "how much did the flood affect your job?". The response included five options, Likert-type, from "nothing" to "too much".

Demographic information. Participants were asked for their age, gender, marital status, years of education, number of people living in the house, and years living in Juarez.

Procedure

After heavy rain in July 2008, several areas in Juarez were flooded. The affected zones were identified and the research team visited the houses, in August and September 2008, that were flooded to interview flood victims, and they also interviewed non-victims from the same neighborhoods to control for socioeconomic status. People were asked to participate, they were given a consent form, questions were answered when asked, and they were given a set of several instruments to complete. The administration of the tests, which were all in Spanish, lasted approximately 20 minutes, and after they were done, they were debriefed. All actions and procedures of this study was reviewed and approved by the Ethics Committee of the Autonomous University of Juarez City.

The information was captured in SPSS 23.0, and the data was analyzed with t-tests, correlations and hierarchical multiple linear regressions (HMLR). Flood victims and non-victims were compared in levels of depression and APTSD using t-tests and Cohen's d to measure the magnitude of the differences. There were two HMLR that were analyzed with depression and APTSD as predicted variables and with the following predictor variables: age, gender, people living at home, years living in Juarez, house damage, economic hardship, impact on family, impact on job,

social support received, social support given, fatalism, pessimism, internality, luck, and divine control.

Results

Depression and APTSD comparisons.

Flood victims and non-victims were compared in depression and APTSD levels. There was a significant difference between both groups in depression, t (754) = -7.84, p < 0.01, where flood victims reported higher levels of depression with a mean of 18.78 (SD = 7.52) than the non-victim group who reported a mean of 14.92 (SD = 5.87). The magnitude of the effect was moderate with a Cohen's d of 0.57 (Cohen, 1977). There was also a statistically significant difference in APTSD levels, t (754) = -12.74, p < 0.01, where flood victims reported higher levels of APTSD with a mean of 29.36 (SD = 10.25) than the non-victim group who reported a mean of 20.77 (SD = 8.07). The magnitude of the difference was large with a Cohen's d of 0.93 (Cohen, 1977).

Correlations

Before analyzing the HMLR, correlations among all variables were calculated in flood victims (see table 2). Depression had statistically significant correlations with APTSD (r = 0.68), house damage (r = 0.35), economic hardship (r = 0.20), impact on family (r = 0.36), impact on job (r = 0.32), fatalism (r = 0.20), and pessimism (r = 0.28). APTSD had statistically significant correlations with depression (r = 0.68), age (r = 0.14), house damage (r = 0.52), economic hardship (r = 0.35), impact on family (r = 0.56), impact on job (r = 0.47), social support given (r = 0.11), and pessimism (r = 0.25).

Table 2
Summary of Intercorrelations for Values of Demographic Information, Impact of Flood, Social Support, and MFS

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
1. Depression															
2. APTSD	0.68**														
3. Age	0.09	0.14**													
4. People living at home	0.07	0.07	-0.12*												
5. Years living in Juarez	-0.08	-0.07	0.48**	-0.11*											
6. House damage	0.35**	0.52**	0.05	-0.07	-0.01										
7. Economic hardship	0.20**	0.35**	0.06	0.05	0.01	0.29**									
8. Impact on family	0.36**	0.56**	0.01	0.03	-0.01	0.60**	0.26**								
9. Impact on job	0.32**	0.47**	-0.01	0.03	-0.09	0.42**	0.29**	0.41**							
10. Social support received	-0.08	0.05	0.01	-0.10*	0.08	0.11*	0.19**	0.11*	0.04						
11. Social support given	0.04	0.11*	0.04	-0.01	-0.01	0.09	0.23**	0.11*	0.11*	0.35**					
12. Fatalism	0.20**	0.07	-0.06	0.10*	-0.07	0.13*	0.03	0.08	0.03	-0.06	0.04				
13. Pessimism	0.28**	0.25**	0.03	0.17**	-0.05	0.06	0.08	0.14**	0.04	-0.14**	-0.01	0.33**			
14. Internality	-0.07	-0.04	-0.02	0.03	-0.02	0.03	0.08	-0.04	0.11*	-0.01	-0.03	0.07	-0.09		
15. Luck	-0.02	-0.01	0.07	0.10*	-0.10	-0.07	-0.08	-0.10*	-0.05	-0.06	0.01	0.22**	0.40**	0.04	
16. Divine control	-0.03	0.02	0.05	0.09	-0.01	0.08	0.05	0.10*	-0.02	0.03	0.07	0.42**	0.22**	0.14**	0.32**

Note. * $p < .05$. ** $p < .01$

Hierarchical multiple linear regressions

Two HMLR were calculated with the sample of flood victims, one with depression and the other with APTSD as predictive variables. Both regressions were analyzed with the same blocks as follows. For the first block, demographic variables were used as predictor variables which included age, gender, people living at home, and years living in Juarez. The second block had variables related to the impact of the flood and it included house damage, economic hardship, impact on family, and impact on job. The third block analyzed social support variables which included social support received and social support given. The fourth and final block included the factors of the MFS which were fatalism, pessimism, internality, luck, and divine control.

In the first HMLR, depression as a predictive variable had a final R^2 value of 0.31 ($p < 0.01$), and all of the blocks had a statistically significant changes in R^2 except for the third block that included the social support variables (see table 3). In the second HMLR, APTSD as a predictive variables had a final R^2 value of 0.51 ($p < 0.01$), and all of the blocks had statistically significant change in R^2 (see table 4).

Table 3
Hierarchical Multiple Regression Analyses Predicting Depression From Demographic Information, Impact of Flood, Social Support, and MFS

Variable	Model 1			Model 2			Model 3			Model 4		
	B	SE B	β	B	SE B	β	B	SE B	β	B	SE B	β
Age	0.11	0.03	0.20**	0.09	0.03	0.16**	0.09	0.03	0.16**	0.10	0.03	0.18**
Gender (0 = female; 1= male)	-1.26	0.77	-0.08	-0.82	0.71	-0.05	-0.82	0.71	-0.06	-0.87	0.68	-0.06
People living at home	0.34	0.20	0.09	0.32	0.18	0.08	0.27	0.18	0.07	0.16	0.18	0.04
Years living in Juarez	-0.08	0.03	-0.16**	-0.06	0.03	-0.12*	-0.06	0.03	-0.11*	-0.06	0.03	-0.12*
House damage				0.45	0.18	0.15*	0.46	0.18	0.16**	0.43	0.17	0.14*
Economic hardship				0.28	0.31	0.05	0.39	0.32	0.06	0.33	0.31	0.05
Impact on family				0.95	0.37	0.16**	0.98	0.37	0.16**	0.77	0.36	0.13*
Impact on job				0.91	0.29	0.18**	0.88	0.28	0.17**	0.95	0.27	0.18**
Social support received							-0.55	0.24	-0.12*	-0.32	0.23	-0.07
Social support given							0.03	0.28	0.01	-0.01	0.26	0.01
Fatalism										0.55	0.17	0.17**
Pessimism										0.61	0.16	0.20**
Internality										-0.24	0.16	-0.07
Luck										-0.19	0.15	-0.07
Divine control										-0.33	0.13	-0.13**
R^2		0.05**			0.22**			0.23			0.31**	
Change in R^2					0.17**			0.01			0.08**	

Note. * $p < .05$. ** $p < .01$

Table 4

Hierarchical Multiple Regression Analyses Predicting APTSD From Demographic Information, Impact of Flood, Social Support, and MFS

Variable	Model 1 B	SE B	β	Model 2 B	SE B	β	Model 3 B	SE B	β	Model 4 B	SE B	β
Age	0.19	0.04	0.24**	0.14	0.03	0.18**	0.14	0.03	0.18**	0.13	0.03	0.17**
Gender (0 = female; 1= male)	-3.13	1.03	-0.15**	-2.14	0.78	-0.11**	-2.19	0.79	-0.11**	-2.08	0.78	-0.10**
People living at home	0.48	0.26	0.09	0.40	0.20	0.08*	0.40	0.20	0.08*	0.32	0.20	0.06
Years living in Juarez	-0.12	0.04	-0.17**	-0.09	0.03	-0.12**	-0.09	0.03	-0.12**	-0.08	0.03	-0.12**
House damage				0.81	0.20	0.20**	0.82	0.20	0.20**	0.86	0.20	0.21**
Economic hardship				1.07	0.35	0.13**	1.06	0.36	0.13**	1.04	0.35	0.12**
Impact on family				2.31	0.41	0.28**	2.30	0.41	0.28**	2.13	0.41	0.26**
Impact on job				1.61	0.32	0.23**	1.60	0.32	0.23**	1.64	0.31	0.23**
Social support received							-0.11	0.27	-0.02	0.06	0.27	0.01
Social support given							0.14	0.31	0.02	0.13	0.30	0.02
Fatalism										-0.11	0.19	-0.03
Pessimism										0.63	0.19	0.15**
Internality										-0.24	0.18	-0.05
Luck										0.04	0.17	0.01
Divine control										-0.19	0.15	-0.06
R^2		0.08**			0.48**			0.48**			0.51**	
Change in R^2					0.40**			<0.01			0.03**	

Note. * $p < .05$. ** $p < .01$

Discussion

Hundreds of people were victims of floods in Juarez, in July 2008, and as in previous studies, most of them showed symptoms of depression and APTSD as a result of the loss of their personal things and damage done to their houses and cars. This study analyzed depression and APTSD symptoms in flood victims immediately after the floods, and also the predictors of these symptoms which included damage caused by floods, social support and fatalism related factors.

Flood victims reported a statistically significant difference in depression and APTSD symptoms replicating previous research that have found consequences in mental health of flood victims. In our study, APTSD symptoms were much higher in flood victims, with a large difference (d = 0.93), than depression levels, with a moderate difference (d = 0.57) between groups. People manifest more symptoms of anxiety and PTSD as measured by the scale, and when participants were interviewed, researchers noticed how the people were preoccupied doing things to protect their properties in case that more rain fell again. They were very active fixing all damages done to their houses, but at the same time they reported being afraid when they saw dark clouds in the sky. People might have been sad from their losses but worried trying to prevent more losses in case the rain would continue.

The correlations showed several statistically significant correlations between the variables but APTSD had the strongest correlations when compared to depression. The correlation between age and APTSD was the only statistically significant for the demographic variables. All of the variables related to damage caused by floods were statistically significant, and for the social support variables, the only significant correlation was between social support given and APTSD but it was low (r = 0.11). For the fatalism related variables, fatalism correlated with depression, and pessimism with both depression and APTSD. Contrary to what was predicted (Dai et al., 2016; Greene et al., 2015), social support does not correlate strongly with depression and APTSD.

The predictor variables in the HMLR explained 31% of the variability of depression (R^2 = 0.31), and eight standardized betas were statistically significant. These significant standardized betas were in the low correlation range, with pessimism reporting the highest value with β = 0.20. It was expected that these predictor variables would explain more variability than what was predicted. For the HMLR with APTSD as the predictive variable, the predictor variables explained 51% of the variability of APTSD (R^2 = 0.51), and the eight statistically significant standardized betas were between the low and the medium range with the variable of impact on family having the strongest beta (β = 0.26). APTSD was better explained by the predictor variables than depression and in both analyzes the second block,

variables related to the impact of the flood, was the block that explained the most variability of the predictive variables.

Conclusion

Victims of floods in Juarez, Mexico, reported higher levels of depression and APTSD than non-victims. Floods have an impact in the mental health of people, and the highest impact was found in the APTSD factor. Symptoms of depression and APTSD was measured with a validated scale in Mexican population, and these variables were correlated to social support and fatalism related factors. Social support does not predict depression or APTSD symptoms, from the MFS fatalism and pessimism predicts depression, and pessimism predicts APTSD. Variables related to the impact of the flood in victims were the variables that best predicted both depression and APTSD.

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