Characteristics of individuals meeting criteria for new onset panic attacks following exposure to a typhoon

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Abstract

The association between trauma exposure and panic attacks has received increased attention over the past decade, with mounting evidence suggesting an overlapping etiologic pathway. This study examined the incidence of new onset panic attacks in 775 Vietnamese individuals in the 2–3 months following Typhoon Xangsane. Pre-typhoon (Wave 1) and post-typhoon (Wave 2) assessments were conducted, allowing for consideration of factors occurring prior to the typhoon in addition to typhoon-relevant responding. Of the 775 participants, 11.6% (*n*=90) met criteria for lifetime panic attack pre-typhoon and 2.8% (*n*=22) met post-typhoon panic attack criteria. Individuals with pre-typhoon panic were significantly older and reported less education compared to the no-panic group. Individuals in both panic groups were more likely to screen positive on a Wave1 psychiatric screening measure, endorse greater typhoon exposure and prior traumatic event exposure and were significantly more likely to meet DSM-IV criteria for posttraumatic stress disorder (PTSD) and major depression (MDD) post-typhoon compared with persons reporting no history of panic attacks. Pre and post-typhoon panic exhibited similar patterns across variables and both panic conditions were associated with the development of PTSD and MDD, suggesting that persons experiencing panic attacks may represent a vulnerable population in need of early intervention services.

Keywords

Panic attacks; Depression; Trauma; Anxiety; Incidence; Natural disaster; General population

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1. Introduction

The association between exposure to a traumatic event and panic has received increased attention over the past decade. The extent literature indicates a high incidence of panic attacks (69–77%) among those exposed to trauma and adults seeking treatment services for trauma-related impairment and symptomatology (Bornovalova et al., 2013; Bryant and Panasetis, 2001; Bulik et al., 2007). Peri-traumatic panic attacks also predict the development of acute stress disorder and posttraumatic stress disorder (PTSD; Bornovalova et al., 2013; Bryant and Panasetis, 2001; Bulik et al., 2007). Related, a considerable number of individuals with panic disorder with and without agoraphobia (PD/PDA) report a lifetime history of Criterion A trauma exposure (Bornovalova et al., 2012; Falsetti et al., 1995; Nes et al., 2007), and clinical and epidemiological samples suggest significant levels of current and lifetime diagnostic comorbidity between PTSD and PD/PDA (Brown et al., 2001; Kessler et al., 1995; Perkonigg et al., 2000). Furthermore, past research has documented the onset of panic attacks following exposure to various types of traumatic events, particularly among those endorsing higher levels of peri-traumatic arousal (Orstavik et al., 2007).

Associations between trauma exposure and panic attacks have also been documented in non-Western samples. For example, Cambodian and Vietnamese refugees have reported experiencing *DSM-IV* panic attacks, as well as culturally specific manifestations of panic attacks (e.g., orthostatic panic), at relatively high rates, with the experience of panic being related to higher rates of psychopathology (Hinton et al., 2003, 2005). Panic attacks have also been theorized to be involved in clinically significant bi-directional relationships with post-trauma psychopathology, namely PTSD, in Southeast Asian samples, a relationship hypothesized to be centered around fear network activation (Hinton et al., 2008).

Although panic reactions following trauma are gaining increasing clinical attention, particularly in non-Western samples, the phenomenology of these reactions has not been rigorously studied, particularly during the phase immediately following trauma exposure. Similarly, to our knowledge, there have not been investigations of rates of post-trauma panic attacks in representative, epidemiologic samples. In addition, it is not clear whether the characteristics of individuals with new-onset panic attacks post-trauma differ from those of trauma-exposed individuals endorsing a pre-existing history of panic attacks. If it appears that these individuals differ meaningfully from one another, investigation of unique etiological pathways to panic attacks and related psychopathology may be warranted. Finally, although multiple studies addressing the occurrence of panic attacks have been conducted among trauma-exposed individuals from various regions of Southeast Asia, they have primarily focused on refugee populations. Therefore, investigation of panic attacks in individuals from this region experiencing other types of traumatic events is needed. Disaster-exposed samples are ideal for investigating post-traumatic panic attacks, given that disasters are random events (i.e., not affected by familial liability for trauma exposure; Stein et al., 2002) and given that there is greater similarity in individuals' traumatic experiences compared to mixed-trauma samples.

The current study examines the incidence of new-onset panic attacks in 775 Vietnamese adults residing in the DaNang province in the 2–3 months following Typhoon Xangsane, which was responsible for at least 72 deaths, hundreds of severe injuries, and at least $629 million in damages in Vietnam (Iglesias, 2006; Reichborn-Kjennerud et al., 2007). The investigation originated as a representative mental health needs assessment but was modified to assess post-disaster responding following the typhoon; therefore, the current study has the advantage of pre-typhoon data, which is incredibly rare for disaster studies given the unpredictable nature of disasters. The aim of the current study was to provide descriptive data on the comparison of individuals with new-onset panic attacks post-typhoon,

individuals with a pre-typhoon history of panic attacks, and individuals with no history of panic attacks on a variety of demographic (e.g., sex, age, religious affiliation, educational attainment), pre-morbid (i.e., pretyphoon psychiatric screening status), peri-traumatic (i.e., severity of typhoon exposure, peri-traumatic fear), and post-traumatic (i.e., prevalence of PTSD, major depression [MDD], and generalized anxiety disorder [GAD]) characteristics.

2. Method

This brief report represents one component of a larger multi-component study. An overview of the methodology is provided here, and full methodological details are provided elsewhere (Amstadter et al., 2009). In August 2006, professional interviewers surveyed 1914 households in the DaNang & Khanh Hoa provinces of Vietnam for the purposes of establishing prevalence estimates of mental health problems and associated needs of individuals in Vietnam. The initial data collection (referred to hereafter as Wave 1) occurred between August and October of 2006, with typhoon Xangsane striking the Da Nang province on October 26th. Participant recruitment and interviewing were halted, and study personnel consulted with the Disaster Research Education and Mentoring Center (DREM), a National Institute of Mental Health-funded research advisory group. The research design was adapted so that a randomly selected sample of approximately 800 participants who had been screened prior to the typhoon were re-assessed following the event, this time with diagnostic data (Wave 2), conducted between January 8 and January 15, 2007 (i.e., less than 3 months post-typhoon), in 21 of the 28 communes in Da Nang. These procedures yielded a total of 798 completed interviews. Full data for the current study were available for 775 participants. The present investigation utilizes the pretyphoon self-report data (Wave 1) as well as the post-typhoon (Wave 2) interview data on panic attacks, MDD, GAD, and PTSD.

2.1. Demographic variables (Wave 1)

Standard demographic variables were assessed, including sex (1=male, 2=female), marital status (0=unmarried, 1=married), occupational status (0=unemployed, 1=employed), age, religious affiliation (0=no, 1=yes), and education.

2.2. Self Reporting Questionnaire-20 (SRQ-20; Wave 1)

The SRQ-20 is a 20-item self-report screening measure developed by the World Health Organization (WHO) to assess the likelihood of an individual meeting criteria for any psychiatric disorder (1994). Respondents mark items dichotomously to indicate the presence or absence of symptoms over a 30-day recall period to obtain a maximum score of 20. Results are recommended to be reported as a dichotomous "case" or "non-case"; however, the contribution of individual items to this measure of "caseness" may be suggestive of the particular category of mental disorder they represent. Based on the recommendations of the literature (Harpham et al., 2003; Tuan et al., 2004), a cut-off of 7/8 (i.e., 7=probable non-case; 8=probable case) has been chosen for this study and has been commonly reported in a range of studies conducted in developing countries and is recommended by the WHO (1994). The SRQ-20 has been found to be reliable and valid in Vietnamese studies (Giang, 2006), and high internal reliability was found in the present sample (Cronbach's alpha=0.87).

2.3. Potentially traumatic event (PTE) exposure (Wave 2)

Participants were asked if they had been exposed to: (1) a natural disaster (other than the current typhoon), (2) a serious motor vehicle accident, (3) a weapon attack, (4) an attack without a weapon, (5) military combat or a war zone, and (6) sexual exploitation/violence. All lifetime events were assessed for Criterion A2, and a dichotomous variable of at least one previous Criterion A PTE versus no previous Criterion A PTE exposures was created.

2.4. Typhoon exposure (Wave 2)

As reported in our prior research with hurricanes (Acierno et al., 2006; Iglesias, 2006; Norris et al., 2002), typhoon exposure variables included yes–no responses that assessed: evacuation, being personally present during typhoon-force winds or flooding, damage to home or property, being unable to live in the home due to damage, fear during the storm, injury to self, and injury or death to a family member. These items were summed and used as an ordinal variable (possible range=0–7).

2.5. Peri-traumatic fear (Wave 2)

To evaluate peri-traumatic fear during the typhoon in more detail, participants were asked to answer the following question on a 1–5 scale, "Whether you evacuated or not, how afraid were you during the typhoon that you might be killed or seriously injured during the storm?". Responses were dichotomized as 0 (no or minimal fear) or 1 (moderate to severe fear).

2.6. DSM-IV diagnostic assessment

PTSD (Wave 2)—PTSD following the typhoon was assessed via the National Women's Study PTSD module (NWS-PTSD). The NWS-PTSD measure is commonly used in population-based epidemiological research and is modified from the Diagnostic Interview Schedule. PTSD was based on DSM-IV symptom requirements (i.e., three avoidance, one intrusion, and two arousal symptoms), including functional impairment. Among individuals in the present study who screened into the NWS-PTSD module, Cronbach's alpha for assessed symptoms was 0.86.

MDD (Wave 2)—The assessment of MDD since the typhoon was measured using structured interview questions modified from the Structured Clinical Interview for DSM-IV (Spitzer et al., 1995), which measured MDD criteria using a yes/no response format for each DSM-IV symptom. Respondents met criteria for MDD if they endorsed 5 or more depressive symptoms for at least 2 weeks. Strong internal consistency and convergent validity was observed for this measure and Cronbach's alpha for individuals in the present study who screened into the MDD module was 0.82.*GAD* (*Wave 2*).

GAD following the typhoon was assessed using a slightly modified version of the Structured Clinical Interview for DSM-IV (Spitzer et al., 1995) again using yes/no response options. To meet diagnostic criteria for GAD required endorsement of excessive and poorly controlled anxiety and worry occurring more days than not for a period of 6–9 months. Moreover, three of six hallmark GAD symptoms also were required, including restlessness, fatigue, concentration problems, irritability, tension, and sleep disturbance. The GAD module demonstrated good internal consistency in the current sample for those individuals who screened into the section (Cronbach's alpha=0.85).

Panic Attacks (Wave 1 and 2)—Participants were categorized as having a "new onset" (post-typhoon) panic attack if: (1) they endorsed the panic attack probe, (2) reported experiencing four or more *DSM-IV* panic attack symptoms occurring within a single panic episode, and (3) experienced an onset of panic attacks after the Wave 1 assessment (i.e., exclusively during or after the typhoon). That is, the post-typhoon panic group had onset of panic attacks post-typhoon with no history of panic attacks pre-typhoon. Participants were classified with a pre-typhoon panic attack history if: (1) they endorsed the panic attack probe, (2) experienced four or more *DSM-IV* panic attack symptoms occurring within a single panic episode, and (3) their age at the Wave 1 assessment was greater than the age of onset of the panic attacks. Thus, individuals in the pre-typhoon panic group reported a history of panic attacks before the typhoon. Using these criteria, participants fell into one of

three categories: no lifetime history of panic attack; history of pre-typhoon panic attack; or new-onset/post-typhoon panic attack.

2.7. Statistical analyses

Descriptive analyses were conducted to compare the three panic attack groups (no history of panic attack, pre-typhoon panic attack, and post-typhoon panic attack) on study variables at the univariate level. The two panic groups (pretyphoon panic attack and post-typhoon panic attack) and the no history of panic attack group, were compared using Chi-square analyses (for dichotomous variables) with z-tests to compare panic group proportions and one-way ANOVAs with Tukey's *post hoc* comparisons for continuous variables. All analyses were conducted in SPSS, version 19 and alpha 0.05 was used for all analyses.

3. Results

Of the 775 participants, 11.6% (*n*=90) met criteria for lifetime panic attack pre-typhoon, 2.8% (*n*=22) met post-typhoon panic attack criteria, and 85.5% (*n*=663) reported no history of panic attack.

3.1. Characteristics of panic in the pre-typhoon and post-typhoon panic groups

No significant difference in the number of panic attack symptoms was observed for the pre- and post-typhoon panic groups, with the pre-typhoon panic group reporting a mean of 9 symptoms (S.D.=3.1) and the post-typhoon panic group endorsing a mean of 7.5 symptoms (S.D.=4.0), ($t(1,110)=1.86$, $p>0.05$). Of the respondents' reporting pre-typhoon panic attacks, 49.4% (*n*=44) of these individuals experienced a panic attack in the post-typhoon period. Of these 44 individuals, 56.8% (*n*=25) reported their panic as occurring immediately after the typhoon while the remaining 43.2% (*n*=19) reported their panic as occurring approximately 1 month or more after the typhoon. Of persons with new onset panic, 77.3% (*n*=17) experienced their panic immediately after the typhoon whereas 22.7% (*n*=5) of these respondents reported onset of panic occurring one month or more after the storm. Within the new onset panic group, 41% (*n*=9) reported persistent panic attacks (i.e., panic occurring from immediately after the typhoon until the time of the post-typhoon assessment).

3.2. Pre-morbid and post-typhoon factors associated with the panic groups

Outcomes associated with univariate analyses examining panic group differences in pre-morbid and post-typhoon factors are presented in Table 1. Results of the demographic factors indicated that individuals in the pre-typhoon panic group were significantly older than the no panic group and the post-typhoon panic group. The pre-typhoon panic group also reported completing less education compared to the no panic group. There was a significant difference in endorsement of a religious affiliation, with the two panic groups (pre- and post-typhoon panic) being less likely to endorse a religion relative to the no panic group. In terms of pretyphoon psychiatric variables, both the pre- and post-typhoon panic groups were more likely to screen positive on the SRQ-20 (assessed at Wave 1) and to endorse a history of PTE exposure (assessed at Wave 2) compared to the no panic group. The number (and percent) of individuals endorsing DSM-IV Criterion A traumatic events by the two panic attack groups (pre- and post-typhoon) and the no panic group is presented in Table 2. Both of these groups reported a greater number of past PTEs compared with the no panic group.

With regard to peri-typhoon factors, the pre- and post-typhoon panic groups reported greater severity of exposure to the typhoon (Table 1). Post-typhoon psychiatric functioning also indicated that pre- and post-typhoon panic groups were more likely to meet *DSM-IV* criteria for PTSD and MDD compared with the no panic group (Table 3). The pre-typhoon panic

group also met criteria for GAD at higher rates than the no panic group, with no significant difference observed between the pre- and post-typhoon panic groups.

4. Discussion

To our knowledge, this is the first study to estimate the rate of new-onset panic attacks in a non-Western general population sample following a natural disaster, which is uniquely suited for such an investigation as disasters are random events that affect large numbers of individuals simultaneously. We observed that 2.8% of persons surveyed met criteria for new-onset panic attack in the acute post-typhoon period, and 11.6% reported a lifetime history of panic attacks. Interestingly, there were few differences between persons who experienced panic attacks before the typhoon and those who experienced panic attacks in the acute phase of the typhoon, with the exception of current age, where the pre-typhoon panic group was older. Both panic attack groups evidenced post-typhoon PTSD and MDD at similar rates (though, markedly higher than the no-panic group, consistent with work by Hinton et al. (2003, 2005) and exhibited many panic-related similarities. These findings suggest that individuals experiencing new-onset panic attacks in the post-typhoon period did not differ substantively from those trauma-exposed individuals endorsing a pre-typhoon history of panic attacks in terms of demographics, risk factors, trauma-related characteristics, panic features, and post-typhoon rates of PTSD and MDD.

Examination of factors assessed pre- and post-typhoon indicates that persons reporting pre- and post-typhoon panic differed significantly on a number of factors compared to persons with no history of panic. In all, persons with a panic history, regardless of whether the panic was pre-existing or new-onset, reported a prior history of exposure to a PTE and increased typhoon exposure severity at higher rates than those without a panic history. These findings are consistent with previous research suggesting a high rate of trauma exposure in those with panic disorder (Bornovalova et al., 2012; Falsetti et al., 1995; Nes et al., 2007). Additionally, those with any panic history evidenced lower pre-typhoon psychological functioning, as well as greater post-typhoon comorbidity with PTSD and MDD, compared to those without a panic history, which is also consistent with extant work by Hinton and colleagues who reported that panic attacks were related to higher rates of psychopathology in Cambodian and Vietnamese refugees (Hinton et al., 2003, 2005). Panic attacks have been implicated in clinically significant bi-directional relationships with post-trauma psychopathology, a relationship hypothesized to be centered around fear network activation (Hinton et al., 2008). Our findings support the tentative interpretation that individuals prone to panic were expressing elevated psychological risk before the typhoon, which coupled with increased typhoon-related exposure and stress likely increased their risk for experiencing a panic attack(s) in the acute post-storm period.

Strengths of the present study include the collection of data regarding respondents' premorbid functioning, which is rare for traumatic stress studies, as exposure to such events is difficult to predict. The current data provide a timely glimpse into the emotional well being of a non-Western general population sample before they experienced a significant traumatic event and provides us the first estimate of the number of people who experience panic in the acute, post-trauma period. Nonetheless, the present study is not without its limitations. Despite a reasonably large sample, the absolute number of individuals experiencing panic attacks (particularly new-onset) or trauma-related difficulties was low, precluding use of risk prediction models. Thus, larger, longitudinal samples are needed to provide increased power to detect associations between panic and trauma-related factors as well as enhance our ability to dissect the potential role that panic plays in the development of PTSD/MDD and vice versa. Additionally, the original study design was not for a disaster study, and as such, extensive risk factors for negative mental health were not assessed pre-

typhoon. Measures used were validated on US populations, and though back-translation occurred, this is a limitation of this study. Additionally, all data were self-report in nature, and clinical interview data were not attained prior to the typhoon; therefore, only the SRQ-20 was available to assess pre-typhoon psychiatric distress. Nonetheless, this study provides unique descriptive data on an understudied population during a distinctly critical time period.

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Table 1

Panic attack group (No History of Panic Attack, Pre-Typhoon Panic Attack, Post-Typhoon Panic Attack) comparisons on premorbid factors.

	Premorbid factors				
	F	d.f.	χ^2	*p*	Mean (S.D.) or %
Sex (% female)			2.35	0.31	
No Panic					54.8%
Panic Attack Onset Pre-Typhoon					62.2%
Panic Attack Onset Post-Typhoon					63.6%
Age (Years)	16.33	774		< 0.001	
No Panic					40.2 (15.4)[a]
Panic Attack Onset Pre-Typhoon					50.5 (20.0)[a,b]
Panic Attack Onset Post-Typhoon					39.9 (16.6)[b]
Education level[§]	17.83	765		< 0.001	
No Panic					2.8 (1.4)[a]
Panic Attack Onset Pre-Typhoon					1.9 (1.2)[a]
Panic Attack Onset Post-Typhoon					2.2 (1.1)
Employment status (% Employed)			3.49	0.18	
No Panic					86.7%
Panic Attack Onset Pre-Typhoon					92.2%
Panic Attack Onset Post-Typhoon					95.5%
Marital status (% married)			2.63	0.27	
No Panic					70.4%
Panic Attack Onset Pre-Typhoon					62.2%
Panic Attack Onset Post-Typhoon					72.7%
Religious affiliation (% with affiliation)			11.22	< 0.01	
No Panic					25.6%[a,b]
Panic Attack Onset Pre-Typhoon					13.3%[a]
Panic Attack Onset Post-Typhoon					4.5%[b]
Pre-typhoon SRQ-20 (% positive screen)			24.12	< 0.001	
No Panic					17.3%[a,b]
Panic Attack Onset Pre-Typhoon					37.8%[a]
Panic Attack Onset Post-Typhoon					36.4%[b]
PTE exposure (% with PTE history)			55.29	< 0.001	
No Panic					40.6%[a,b]
Panic Attack Onset Pre-Typhoon					81.1%[a]
Panic Attack Onset Post-Typhoon					63.6%[b]
Severity of typhoon exposure	15.15	773		< 0.001	
No Panic					3.1 (1.3)[a,b]
Panic Attack Onset Pre-Typhoon					3.7 (1.2)[a]
Panic Attack Onset Post-Typhoon					4.0 (1.4)[b]

					Premorbid factors
	F	**d.f.**	**χ^2**	**p**	**Mean (S.D.) or %**
Peri-traumatic fear (% with moderate to severe fear)			23.45	< 0.001	
No Panic					60.4%[a]
Panic Attack Onset Pre-Typhoon					85.6%[a]
Panic Attack Onset Post-Typhoon					77.3%

Note: "No Panic"=no lifetime history of panic attacks, "Panic Attack Onset Pre-Typhoon"=lifetime history of panic attacks with onset occurring prior to exposure to the typhoon, "Panic Attack Onset Post-Typhoon"=onset of panic attacks post-typhoon with no history of panic pre-typhoon.

Alpha superscripts denote statistically significant post-hoc group contrasts at *p* < 0.05. The a and b superscripts indicate statistically significant differences.

[§] Higher values reflect higher levels of achieved educational attainment.

Table 2

The number of individuals endorsing DSM-IV criterion A traumatic events by the Two Panic Attack Groups and the No Panic Attack Group.

	No Panic	Panic Attack Onset Pre-Typhoon	Panic Attack Onset Post-Typhoon	Total Sample
Type of Trauma-N (%)				
Natural disaster	131 (19.8)	42 (46.7)	9 (40.9)	187 (23.8)
Motor vehicle accident	100 (15.1)	37 (41.1)	6 (27.3)	146 (18.6)
Weapon attack	31 (4.7)	16 (17.8)	5 (22.7)	52 (6.6)
Non-weapon attack	16 (2.4)	14 (15.6)	2 (9.1)	33 (4.2)
Combat	121 (18.3)	41 (45.6)	7 (31.8)	173 (22.0)
Sexual trauma	46 (6.9)	25 (27.8)	7 (31.8)	80 (10.2)

Note: "No Panic"=no lifetime history of panic attacks, "Panic Attack Onset Pre-Typhoon" =lifetime history of panic attacks with onset occurring prior to exposure to the typhoon, "*Panic Attack Onset Post-Typhoon*"=onset of panic attacks post-typhoon with no history of panic pre-typhoon.

Table 3

Panic attack group (No History of Panic Attack, Pre-Typhoon Panic Attack, Post-Typhoon Panic Attack) comparisons on rates of post-typhoon PTSD, MDD, and GAD.

	Post-typhoon diagnoses		
	χ^2	*p*	**%**
PTSD (% with diagnosis)	31.09	< 0.001	
No Panic			1.1%[a,b]
Panic Attack Onset Pre-Typhoon			10.0%[a]
Panic Attack Onset Post-Typhoon			9.1%[b]
MDD (% with diagnosis)	59.87	< 0.001	
No Panic			3.2%[a,b]
Panic Attack Onset Pre-Typhoon			26.7%[a]
Panic Attack Onset Post-Typhoon			14.3%[b]
GAD (% with diagnosis)	7.70	0.02	
No Panic			1.5%[a]
Panic Attack Onset Pre-Typhoon			5.9%[a]
Panic Attack Onset Post-Typhoon			4.5%

Note: "No Panic"=no lifetime history of panic attacks, "Panic Attack Onset Pre-Typhoon" =lifetime history of panic attacks with onset occurring prior to exposure to the typhoon, "Panic Attack Onset Post-Typhoon"=onset of panic attacks post-typhoon with no history of panic pre-typhoon; "PTSD"=Posttraumatic Stress Disorder, "MDD"=Major Depressive Disorder, "GAD"=Generalized Anxiety Disorder. Alpha superscripts denote statistically significant post-hoc group contrasts at *p* < 0.05.