# ORIGINAL RESEARCHES

## THREE YEARS AFTER TYPHOON ONDOY UNTIL *HABAGAT* RAINS: PREVALENCE OF ACUTE STRESS DISORDER AND POST-TRAUMATIC STRESS DISORDER AMONG RESIDENTS OF *BARANGAY* TUMANA, MARIKINA: A CROSS-SECTIONAL, ANALYTICAL STUDY

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**ABSTRACT**

**OBJECTIVE:** This study aimed to determine the prevalence of Acute Stress Disorder and Post Traumatic Stress Disorder among residents of *Barangay* Tumana, Marikina exposed to Typhoon Ondoy in September 2009 and *Habagat* rains in August 2012. **METHODOLOGY:** The Acute Stress Disorder Scale (ASDS) and Impact of Events Scale-Revised (IESR) were administered to 212 subjects. Trauma history was also obtained. When screened positive for Acute Stress Disorder (ASD) and/or Post Traumatic Stress Disorder (PTSD), a confirmatory diagnosis was done through psychiatric clinical interview. **RESULTS:** The study showed a prevalence rate of 10% for ASD and 5% for PTSD. Co-morbid ASD and PTSD were seen in 4% of the subjects. Frequency and type of prior traumatic events were not significantly different among subjects who were positive or negative for ASD/PTSD diagnoses. **CONCLUSION:** There was a significant prevalence of ASD/PTSD diagnoses among residents exposed to Typhoon Ondoy and *Habagat*, thus the need for developing a means of early detection and immediate therapeutic intervention in Filipino communities exposed to natural disasters.

**KEYWORDS:** *Prevalence, Acute Stress Disorder, Post Traumatic Stress Disorder, Typhoon*

**INTRODUCTION**

In an annual statistical review in August 2010 by the Center for Research and Epidemiology Disasters (CRED), the Philippines was ranked as number 1 in the World's Most Disaster Prone Area, garnering a total of 25 natural disasters occurring the previous year (2010). Given its tropical climate, geographic structure and component, the country is predisposed to numerous natural disasters, such as typhoons, sea surface temperature anomalies (such as El Niño), floods and droughts. The most memorable of these disasters was Typhoon Ondoy that drew up a death toll of 337 citizens in September 2009. The amount of damage incurred from the flood reached a staggering 23 billion Philippine Pesos, which included infrastructure, homes and agriculture[1].

The *Habagat* monsoon rains, also known as the "Storm with No Name" that occurred from August 6 until August 8, 2012, brought heavy rain fall and floods reminiscent of Typhoon Ondoy. A few days after the event, the National Disaster Risk Reduction and Management Council (NDRRMC) reported cost of damage of infrastructure and agriculture at 2.25 billion Philippine Pesos, a mortality of 95 people, mostly through drowning, and more than 100,000 people sheltered in evacuation centers[2].

Constant vigilance was promoted in the Psychiatric community in the face of formidable natural disasters that result in loss of human, social and physical resources as well as eventual psychological trauma.

Acute Stress Disorder (ASD) and Post-traumatic Stress Disorders (PTSD) are types of anxiety disorders that occur after exposure to a traumatic event, the main difference being that ASD occurs within a month after a traumatic event. Symptoms that persist after a month warrant a diagnosis of PTSD. Symptoms arise from exposure to an event that involved threat to life or physical integrity, persistently re-experienced through recurrent and intrusive recollections, dreams, distress and a sense of reliving of the traumatic event. Increased arousal, avoidance of stimuli and emotional numbing pertaining to the traumatic event are also experienced, contributing to social and occupational dysfunction. Acute Stress Disorder also differs in that it involves dissociative symptoms like numbing, detachment, derealization, depersonalization or dissociative amnesia. ASD may occur co-morbid with PTSD, usually seen in persons exposed to various or repeated traumatic events. This co-morbidity has the capacity to cause further psychological injury to an individual, evolving into a chronic, debilitating form of PTSD.

Sadly, our present mode of disaster management is more of a reactive approach. Psychiatric interventions, such as debriefing, are performed in only a few locations around

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the country. Majority of victims are unable to seek proper primary health care, let alone psychiatric care, due to lack of awareness and financial resources. Knowing the characteristics and predicaments of a community that is vulnerable to psychological trauma is important in determining the best course of intervention.

Few research studies have been done about ASD and PTSD in the Philippine setting. A mental health survey done on 351 tribal and non-tribal Mount Pinatubo disaster victims 6 years after their displacement following the volcanic eruption in Pampanga on June 12, 1991 showed a prevalence rate of 27.6%[3].

A meta-analysis of the epidemiology of PTSD after disasters done by Galea et al. states that the prevalence of PTSD ranges from 5% to 60% during the 1st to 2nd year after a natural disaster[4].

Demographic statistics often implicated in post-disaster PTSD include female gender, younger age and a low socioeconomic status. Various studies have also emphasized the significance of low social support, greater trauma exposure, greater and permanent loss of resources, more negative life events and low self-esteem as possible predictors of PTSD[3, 5].

A retrospective study of PTSD among flood victims in Hunan, China conducted between 1998 to 1999 showed a prevalence of 8.6% among 38,760 subjects who underwent psychiatric interview using DSM IV criteria, with increased risk for females and older victims[6].

Prevalence of PTSD after the typhoon Xangsane in Vietnam (2006) was 2.6% among 797 participants. Prevalence was associated with higher prior traumatic events and high typhoon exposure[7].

The prevalence rate of PTSD symptoms among adult victims in 2004 in South Thailand post-Tsunami was higher among displaced persons (12%), who experienced more traumatic events such as loss of material resources and livelihood during the Tsunami, compared to non-displaced persons (7% in Phang Nga and 3% in Krabi and Phuket). Higher prevalence is also seen in those aged 35-54, with lower education or had no income after the Tsunami[8].

Screening of PTSD in adult victims of Hurricane Katrina in 2005, showed a 30-day prevalence rate of 30.3% among 594 residents of New Orleans and 12.5 % among 449 residents in the surrounding affected areas of Lousiana, Alabama and Mississippi, with a combined rate of 16.3% prevalence for all. The high rate was strongly associated with hurricane-related stressors and was independent of socio -demographic factors[9].

Most studies on ASD focused on its evolution to PTSD. A study of 320 subjects exposed to a series of 5 typhoons in Guam in November 1992 showed a prevalence of 7.2% for ASD and 15% for Early Traumatic Stress Response (fear, intrusion, avoidance, arousal without dissociation) after 1 week. After 8 months, a prevalence of 5.9% for PTSD was obtained, with a higher point prevalence coming from subjects with ASD[10].

The general objective of this study was to determine the prevalence of Acute Stress Disorder (ASD) and Post-traumatic Stress Disorder (PTSD) among residents of *Barangay* Tumana, Marikina, exposed to Typhoon Ondoy in September 2009 and *Habagat* rains in August 2012. The specific objectives were to describe the sociodemographic profile, about the residents of *Barangay* Tumana, Marikina exposed to Typhoon Ondoy and *Habagat* rains and determine the ff: prevalence of ASD, PTSD and co-morbid ASD and PTSD as well as the association of trauma history and diagnosis of ASD only, PTSD only and co-morbid ASD and PTSD between August – September 2012.

## METHODOLOGY

*Study Area & Population*

This analytical, cross-sectional study was conducted in Marikina, one of the 17 cities located in Metro Manila, Philippines, divided into 2 districts and composed of 16 *barangays* or villages. The community chosen for this study was *Barangay* Tumana, a predominantly impoverished locality next to the Marikina River. The area used to be part of *Barangay* Concepcion Uno but later, was declared an independent sub territory on April 10, 2007. As of 2010, its population was estimated at 41,809[11]. It has a land area of 181.97 hectares, divided into 62 blocks. It was geologically formed by buildup of soil as a result of flooding, erosion and landslide. It is an accretion of land that used to be part of the riverbank. In the past centuries, it was used for farming until it evolved into a residential area with some small commercial areas along the main streets. The residents do not claim ownership of the land. Majority have been living there for the past 2 to 3 decades, despite the awareness of threat of eviction[12].

During the floods of *Habagat*, 25,000 residents were stranded on their rooftops while around 1,500 families were evacuated[13]. Aside from having greater trauma exposure during Typhoon Ondoy and *Habagat*, the *barangay* experienced repeated floods throughout the succeeding years. Aside from the water level reaching past the 2nd or 3rd floors of most houses, a second flood occurred just a few hours after the first one cleared up, causing much frustration, especially among those who had started to clean-up.

The sample size was calculated using the following equation:

$$n = \frac{t^2 \times p(1-p)}{m^2}$$

Where: n = sample size; t = confidence level at 95% (standard value of 1.96); p = estimated prevalence; and m = margin of error. Using a prevalence rate of 11% obtained from the average of previous PTSD studies on natural disasters, particularly hydrological disasters, a confidence level of 95%, and a margin of error of 5%, the desired population size computed was 150 but there were 212 respondents in this study.

The inclusion criteria of the study were: adult residents of *Barangay* Tumana, Marikina, aged 18 years and older who were exposed to Typhoon Ondoy and *Habagat* and who understood English and/or Filipino. Subjects who refused to give consent to participate in the study, were acutely psychotic, had an organic mental syndrome or a serious or uncontrolled medical disease were excluded from the study.

*Data Collection*

The study was conducted from August 27 to October 26, 2012, composed of 2 phases. The screening phase occurred from August 27 until September 8, 2012, while the interview phase was done from August 31 until October 26, 2012. Four sets of self-report questionnaires were given to each participant. Each questionnaire was translated to Tagalog by an experienced, Filipino teacher. Linguistic validation was by translation to English and re-translation back to Tagalog by 3 persons (physician, medical staff employee and a non-medical staff employee).

The first questionnaire included socio-demographic information: age, gender, marital status, occupation, household income, educational attainment and hazard water level based on classification of block. The Red zone of the barangay constituted the blocks, which were first evacuated when water level reached 17 meters. The Orange zone blocks were next to be evacuated when water level reached 18 meters. The Yellow zone blocks evacuated when the water level reached 19 meters or higher[14]. (Appendix 1).

The second questionnaire was a set of Trauma History questions revised from the original 24-item Trauma History Questionnaire (THQ) so as to shorten it and make it more socially relevant to the study population. It included 8 questions about criminal-related events, disaster events, physical injury and death, and sexual abuse. (Appendix 2)

The Acute Stress Disorder Scale was a short 19-item self-report screening scale that measured symptoms of Acute Stress Disorder in response to the *Habagat* rains. It had a sensitivity of 95%, specificity rate of 83% and positive predictive value of 80% in identifying ASD compared with the ASD Interview, a structured clinical interview, in a study on civilian trauma survivors. It included a cluster for dissociative symptoms, which was one of the distinguishing factors of ASD from PTSD. A subject with a combined score of > 9 dissociative symptoms (Questions 1-5) and >28 in other symptoms (Questions 6-19) was screened positive for ASD.

To measure subjective response to Typhoon Ondoy, Impact of Event Scale – Revised (IES-R) was used. It was a short and easily administered self-report screening scale, composed of 22 questions, encompassing the DSM-IV criteria for PTSD. The main strengths of this revised instrument was that it was still short, easily administered and scored, correlated better with the DMS-IV criteria for PTSD and could be used repeatedly to assess progress. It had a sensitivity of 89%, specificity of 85%, positive predictive value of 89% and overall efficiency of 89%. A total score of > 24 was screened positive for PTSD.

During administration of screening questionnaires and diagnostic interview, the time period of the typhoon was clearly specified and temporal occurrence of trauma symptoms were elicited in detail to ensure their correlation.

A meeting was held with the chairmen of the blocks in the barangay to orient them with the purpose of the study, the content and method of administration of the questionnaires. Though random sampling of all 62 blocks was preferred to reduce sampling bias, only 18 chairmen were able to attend and participate. Each was given 30 sets of questionnaires to distribute. The chairmen were told to give the questionnaires at random, such as pulling names blindly from a list of residents of their block or skip houses when walking along a street. A subject was given the option to use an English or Tagalog questionnaire.

Those who screened positive with ASD and/or PTSD was visited at home by the researcher and reassessed using a psychiatric clinical interview based on DSM IV-TR criteria of ASD or PTSD. During the course of data gathering, if a subject presented with psychiatric symptoms, he or she was provided initial supportive psychotherapy and psychoeducation, then advised to follow up in a psychiatric outpatient clinic.

*Data Analysis*

STATA 12.0 was used for data analysis. Descriptive statistics were presented as frequencies or counts, means and percentages or proportions. Prevalence proportion was computed together with standard errors and 95% confidence intervals.

For inferential statistics, tests of significance were set at 5%. To determine the association of frequency of exposure (categorical number of events) and diagnosis (ASD only, PSTD only and comorbid ASD and PSTD), chi-square test was used. To compare the median number of categorical number of events and diagnosis, the Mann-Whitney two-sample statistic was utilized.

**TABLE 1: Sociodemographic Characteristics (N=212)**

| Characteristics | # Respondents | % |
|---|---|---|
| Sex | | |
| Male | 62 | 29.25 |
| Female | 150 | 70.75 |
| Marital Status | | |
| Single | 50 | 23.81 |
| Married | 138 | 65.09 |
| Separated | 3 | 1.42 |
| Widowed | 19 | 8.96 |
| Education | | |
| Some Elementary | 35 | 16.59 |
| Some High School | 101 | 47.87 |
| Some College/ Voc/ Tech Sch | 57 | 27.01 |
| College Graduate | 18 | 8.53 |
| Employment | | |
| Full time | 26 | 12.32 |
| Part time | 40 | 18.96 |
| Self-employed | 22 | 10.43 |
| Housewife/<br>Househusband | 64<br>44 | 30.33<br>20.85 |
| Unemployed Disabled,<br>Retired/ Not Look for work | 8 | 3.79 |
| Student | 7 | 3.32 |
| Monthly Family Income (PhP) | | |
| ≤ 8k | 177 | 83.49 |
| 8,001 – 15k | 27 | 12.74 |
| 15,001 – 30 k | 6 | 2.83 |
| 30,001 – 50k | 1 | 0.47 |
| ≥ 50k | 1 | 0.47 |
| Resident Zone | | |
| Red | 43 | 20.28 |
| Orange | 73 | 34.43 |
| Yellow | 96 | 45.28 |

The association of types of traumatic event and diagnosis (ASD only, PSTD only, and comorbid ASD and PSTD), were determined using chi-square test. Positive predictive values of the screening tests for ASD and PTSD were also computed.

## RESULTS

*Sociodemographic Data*

A total of 212 subjects coming from 18 blocks, were able to participate in this study. The mean age of all respondents in the study was 44 years old (43.81±13.07), while the age range was 18 to 76 years old. Majority of the subjects were female (150, 71%) while the rest were males, (62, 29%). More than half of the subjects were married (138, 65%). Majority of subjects (101, 48%) attained a high school level of education, followed by some college/vocational/technical school level (57, 27%). There were 64 housewives/house husbands composed (30%), followed closely by unemployed subjects (44 subjects, 21%) and part time employees (40 subjects, 19%). The family monthly income of the majority of the subjects was less than 8,000 PhP (177, 83%). A larger portion of the subjects lived in the Yellow zone (45%) compared to Orange and Red zones. However, the unequal distribution of subjects by zones may correspond to the inclusion of only 18 blocks out of all 62 blocks. (Table 1)

Out of 212 subjects, 78 respondents (37%) screened positive for ASD. After clinical interview, 21 respondents (10%) were confirmed to have a diagnosis of ASD based on the DSM IV TR. Of these ASD subjects, 12 had ASD only and no PTSD diagnosis (6%), while 9 (4%) were comorbid for ASD and PTSD. (Table 2)

**TABLE 2: Prevalence of Acute Stress Disorder (ASD)**

| N= 212 | Prevalence # (%) | Std Error | 95% CI |
|---|---|---|---|
| AFTER SCREENING | | | |
| (+) ASD | 78 (36.79) | 3.23 | 33.47 – 40.11 |
| AFTER INTERVIEW | | | |
| ASD only | 12 (5.66) | 1.59 | 4.07-7.25 |
| ASD & PTSD | 9 (4.25) | 1.39 | 2.86 – 5.63 |
| Overall ASD | 21 (9.91) | 2.06 | 7.85 – 11.96 |

Out of 212 subjects, 68 subjects (32%) were screened positive for PTSD. However, during the clinical interview, only 11 subjects (5%) were confirmed to have a diagnosis of PTSD, 2 of who had PTSD only. (Table 3)

During the clinical interview, 57 out of 78 respondents who were screened positive for ASD were confirmed to have no diagnosis of ASD, while 57 out of 68 respondents who were screened positive for PTSD were confirmed to have no diagnosis of PTSD. This could be due to various reasons such as not having symptoms severe enough to fulfill the ASD or PTSD criteria, a fleeting duration of symptoms, or the preservation of full socio-occupational functioning.

With data for the true positives and false positives obtained

through screening and interview, the positive predictive value or precision rates of the screening scales were computed. The positive predictive value or precision rate of ASDS was 27%, while IES-R was 31%. (Table 4)

**TABLE 3: Prevalence of Post-traumatic Stress Disorder (PTSD)**

| N= 212 | Prevalence # (%) | Std Error | 95% CI |
|---|---|---|---|
| AFTER SCREENING | | | |
| (+) PTSD | 68 (32.08) | 3.22 | 28.86 – 35.29 |
| AFTER INTERVIEW | | | |
| PTSD only | 2 (0.94) | 0.66 | 0.28-1.61 |
| ASD & PTSD | 9 (4.25) | 1.39 | 2.86 – 5.63 |
| Overall PTSD | 11 (5.19) | 1.53 | 3.66-6.72 |

**TABLE 4. Positive Predictive Value of ASDS & IES-R**

| Scale | Confirmed ASD thru Structured Interview | | Total Positives | (+) Predictive Value (%) |
|---|---|---|---|---|
| | True (+) | False (+) | | |
| ASDS | 21 | 56 | 78 | 27.27 |
| IES-R | 18 | 40 | 58 | 31.03 |

*Trauma History*

Most respondents experienced 3-5 traumatic events whether they were positive or negative for ASD and/or PTSD. The median number of traumatic events was 5 for both ASD only positive and ASD only negative groups. The median number of events in PTSD only respondents was higher, with a score of 8, compared to a score of 5 in those who were negative. Mean score of those positive for co-morbid ASD and PTSD was lower at 4, compared to those who were negative, 5. Comparison of the median scores for positive and negative for ASD/PTSD diagnoses were not statistically significant. (Table 5)

**TABLE 5. Frequency of Exposure to Traumatic Events in Respondents**

| ASD/PTSD | CATEGORICAL # EVENTS | | | | | | MEDIAN # EVENTS | | |
|---|---|---|---|---|---|---|---|---|---|
| | 1-2 | 3-5 | 6-10 | >10 | $\chi^2$ df=4 | P | Median | $\chi^2$ df=1 | P |
| **ASD only** | | | | | | | | | |
| Present (n= 12) | 2 | 5 | 1 | 4 | 5.75 | 0.13 | 5 | 0.02 | 0.88 |
| Absent (n= 79) | 2 | 46 | 11 | 20 | | | 5 | | |
| **PTSD only** | | | | | | | | | |
| Present (n=2 ) | 0 | 1 | 0 | 1 | 0.81 | 0.85 | 8 | 0.09 | 0.76 |
| Absent (n= 89) | 4 | 50 | 12 | 23 | | | 5 | | |
| **Co-morbid ASD & PTSD** | | | | | | | | | |
| Present (n= 9) | 1 | 7 | 0 | 1 | 4.07 | 0.25 | 4 | 3.38 | 0.07 |
| Absent (n= 82) | 3 | 44 | 12 | 23 | | | 5 | | |

The subjects of this study had experienced a large variety of different types of traumatic events in their lives, with disasters being the most frequent. The most frequently reported traumatic event among all respondents was flood (204, 96%), which was the same for respondents with ASD only (12, 100%), both subjects of PTSD only (2, 100%) and co-morbid ASD and PTSD (9, 100%). This was followed closely by exposure to typhoon among all respondents (181, 85%), ASD only (11, 92%), PTSD only (2, 100%) and co-morbid ASD and PTSD (8, 89%). The most frequent non-disaster event that all respondents experienced was robbery (52, 25%); among the ASD only group, having seen someone seriously injured or killed (4, 33%) and experiencing a serious accident (4, 33%) were the more frequently experienced non disaster event; and among the co-morbid ASD and PTSD group, robbery (4, 44%) was more frequently experienced. The frequencies of non-disaster events in PTSD only subjects were varied. The differences in proportion among the three groups with ASD/PTSD diagnoses for each specific event were not statistically significant. The P value for typhoon referred to exposure for both Ondoy and *Habagat* rains. (Table 6)

**TABLE 6. Relation of Traumatic Event to Diagnosis**

| | All Respondents (N=212) | | ASD Only (n=12) | | PTSD Only (n=2) | | ASD & PTSD (n=9) | | P Value |
|---|---|---|---|---|---|---|---|---|---|
| | # | % | # | % | # | % | # | % | |
| **PHYSICAL ABUSE** | | | | | | | | | |
| Attacked w/ weapon | 14 | 6.60 | 2 | 16.67 | 1 | 50 | 0 | 0 | 0.46 |
| Beaten up, spanked/ pushed causing injury | 21 | 9.91 | 3 | 25.0 | 1 | 50 | 1 | 11.11 | 0.46 |
| **CRIME-RELATED** | | | | | | | | | |
| Robbery or attempt at robbery | 52 | 24.53 | 3 | 25 | 1 | 50 | 4 | 44.44 | 0.76 |
| **ACCIDENT** | | | | | | | | | |
| Serious accident | 22 | 10.53 | 4 | 33.33 | 0 | 0 | 3 | 33.33 | 0.12 |
| **DISASTER** | | | | | | | | | |
| Typhoon | 181 | 85.38 | 11 | 91.67 | 2 | 100 | 8 | 88.9 | 0.95 |
| Flood | 204 | 96.23 | 12 | 100 | 2 | 100 | 9 | 100 | -- |
| Major Earthquake | 52 | 24.53 | 1 | 8.33 | 1 | 50 | 2 | 22.22 | 0.21 |
| Fire or Explosion | 24 | 11.32 | 0 | 0 | 0 | 0 | 1 | 11.11 | 0.44 |
| Others | 1 | 0.47 | 0 | 0 | 0 | 0 | 0 | 0 | -- |
| **GENERAL TRAUMA** | | | | | | | | | |
| Seen someone seriously injured or killed | 44 | 20.75 | 4 | 33.33 | 1 | 50 | 1 | 11.11 | 0.58 |
| **SEXUAL EVENT** | | | | | | | | | |
| Forced to have intercourse, oral/ anal sex | 4 | 1.89 | 1 | 8.33 | 0 | 0 | 0 | 0 | 0.81 |
| Touching of private parts | 3 | 1.42 | 0 | 0 | 0 | 0 | 0 | 0 | -- |

## DISCUSSION

*Sociodemographic Profile*

Majority of the respondents who participated in the study had the following sociodemographic profile of: mostly being in their 40s, female, married and a housewife or

unemployed. This may be due to the high probability of these types of respondents being present at home during the time the questionnaires distribution. The community was predominantly impoverished thus majority were only able to reach high school level. To avoid additional expense in pursuing further education, they opted to start working early or stayed at home to take care of their children and keep house. Majority of the respondents lived in the Yellow zone and only a few came from the Red zone. Trauma exposure was expected to be greater in the Red zone, due to higher chance of drowning or injury and incurring more serious property damage in this area. However, the result may have been underestimated due to the lack of participation of 44 blocks during the study. Furthermore, some respondents from the Red Zone area refused to participate in the study because it was too upsetting for them to discuss the floods at such an early time. Also, the process of repair and recuperation after *Habagat* may have been their foremost priority during the time of conducting this research.

*Prevalence of ASD and PTSD*

Since exposure to *Habagat* and Ondoy were part of the inclusion criteria and was specifically asked during screening, the time period of the typhoon and temporal occurrence of trauma symptoms were specified in detail to ensure that ASD was most probably due to *Habagat* and PTSD was most likely due to Ondoy.

The study yielded high prevalence rates of ASD and PTSD, which were confirmed through a diagnostic interview by a psychiatrist. The prevalence rate of ASD (10%) was slightly higher compared to that of victims in the series of typhoons in Guam (7.3%)[10], which may be explained by discrepancies in severity and duration of the disasters and culture-specific ways of dealing with disaster.

Despite the long period of time since Typhoon Ondoy's occurrence, the prevalence rate of PTSD (5%) among our respondents was high and corresponded with the range of prevalence rates seen in previous studies of hydrological disasters. Being the first typhoon and flood of its magnitude to befall the *barangay*, it became a strong and constant reminder that the safety and well-being of the inhabitants are always in danger every time it rains or floods. Notable was the prevalence rate of co-morbid ASD and PTSD at 4%, which could indicate that greater severity and longer duration of PTSD renders a person living in this area susceptible to re-traumatization, especially with a repeated pattern of floods. All of the subjects interviewed did not seek any primary care or psychiatric help for ASD/PTSD symptoms. This could be attributed to: lack of awareness about ASD/PTSD diagnoses and treatment, absence of charity psychiatric services within Marikina and the lack of funds for private consult or even transportation to an OPD clinic.

The positive predictive values of both ASDS and IES-R were significantly lower than those obtained by the authors of the scales, 80% for ASDS[15] and 89% for IES-R[16]. The huge discrepancies could be explained by the following factors. First, during the clinical interviews, it was observed that although many subjects fulfilled the criteria for ASD or PTSD symptoms, they remained fully functional. Resiliency and value for family are often brandished as strong Filipino traits. With the survival of their families at stake, these victims were compelled to endure their illness and continue working or caring for their families out of concern for them. Secondly, the report of frequency of symptoms by the scales was arbitrary. When time and duration were specified in detail during clinical interview, the frequency of symptoms became significantly lower. Lastly, there were some Tagalog translations in the scales that caused some confusion regarding such symptoms of dissociation and re-experiencing.

*Trauma History*

The likelihood of having a confirmed diagnosis of ASD only, PTSD only or co-morbid ASD and PTSD did not increase as a function of the number of reported traumatic events, which was contrary to previous studies showing that more previous traumatic events were seen in persons diagnosed with PTSD[3, 5, 7].

The types of trauma most frequently experienced by all respondents were flood and typhoon. This was also consistently seen in subjects positive for ASD/PTSD diagnoses. The likelihood of having a confirmed diagnosis of ASD only, PTSD only and co-morbid ASD and PTSD did not correspond significantly to any particular type of traumatic event.

High frequency of trauma exposure or types of traumatic events may not be major predictors of ASD/PTSD diagnoses in this study group. Greater trauma exposure and disaster-related stressors such as major clean-up, loss of property and livelihood or physical illness or injury due to flood may be more significant contributors to ASD/PTSD occurrence in this community. Aside from natural disasters being experienced homogenously by the entire population, report of the frequency of flood and typhoon may have been inflated. A respondent may state the actual frequency of occurrence of floods and typhoons in his or her life, which was quite high for the majority, overlooking the condition of danger to self or others.

*Limitations of the Study*

Only 18 out of 62 blocks were able to participate in the study due to lack of attendance and participation of the chairmen of the rest of the remaining 44 blocks during orientation and distribution of materials. It would have been preferable that random sampling was done out of all 62 barangay blocks.

Due to the large number of respondents who screened positive for ASD and PTSD, half of them were interviewed beyond 1 month after the *Habagat* rains, when disaster-related stressors such as destruction of property had already been considerably addressed. Many subjects' homes took some time to locate while others were not at home and necessitated return visits. Reports of ASD symptoms may have been downplayed. However, efforts to minimize recall bias was done through the use of clinical interview, which is a strong tool to elicit an accurate and detailed assessment.

Due to limited resources and time constraints, a proper, large scale linguistic validation study of the screening tools wer not done, which should have ensured a more precise, valid and appropriate method of questioning regarding ASD and PTSD symptoms.

*Recommendations*

As the study showed significant prevalence rates of ASD, PTSD and co-morbid ASD and PTSD within the community, we recommend the following: 1) Program development of skills among the block chairmen and barangay health workers in terms of recognizing symptoms of ASD and PTSD as well as its risk factors, commonly seen in persons who experience a traumatic event; 2) Implementation of the Trauma module of the Philippine Psychiatric Association to teach the block chairmen and *barangay* health workers how to administer initial psychoeducation and debriefing; 3) Establishing linkage between the *barangay* and mental health organizations so that early detection and immediate referral of ASD/PTSD cases to psychiatric services could be facilitated. Co-morbid ASD and PTSD cases should be prioritized for psychiatric referral since they would be more susceptible to developing a more debilitating mental condition; 4) A follow-up study among the subjects identified to have ASD, PTSD and co-morbid ASD and PTSD to monitor progression of illness. Other studies may also encompass other mental disorders such as depression, anxiety and substance-related disorders, which are usually co-morbid with ASD and PTSD; 5) Replication of this study in other Filipino communities to detect ASD/PTSD cases, recognize the profile and dilemmas predisposing to vulnerability to ASD and PTSD as well as expedite therapeutic intervention when needed; 6) Utilization of validated Tagalog/Filipino screening scales for ASD and PTSD to ensure accuracy of questioning. Once a more comprehensive and well-suited translation of screening scales are produced, they may be taught to barangay chairmen and health workers so as to aid them in ASD and PTSD detection; and since crime, physical and sexual abuse and other similarly traumatizing social problems rampant in the country are also significant issues, these should be investigated in identifying what predisposes a person to ASD and PTSD.

*Conclusion*

Discrepancies between the numbers of subjects who screened positive in the ASDS and IES-R versus those with a confirmed diagnosis through clinical interview may be explained by the good functioning of subjects despite severity of their symptoms. The frequency and type of previous traumatic events were not significantly different among subjects who were positive or negative for ASD/PTSD diagnoses. In a country burdened with repeated occurrence of natural disasters, it is imperative that the government develop methods of early detection and therapeutic intervention in Filipino communities especially for the underprivileged through the help of trained barangay chairmen and health workers.

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**APPENDIX 1. Sociodemographic Questionnaire**

Name: _____

Address: _____

1. Gender: ❑Male ❑Female
2. Age: _____
3. Marital Status:
   ❑Single ❑Married ❑Separated ❑Widowed

4. What is the highest level of education you have completed?

| | |
|---|---|
| a. Some elementary school | |
| b. Some high school | |
| c. Some college/Vocational/Technical School Training | |
| d. College graduate (BA or BS) | |
| e. Graduate School (Master's or Doctorate) | |

5. Check the box that best corresponds to your current work situation.

| | | Nature of work |
|---|---|---|
| a. Working full time | | |
| b. Working part time | | |
| c. Self-employed | | |
| d. Housewife/husband | | |
| e. Unemployed | | |
| f. Disabled or retired and not looking for work | | |
| g. Currently in school | | |

6. What is your total combined monthly family income before taxes? If you don't know your exact income, please estimate.

| | |
|---|---|
| a. Php 8,000 and below | |
| b. Php 8,001 – Php 15,000 | |
| c. Php 15,001 –Php 30,000 | |
| d. Php 30,001 – Php 50,000 | |
| e. Php 50,000 and higher | |

**APPENDIX 2. Trauma History**

For each event, please indicate whether it happened, and if it did, the number of times it happened:

| **Traumatic Events:** | **How Many Times** |
|---|---|
| a)Have you ever been attacked with a knife, gun or some other weapon? | |
| b)Have you ever been beaten, spanked or pushed hard enough to be injured? (If yes, pls indicate nature of relationship with the person.eg. stranger, friend, relative, spouse, parent, sibling) | |
| c)Has anyone ever attempted to rob you or actually robbed you i.e.personal belongings? | |
| d)Have you ever had a serious accident at work, in a car or somewhere else? (If yes, pls specify) | |
| e)Have you ever experienced a disaster such as a typhoon, flood, landslide, major earthquake, fire, building collapse etc., where you felt you or your loved ones were in danger of death or injury? (Pls. specify) | |
| 1.Typhoon | |
| 2.Flood | |
| 3.Major Earthquake | |
| 4.Fire or Explosion | |
| 5.Others (Pls. specify | |
| a) Have you ever seen someone seriously injured or killed? | |
| b)Has anyone ever made you have intercourse, oral or anal sex against your will? (If yes, pls indicate nature of relationship with the person eg. stranger, friend, relative, parent, sibling) | |
| c)Have you ever been touched your private parts or made you touch theirs against your will? (If yes, pls indicate nature of relationship with the person eg. stranger, relative, friend, parent, sibling) | |