

Psychological Consequences of a Mass Attack Following Multiple Gunshots and Explosions among Victims in a State in Southwest Nigeria

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Abstract

Introduction: On the 5th of June 2022, an incident of a mass attack following multiple gunshots and explosions occurred in a community in Ondo State Nigeria. This study aims to assess the mental health status of victims of the mass attack to guide further interventions among them. **Methods:** A cross-sectional study was conducted among victims of a mass attack in Owo community, Ondo State. A total of 209 affected victims were interviewed on socio-demographic characteristics, symptoms of anxiety (AD) and post-traumatic stress disorder (PTSD), threat experienced, and mental health support received. A 7-item Generalized Anxiety Disorder (GAD-7) and 9-item Post Traumatic Stress Disorder (PTSD) scale were used to assess the mental health status of the victims. A point was assigned to respondents who reported the symptoms of GAD, with a maximum score of 7 attained. For GAD, scores were categorized as follows: 1 - 2 as mild, 2 - 3 as minimal, 4 - 5 as moderate and 6 - 7 as severe. The PTSD symptoms were rated using a 5-point Likert scale response, and assigned the following points; 4 = extremely, 3 = quite a bit, 2 = moderate, 1 = a little bit and 0 = not at all. From a maximum score of 36, participants with scores 18 and above were categorized as those with provisional PTSD. The independent samples t-test and correlational analysis were used to determine the association between PTSD score and other independent variables, with an alpha level of significance set at 0.05. **Results:** Generally, 38 (18.2%) of the respondents had severe AD. About half (89; 42.6%) were categorized as those with provisional PTSD. The mean level of both AD (3.40 ± 2.26) and PTSD (16.51 ± 7.63) score is higher among those who were married compared to those not married (anxiety disorder; 2.52 ± 2.20 , $P = 0.005$ and PTSD; 13.20 ± 8.86 , $P = 0.004$). Respondents who have

been counseled by a healthcare worker had a higher mean level (15.89 ± 7.58) of provisional PTSD compared to those not counseled by a healthcare worker (13.56 ± 9.22 , $P = 0.046$). The level of PTSD score increased with a higher age group ($r = 0.21$, $P = 0.003$). **Conclusions:** The results show that the mass attack had psychological consequences among a high proportion of the victims, particularly, those married and in the older age groups. This suggests the need for continuous supportive counseling targeting these affected groups, and considering other factors moderating the effectiveness of counseling among them in future interventions.

Keywords

Mass Attack, Mass Casualty, Anxiety Disorder, Posttraumatic Stress Disorder

1. Introduction

Nigeria continues to face several insurgencies or conflicts related to ethnic, religious, political and regional divisions such as those over resources in the Niger Delta region, Christian-Muslim division in the middle part of the country, rises in the Islamist groups in the north and cases of kidnapping and banditry in the South [1]. The insurgency has intensified with improvised devices (IEDs) and suicide bombing. The Boko Haram sect of an Islamist group had played key roles in offensive attacks on Christians, churches, mosques, schools, and other public places in Nigeria. As of 2018, an estimated 14.8 million people have been affected by insurgency, 1.7 million internally displaced, 229 refugees and widespread property destruction [2].

The Nigerian Government responded to the ongoing crisis by deploying military personnel to most parts of the country, particularly in the Northeast, to subdue conflicts. Several states have also engaged local security personnel such as vigilantes, joint task forces and hunters to protect communities from bandits [2].

On 5th June 2022, a mass attack involving multiple gunshots and explosions occurred in Owo community, Ondo State, Nigeria. It was reported that some groups of gunmen entered a church and began shooting sporadically. Some explosive devices were also detonated on both the inside and outside of the church building during worship. According to the Ondo State situation report on the 21st June 2022, a total of 249 people were affected by the attack, 40 died and 92 were hospitalized in five major hospitals in the state. The Ondo State government, in collaboration with the World Health Organization and other agencies, has responded to the event by ensuring that all the affected persons receive timely medical care, and mental health and psychosocial support.

The effect of traumatic events on an individual has been a subject of study for many years. These effects may vary, including both psychological and physiological consequences. Psychologically, exposure of an individual to a traumatic

event often results in increased rates of acute stress disorder, post-traumatic stress disorder (PTSD), major depression and generalized anxiety disorder. Most studies have focused on PTSD because it is a recognized and well-defined result of traumatic events [3]. Previous studies have found an increased rate of mental disorders, particularly for isolated attacks in countries not at war and continued political conflicts [4] [5]. The prevalence of PTSD ranges from 1% to 60%, depending on the target population and the measures used to establish the diagnosis [6]. A study among Pakistani emergency responders exposed to terrorist attacks showed the prevalence of PTSD to be 15%, and 11% - 16% revealed heightened levels of anxiety and depression [7]. In Northeast Nigeria, the prevalence of PTSD was 63.7% among Internally Displaced Persons (IDPs), while Agbir *et al.* (2016) and Sheikh *et al.* (2014) found 42% and 57.8% prevalence of PTSD among IDPs in the North-Central and North-Western Nigeria respectively [8] [9].

This study was an ongoing mental and psychosocial intervention among victims of a mass attack in Owo, Ondo State, Nigeria. The study, being the first to be conducted following the attack, aims to assess the mental health status of victims, and identify factors associated with PTSD among them. The study's findings will guide additional mental health and psychosocial support for the victims.

2. Method

2.1. Study Area

Ondo state is one of the 36 Federal Republic of Nigeria states, with the capital in Akure. It is located between longitudes 4° 15'E and 6° 00'E of the Greenwich meridian and latitudes 5° 45'N and 7° 45'N, which are to the North of the equator, in the Southwestern geopolitical zone of the country. The state has 18 Local Government Areas (LGAs) in three senatorial districts; Ondo North, Central and South, and a 2023 projected total population of about 5,687,488 based on the 2006 population census [10].

The state climate favors cultivating activities, including planting crops such as cocoa, kola nut, palm tree, arable crops like maize and tubers such as yam and cassava [11]. Farming remains the main occupation, particularly in rural areas, while hunting and livestock keeping are also practiced in the communities. Other economic activities in the state include trading and civil service. The annual rainfall is between 1000 mm and 1500 mm, with a high daily temperature of about 30°C. The ethnic composition consists largely of the Yoruba with sub-groups of Idanre, Akoko, Akure, Ilaje, Ondo and Owo people who speak Yoruba, and the Ijaws who inhabit the riverine areas in the southern senatorial district.

Ondo state has about 800 primary health facilities, 18 general hospitals, six tertiary health facilities and several private health facilities across all the state's LGAs.

Owo is one of the 18 LGAs of Ondo State, located in the northern senatorial district, with a projected population of 361, 785 based on the 2006 population census [10]. The LGA has one tertiary, one secondary and 48 Primary Health-care Facilities.

2.2. Study Setting and Participants

This community-based cross-sectional study was conducted in Owo, Ondo State, Nigeria, following a mass attack on the 5th of June 2022. The study participants were victims who were at the scene of the attack. The participants were interviewed between 22nd October and 2nd November 2022 (5 months post-event).

2.3. Organization of the Response to the Mass Casualty Event

On the 5th of June 2022, the Ondo State Ministry of Health received an alert of an incident of mass attack at Owo, Ondo State. Immediately, the state Rapid Response Teams (RRT) visited health facilities managing the victims in Owo for assessment of care. On the 6th of June 2022, an Emergency Operational Center (EOC) was activated and used to effectively respond to the event. The EOC comprises key pillars, including coordination, surveillance, case management, mental health and psychosocial, logistics, health education and Infection Prevention and Control (IPC). The Incident Action Plan was drafted and guided all responses to the mass casualty event.

2.4. Sample Size and Technique

A total sampling of the 209 victims who were alive and at the venue of the attack were included in the study.

2.5. Data Collection and Measure

Data were collected using an interviewer-administered, semi-structured questionnaire. The questions were administered to the respondents using the Kobo-Collect electronic data collection tool. The questionnaire was sectioned into socio-demographic characteristics, symptoms of anxiety disorder, symptoms of post-traumatic stress disorder (PTSD), threats experienced during the attack and mental health supports received. A 7-item Generalized Anxiety Disorder (GAD-7) questionnaire was used to assess the level of anxiety and depression among the participants [12]. Respondents were asked if each symptom bothered them over the past two weeks, with “Yes” or “No” response options. A total of 10 research assistants were trained for a day and engaged in data collection in the affected communities.

The level of PTSD was assessed using a 9-item question adapted from a 20-item PTSD symptoms checklist 5 (PCL-5) [13]. The questions include four main domains consistent with the four criteria for PTSD. These domains are: Re-experiencing (criterion B), Avoidance (criterion C), Negative alterations in cognition and mood (criterion D) and Hyper-arousal (criterion E), and used to assess the respondents on their experience in the last two weeks. The PCL-5 was

assessed on a scale of 5 according to the order of severity (Extremely, quite a bit, moderate, A little bit and not at all). The checklist has been used for monitoring symptom change, screening for PTSD, or making a provisional PTSD diagnosis [13].

2.6. Data Management and Analysis

Respondents' data were exported from the KoboCollect database and imported into STATA 16 software for analysis. The 7-item GAD and 9-item PTSD symptoms response were scored, respectively. For the General anxiety disorder, a point was assigned to respondents who reported the symptoms, while no point was assigned to those who reported no symptom. A maximum score of 7 is expected per respondent. Participants with scores 1 - 2 were categorized as mild, 2 - 3 minimal, 4 - 5 moderate and 6 - 7 severe GAD. The PTSD symptoms scale was scored as follows; 4 = extremely, 3 = quite a bit, 2 = moderate, 1 = A little bit and 0 = Not at all. The total score ranges from 0 - 36. Participants with scores 18 and above (average score) were categorized as those with provisional (positive) PTSD, while those having < 18 scores were those with negative PTSD.

Descriptive analyses were conducted using frequency, pyramid, bar chart, mean and standard deviation. The Independent sample t-test was conducted to determine the factors associated with anxiety disorder and provisional PTSD, with the significance level set at 0.05. A correlational analysis of PTSD with anxiety disorder, age and income was also conducted.

2.7. Ethical Approval

The ethical approval for this study was obtained from the study location. Informed consent was obtained from the respondents before the commencement of the interview. Respondents were made to understand that participation is voluntary and that there is no consequence for non-participation. All information obtained was kept confidential. Participants' confidentiality was respected and maintained by ensuring that no unauthorized person had access to the information collected. Information on each participant cannot be traced to them given that code/number was used to identify them, and unauthorized use of information was strictly prohibited and monitored during the research process by the principal investigator and co-investigators.

3. Results

3.1. Socio-Demographic Characteristics of Respondents

A total of 209 respondents provided consent to participate in the study and were interviewed. **Figure 1** shows the age-sex distribution of the respondents, with more of the males who were 11 - 20 years (39) affected compared to the females of the same age group (20) (Mean \pm standard deviation; 32.2 ± 1.33). About half (103; 49.3%) of the respondents were married and 104 (49.8%) had a secondary level of education, followed by tertiary (59; 28.2%) (**Table 1**). A high proportion

Table 1. Socio-demographic characteristics of respondents in Ondo State n = 209.

	Frequency	Percentage (%)
Marital status		
Married	103	49.3
Single	102	48.8
Widow/Widower	4	1.9
Highest level of education		
None	7	3.3
Primary	37	17.7
Secondary	104	49.8
Tertiary	59	28.2
Post tertiary	2	1.0
Occupation (multiple responses allowed)		
Civil servant	14	6.7
Business	82	39.2
farmer	7	3.3
Housewife	3	1.4
Student	95	45.5
Retiree	7	3.3
Others	15	7.2
Religion		
Christian	206	98.6
Muslim	3	1.4
Ethnic group		
Yoruba	40	19.1
Igbo	158	75.6
Egbira	8	3.8
*Others	3	1.5
Average income		
No income	80	38.3
<10,000	30	14.4
10,001 - 50,000	62	29.7
50,001 - 100,000	16	7.7
>100,000	21	10.0

Continued

Family member at the venue of the attack (Multiple responses allowed)		
Father	47	22.5
Mother	71	34.0
Sister	72	34.4
Brother	94	45.0
Grandparent	10	4.8
Wife	15	7.2
Child	42	20.1
+Other family members	31	57.9

*Urhobo, Ebira, Edo, Benue. +: Nephew, brother-in-law, Cousin, friend, Husband.

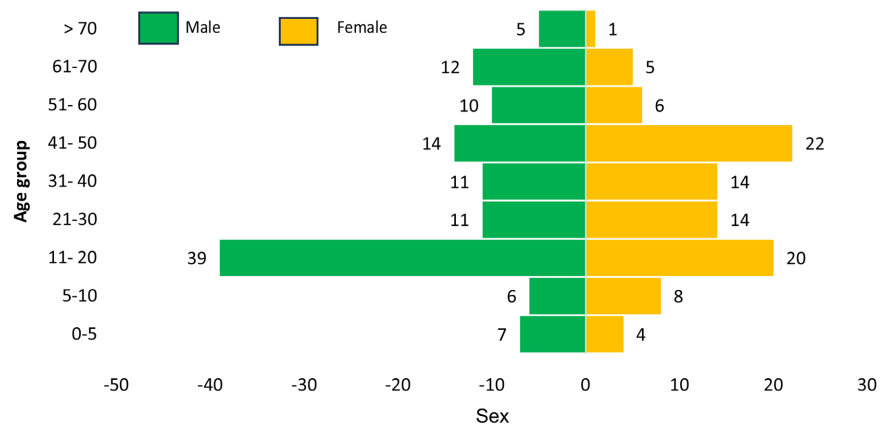


Figure 1. Age-sex distribution of respondents in Ondo State n = 209.

(95; 45.5%) of the respondents were students. One hundred and fifty-eight (75.6%) were from the Igbo ethnic group, followed by Yoruba (40; 19.1%). On average, 80 (38.3%) earn less than 10,000 naira monthly.

3.2. General Anxiety Disorder and Post-Traumatic Stress Disorder Symptoms Experienced by the Respondents

Figure 2 shows the symptoms of General Anxiety Disorder reported by the respondents. The highest proportion (145; 69.4%) of the respondents reported being “feeling afraid as if something bad might happen,” followed by “feeling nervous, anxious or on edge” (120; 957.4%).

Table 2 shows the post-traumatic stress disorder symptoms experienced by respondents. Twenty-five (12.0%) of the respondents had trouble sleeping, 35 (16.7%) had reminders of the event that caused physical reactions, 41 (19.6%) felt as if the stressful experience were happening again, 56 (26.8%) still have pictures about it popped through their mind, 16 (7.7%) tried to permanently remove it from their memory, 17 (8.1%) lost interest in eating or sometimes over-eating, 74 (35.4%) had reminders that always brought back fear and anger about

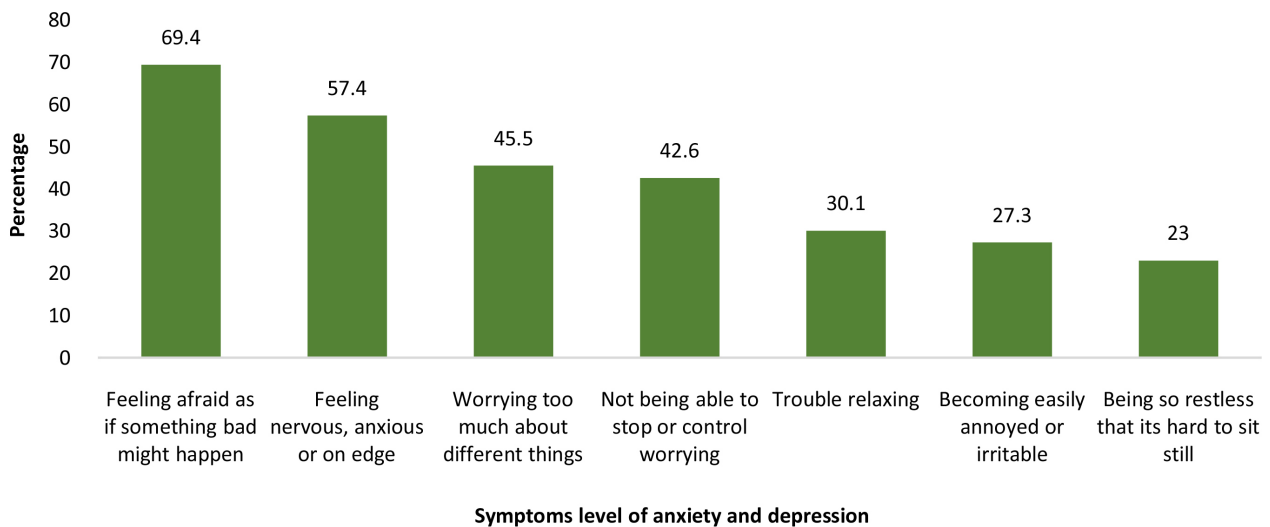


Figure 2. Symptoms level of anxiety and depression among respondents (*Multiple responses allowed*).

Table 2. Post-traumatic stress disorder symptoms experienced by respondents.

	Extremely n (%)	Quite a bit n (%)	Moderate n (%)	A little bit n (%)	Not at all n (%)
Had trouble with sleep	25 (12.0)	29 (13.9)	33 (15.8)	57 (27.3)	65 (31.1)
Reminders caused physical reactions such as sweating, trouble breathing, nausea or pounding heart	35 (16.7)	19 (9.1)	33 (15.8)	43 (20.6)	79 (37.8)
feeling of the stressful experience actually happening again	41 (19.6)	46 (22)	29 (13.9)	34 (16.3)	59 (28.2)
Pictures of events popping into mind	56 (26.8)	36 (17.2)	40 (19.1)	49 (23.4)	28 (13.4)
tried to remove it from memory	16 (7.7)	44 (21.1)	42 (20.1)	66 (31.6)	41 (19.6)
Loss of interest in eating or sometimes overeating	17 (8.1)	12 (5.7)	38 (18.2)	32 (15.3)	110 (52.6)
Reminder brought back fear and anger about the attack	74 (35.4)	25 (12.0)	35 (16.7)	50 (23.9)	25 (12.0)
Prevent getting upset when reminded of the attack	30 (14.4)	40 (19.1)	31 (14.8)	68 (32.5)	40 (19.1)
Had trouble concentrating on things such as reading the newspaper or watching television	14 (6.7)	20 (9.6)	28 (13.4)	38 (18.2)	109 (52.2)

the attack, 30 (14.4%) prevent themselves from getting upset whenever they had a reminder about the attack and 14 (6.7%) had trouble concentrating on things such as reading a newspaper or watching television. Overall, 38 (18.2%) of the respondents had severe and 42 (20.1%) had moderate anxiety disorder. A total of 89 (42.6%) were positive for provisional PTSD.

3.3. Threat Experienced and Mental Health Support Received by Respondents

Table 3 shows the threat experienced by the respondents during the attack. The majority (189; 90.4%) reported seeing dead bodies or body parts during the attack. One hundred and sixty-nine (80.9%) heard cries for help. More than two-thirds (150; 71.8%) felt the attack mentally affected them. A high proportion (153; 73.2%) of the respondents reported to have received counseling following the attack, among whom 115 (75.2%) were reached by healthcare workers. Slightly above half (81; 52.9%) of respondents reported being counseled in the last one month.

3.4. Factors Associated with High Mean Anxiety Disorder and Provisional PTSD Scores among the Respondents

In **Table 4**, the independent t-test statistics revealed key factors significantly associated with mean anxiety disorder and PTSD score. These include age, marital status and counseling received by respondents. Respondents who were married had higher mean levels of both anxiety disorder (3.40 ± 2.26) and PTSD (16.51 ± 7.63) compared to those who were not married (anxiety disorder; 2.52 ± 2.20 , $P = 0.005$ and PTSD; 13.20 ± 8.86 , $P = 0.004$). Respondents who reported to have ever been counseled (15.76 ± 7.87) or counseled by a healthcare worker (15.89 ± 7.58) had a higher mean level of PTSD compared to those who have never been counseled by anyone (12.28 ± 9.38 , $P = 0.008$) or by healthcare worker (13.56 ± 9.22 , $P = 0.046$).

A moderately significant positive correlation was found between age, anxiety disorder and PTSD scores, *i.e.*, an increase in the age of respondents signifies an increase in PTSD score ($r = 0.21$, $P = 0.003$). Likewise, an increase in anxiety disorder score potentially led to an increase in PTSD score ($r = 0.59$, $P < 0.001$).

4. Discussion

This study assessed the mental health status of victims of a mass casualty following multiple gunshots and explosions in a church in Owo, Ondo State, Nigeria. We found that the males were more affected, particularly those between 11 - 20 years of age, compared to the females. This finding is similar to another study among Internally Displaced Persons (IDPs) in Jos, Nigeria, where more respondents were young and male [14]. In addition, a previous study among victims of mass casualty in Kano, Nigeria, shows a similar mean age group of 33.4 ± 19.25 years to this study (32.2 ± 1.33 years) [15]. This finding relates to the fact that there was industrial action in tertiary institutions in Nigeria during the study period.

Hence, most students were not in school, which may have led to a high turnout of young ones during the church service where the attack occurred. We found that the majority of the victims were from the Yoruba ethnic group, which is a typical Owo city metropolis, and their religion is Christian in keeping with the church attack.

Table 3. Threat experienced and mental health support received by respondents (n = 209).

	Frequency	Percentage (%)
Seeing dead bodies or body parts during the attack		
Yes	189	90.4
No	20	9.6
Hearing sounds and cries for help		
Yes	169	80.9
No	40	19.1
Feeling mentally and emotionally affected by the attack		
Yes	150	71.8
No	59	28.2
Ever been counseled on mental health or psychosocial well-being by anyone since the attack		
Yes	153	73.2
No	56	26.8
From whom counselling was received in the last one month (<i>Multiple responses allowed</i>) (n = 153)		
Healthcare worker	115	75.2
Family/relatives	120	78.4
Neighbours	90	58.8
Church members	135	88.2
Friends	11	7.2
*Others	11	14.4
When last counseled on mental and psychosocial well-being (n = 153)		
In the last 24 hours	8	5.2
1 - 7 days	29	18.9
Within a month	44	28.8
More than a month	35	22.9
More than two months	37	24.2

*Others: Pastors, Red cross, Teacher.

Table 4. Factors associated with mean anxiety disorder and provisional PTSD scores among the respondents.

Variables	Anxiety disorder			Provisional PTSD		
	Mean \pm SD	P-value	95% confidence interval	Mean \pm SD	P-value	95% confidence interval
Age in years						
≤ 40 years	2.75 \pm 2.36	0.090	2.37 - 3.14	14.21 \pm 8.94	0.153	12.68 - 15.74
> 40 years	3.31 \pm 2.23		2.79 - 3.82	15.95 \pm 7.34		14.26 - 17.64
Gender						
Female	3.06 \pm 2.20	0.520	2.61 - 3.51	15.32 \pm 8.81	0.452	13.51 - 17.12
Male	2.86 \pm 2.32		2.43 - 3.29	14.43 \pm 8.11		12.94 - 15.93
Marital status						
Married	3.40 \pm 2.26	0.005	2.96 - 3.84	16.51 \pm 7.63	0.004	15.02 - 18.01
Not married/single	2.52 \pm 2.20		2.10 - 2.94	13.20 \pm 8.86		11.49 - 14.90
Educational level						
Secondary and lower	3.05 \pm 2.26	0.345	2.68 - 3.41	14.82 \pm 8.74	0.983	13.40 - 16.24
Tertiary	2.72 \pm 2.27		2.14 - 3.30	14.85 \pm 7.67		12.89 - 16.82
Average income in naira						
$< 50,000$	2.94 \pm 2.31	0.886	2.55 - 3.32	14.86 \pm 8.59	0.947	13.43 - 16.28
$\geq 50,000$	2.98 \pm 2.18		2.45 - 3.52	14.78 \pm 8.13		12.79 - 16.76
Did you see dead bodies or body parts during the attack						
No	2.20 \pm 2.38	0.118	1.09 - 3.31	12.55 \pm 9.21	0.203	8.24 - 16.86
Yes	3.03 \pm 2.24		2.71 - 3.35	15.07 \pm 8.32		13.68 - 15.98
Ever received counseling from anyone since the attack						
Yes	3.12 \pm 2.27	0.081	2.75 - 3.48	15.76 \pm 7.87	0.008	14.51 - 17.02
No	2.5 \pm 2.19		1.91 - 3.09	12.28 \pm 9.38		9.77 - 14.80
Received counseling from healthcare professional						
Yes	3.06 \pm 2.19	0.446	2.65 - 3.47	15.89 \pm 7.58	0.046	14.49 - 17.30
No	2.82 \pm 2.35		2.34 - 3.30	13.56 \pm 9.22		11.68 - 15.44
Correlation analysis of provisional post traumatic stress disorder scores with age anxiety disorder score and income.						
			Provisional PTSD (r)			P-value
Age			0.21			0.003
Anxiety disorder			0.59			< 0.001
Average income			0.11			0.115

We found that 42.6% of the respondents had provisional PTSD, while more than one-tenth had a severe anxiety disorder. The high prevalence of provision PTSD in this study is similar to those reported in Northcentral (42%) and Northwestern (57.8%) parts of Nigeria respectively [8] [9], lower than 63.7% reported in an earlier study in Jos, Nigeria [14] and higher than 15% reported in Pakistan [7]. The low prevalence of PTSD in the Pakistan study compared to ours may be attributed to the circumstance that respondents were emergency responders who may not have had face-to-face encounters with assailants and could have had PTSD due to several exposures to attacks while performing duties compared to this study where the majority of the respondents reported to have close contact with the gunmen. This finding suggests that exposure to traumatic conflict is associated with an increased prevalence of PTSD.

We found that most victims reported receiving counseling from healthcare professionals. The initial assessment of the victims at the treatment centers following the attack led to intensified counseling by healthcare professionals or counselors who provided mental health and psychosocial support to them.

In this study, we found a significant relationship between marital status and the level of anxiety disorder and PTSD. Respondents who were married had higher mean levels of anxiety disorder and PTSD compared to those who were not married. The findings of this study are different from those of previous studies [16] [17] which revealed greater perceived social support and lower levels of mental disorders among victims who were married compared to those not married. It is believed that marriage could serve as a mediator that provides social integration and feelings of belonging and purpose to individuals [18]. The high level of mental disorders among the married may be due to the circumstance that the event took place in church, where families are expected to visit. This is also supported by a significant number of people who reported that their spouse and children were at the venue of the attack.

We found that the mean level of PTSD increased with the rise in age significantly. It is generally known that adults aged 65 and above might have been exposed to at least one potential event during their lifetime [19]. Earlier studies based on community samples of older adults found that 70% of older men reported lifetime exposure to trauma [19]. Most of the older respondents in this study were married and were with their family members who may have sustained various injuries or died following the attack. This might have resulted in high mental health disorders among them.

In this study, respondents who were counseled by healthcare workers had a higher mean level of anxiety disorder and provisional PTSD compared to those not counseled. Following the attack, victims were assessed and categorized based on their current mental health status, and those directly affected by the attack were visited more often by the mental health and psychosocial unit of a tertiary hospital in Owo, Ondo State, Nigeria for counseling, while some were also counseled during regular medical check-ups or visits at the health facility. Vic-

tims with severe conditions or who might have lost someone during the incident were prioritized for counseling sessions. This may be the reason that a high number of respondents counseled by healthcare workers had mental health issues in this study.

5. Limitations

The responses of the participants might have been influenced by recall bias, however, we ensured that key questions were restricted to a specific timeline of two weeks to the study period. In addition, there may be response bias given that some aspects of the questionnaire were self-reported, which may bring back unpleasant memories about the attack but, the questions were phrased simply and concisely for the participants so as to minimize such bias.

6. Conclusion

The study reveals that a high number of victims of a mass attack following multiple gunshots and explosions were having high levels of anxiety and provisional Post Traumatic Stress Disorder, particularly those that were married and in the older age group following 5 months of the attack. It was observed that those who had received mental health and psychosocial support showed high levels of mental health issues. Psychosocial support has been one of the effective tools for buffering the negative consequences of disasters among victims; however, providing such support does not always result in positive psychological consequences due to several other factors, including the level of income and family support received among victims. Future studies may look into these different factors moderating the effectiveness of supportive interactions among victims of disasters. In addition, there is a need to intensify supportive counseling among the victims including those in the older age group.

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Authors' Contributions

Authors AMA and DDO conceived the study. Author AMA conducted the analysis and wrote the first draft of the manuscript. All authors reviewed the first draft and approved the final manuscript.

Ethical Statement

The ethical approval for this study was obtained from Health Research Ethics Committee of the Ondo State Ministry of Health, Ondo State Nigeria. Informed consent was obtained from the respondents before the commencement of the interview.

Conflicts of Interest

The authors declare that they have no conflict of interest.

References

- [1] Dunn, G. (2018) The Impact of the Boko Haram Insurgency in Northeast Nigeria on Childhood Wasting: A Double-Difference Study. *Conflict and Health*, **12**, Article No. 6. <https://doi.org/10.1186/s13031-018-0136-2>
- [2] Ibrahim, J. and Bala, S. (2023) Civilian-Led Governance and Security in Nigeria after Boko Haram. Special Report. United States Institute of Peace. https://www.usip.org/sites/default/files/2018-12/sr_437_civilian_led_governance_and_security_in_nigeria_0.pdf
- [3] Stith, B.A., Panzer, A.M. and Goldfrank, L.R. (2003) Preparing for the Psychological Consequences of Terrorism: A Public Health Strategy. National Academies Press (US). <https://www.ncbi.nlm.nih.gov/books/NBK221638/>
- [4] Comer, J.S. and Kendall, P.C. (2007) Terrorism: The Psychological Impact on Youth. *Clinical Psychology Science Practice*, **14**, 179-212. <https://doi.org/10.1111/j.1468-2850.2007.00078.x>
- [5] Santiago, P.N., Ursano, R.J., Gray, C.L., *et al.*, (2013) A Systematic Review of PTSD Prevalence and Trajectories in DSM-5 Defined Trauma Exposed Populations: Intentional and Non-Intentional Traumatic Events. *PLOS ONE*, **8**, e59236. <https://doi.org/10.1371/journal.pone.0059236>
- [6] Wang, C.W., Chan, C.L. and Ho, R.T. (2013) Prevalence and Trajectory of Psychopathology among Child and Adolescent Survivors of Disasters: A Systematic Review of Epidemiological Studies across 1987-2011. *Social Psychiatry Psychiatric Epidemiology*, **48**, 1697-720. <https://doi.org/10.1007/s00127-013-0731-x>
- [7] Razik, S., Ehring, T. and Emmelkamp, P.M. (2013) Psychological Consequences of Terrorist Attacks: Prevalence and Predictors of Mental Health Problems in Pakistani Emergency Responders. *Psychiatric Research*, **207**, 80-85. <https://doi.org/10.1016/j.psychres.2012.09.031>
- [8] Agbir, T.M., Audu, M.D. and Obindo, J.T. (2016) Post-Traumatic Stress Disorder among Internally Displaced Persons in Riyom, Plateau State, North Central Nigeria. *Journal of Medicine and Research Practice*, **4 & 5**, 13-17.
- [9] Sheikh, T.L., Mohammed, A., Agunbiade, S., *et al.* (2014) Psycho-Trauma, Psychosocial Adjustment, and Symptomatic Post-Traumatic Stress Disorder among Internally Displaced Persons in Kaduna, Northwestern Nigeria. *Frontier in Psychiatry*, **5**, Article 127. <https://doi.org/10.3389/fpsy.2014.00127>
- [10] Nigeria Data Portal (2023) The Nigeria Population Census 2006. <https://nigeria.opendataforafrica.org/ifpbxbd/state-population-2006>
- [11] Amos, T.T. (2007) An Analysis of Productivity and Technical Efficiency of Smallholder Cocoa Farmers in Nigeria. *Journal of Applied Social Science*, **15**, 127-133. <https://doi.org/10.1080/09718923.2007.11892573>
- [12] Kroenke, K., Wu, J., Yu, Z., *et al.* (2016) The Patient Health Questionnaire Anxiety and Depression Scale (PHQ-ADS): Initial Validation in Three Clinical Trials. *Psychosomatic Medicine*, **78**, 716-727. <https://doi.org/10.1097/PSY.0000000000000322>
- [13] NovoPsych (2023) PTSD Checklist 5 (PCL-5). <https://novopsych.com.au/assessments/diagnosis/ptsd-checklist-5-pcl-5/>
- [14] Taru, M.Y., Bamidele, L.I., Makput, D.M., *et al.* (2018) Posttraumatic Stress Disorder among Internally Displaced Victims of Boko Haram Terrorism in North-Eastern

Nigeria. *Jos Journal of Medicine*, **12**, 1-15.

- [15] Yunusa, B., Aji, S.A., Mashi, S.A., *et al.* (2018) Experiences and Challenges of Managing Mass Casualty during Industrial Action in Aminu Kano Teaching Hospital, Kano. *Niger Journal of Basic Clinical Science*, **15**, 132-137.
https://doi.org/10.4103/njbcn.njbcn_7_18
- [16] De Silva, M.J., McKenzie, K., *et al.* (2005) Social Capital and Mental Illness: A Systematic Review. *Journal of Epidemiology & Community Health*, **59**, 619-627.
<https://doi.org/10.1136/jech.2004.029678>
- [17] Harandi, T.F., Taghinasab, M.M. and Nayeri, T.D. (2017) The Correlation of Social Support with Mental Health: A Meta-Analysis. *Electron Physician*, **9**, 5212-5222.
<https://doi.org/10.19082/5212>
- [18] Vaingankar, J.A., Abidin, E., Chong, S., *et al.* (2020) The Association of Mental Disorders with Perceived Social Support, and the Role of Marital Status: Results from a National Cross-Sectional Survey. *Archive of Public Health*, **78**, Article No. 108.
<https://doi.org/10.1186/s13690-020-00476-1>
- [19] Kaiser, A.P., Wachen, J.S., Potter, C., *et al.* (2023) Posttraumatic Stress Symptoms among Older Adults: A Review.
https://www.ptsd.va.gov/professional/treat/specific/symptoms_older_adults.asp

Appendix

Questionnaire

Psychological consequences of a mass attack following multiple gunshots and explosions among victims in a state in Southwest Nigeria

Section 1: Socio-demographic characteristics of respondents

S/N	Questions	Response
1	Age as at last birthday	
2	Gender	1) Male 2) Female
3	Highest level of education	1) No formal education 2) Primary 3) Secondary 4) Tertiary 5) Post tertiary
4	Marital Status	1) Single 2) Married 3) Divorced 4) Separated 5) Widow/Widower
5	If married, how many children do you have?	
6	Ethnic group	1) Yoruba 2) Igbo 3) Hausa 4) Others (specify)_____
7	Occupation	1) Civil servant 2) Business man/woman 3) Farmer 4) Retiree 5) Housewife 6) Student 7) Others (specify)_____
8	Religion	1) Christian 2) Muslim 3) Tradition 4) Others (specify)_____
9	What is your average family income (naira)	1) <50,000 2) 50,000 - 100,000 3) 100,001 - 200,000 4) 200,001 - 300,000 5) 400,000 - 500,000 6) >500,000

Section 2: Psychological consequences of attack among respondents

S/N	Not at all	A little bit	Moderate	Quite a bit	Extremely
11	Any reminder brought back feelings about it				
12	I had trouble staying asleep.				
13	Other things kept making me think about it				
14	I felt irritable and angry				
15	I avoided letting myself get upset when I thought about it or was reminded of it				
16	I thought about it when I didn't mean to				
17	I felt as if it hadn't happened or wasn't real				
18	I stayed away from reminders of it				
19	Pictures about it popped into my mind				
20	I was jumpy and easily startled				
21	I tried not to think about it				
22	I was aware that I still had a lot of feelings about it, but I didn't deal with them				
23	My feelings about it were kind of numb.				
24	I found myself acting or feeling like I was back at that time				
25	I had trouble falling asleep				
26	I had waves of strong feelings about it				
27	I tried to remove it from my memory				
28	I had trouble concentrating				
29	Reminders of it caused me to have physical reactions, such as sweating, trouble breathing, nausea, or a pounding heart				

Continued

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- 30 I had dreams about it
- 31 I felt watchful and on-guard
- 32 I tried not to talk about it
-

Section 3: Symptoms levels of anxiety and depression (Anxiety and Depression Questionnaire)

S/N		Yes	No
33	Do you think you have some mental problem?		
34	Do you feel anxious amongst a lot of people?		
35	Is your mind in peace?		
36	Do you worry over trivial things?		
37	Has your tolerability decreases?		
38	Does one idea come to your mind again and again?		
39	Have you become more irritable?		
40	Do you feel lazy?		
41	Have you lost your self-confidence?		
42	Do you get frightened?		
43	Do you feel that your mind is not working?		
44	Do you feel that you are being punished for something?		
45	Do you sleep well at night?		
46	Do you keep thinking without any purpose all the time?		
47	Do you feel that you do not understand anything?		

Section 4: Participants' threat experienced during and after the event

S/N		Yes	No
<i>Please indicate your experience during and after the last mass attack</i>			
48	Were you at the scene of the attack?		
49	Did you see dead bodies or body parts during the attack?		
50	Did you have to listen to people telling you in great detail about their experiences of the attack?		
51	Did you hear sounds and cries for help?		

S/N	Not at all	A little bit	Moderate	Quite a bit	Extremely
Please indicate how distressing the following was for you during the attack					
52	Felt overwhelmed by what people were telling you about their experience of the attack?				
53	Felt helpless				
54	Experienced a lot of fear				
55	I thought I was going to die				
56	I thought the ones who died could have been me				
57	I thought the one who died in the attack could have been one of the members of my family (spouse, children and parents)				

Levels of perceived social support following the mass attack

S/N	Response	
58	Have you ever been counseled on your emotional/mental and psychosocial wellbeing by anyone since the attack?	Yes No
59	If yes, from which category of people did you received such counseling?	1) Family/relative members 2) Friends 3) Neighbours 4) Church member 5) Co-workers 6) Healthcare worker 7) Others (specify)_____
60	When were you last counseled on your mental and psychosocial wellbeing?	1) In the last 24 hours 2) Within the last 72 hours 3) Since a week 4) Since a month 5) More than a month
61	How many times did you received counseling on your mental and psychosocial wellbeing in the last one month	1) Once 2) Twice 3) 3 times 4) 4 times 5) >4 times
61	If you were counseled by healthcare workers, what method was last used to counsel you (multiple selection allowed)	1) Phone call 2) SMS 3) Face-to-face 4) Others (specify)_____

Continued

62	Did you feel that you are mentally and emotionally affected by the attack	Yes	No
63	Did you think that the counseling you had received helped you?	Yes	No
64	Were you satisfied with the last counseling session on your mental and psychosocial well-being?	Yes	No
65	In what areas do you think you most need support or assistant	1) Emotional stability 2) Mental support 3) Funding for medical purpose 4) Others (specify)_____	
