SOCIODEMOGRAPHIC PREDICTORS OF DEPRESSION AMONG SURVIVORS OF ARMED CONFLICT WITH POSTTRAUMATIC STRESS DISORDER IN DOGONAHAWA, NORTH CENTRAL NIGERIA

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ABSTRACT

Background: *Survivors of mass violence are at high risk of developing a wide range of psychological disorders. Nevertheless, little is known about the impact of trauma in post conflict low-income countries where armed conflict abounds.*

Objective: *This study was carried out to assess the prevalence of comorbid depression among victims of armed- conflict in Dogonahawa, north-central Nigeria who developed posttraumatic stress disorder (PTSD) and those who did not. It also assessed the socio-demographic predictors for comorbid depression among those who developed PTSD.*

Method: *A cross-sectional study that employed a multi stage sampling technique to select eligible subjects in Dogonahawa, north-central Nigeria. The PTSD module of Mini International Neuropsychiatric Interview (MINI) was used to assess for current symptoms of PTSD, while the Beck Depression Inventory-II (BDI-II) was used to assess for depression.*

Results: *The results showed that 55.5% and 44.7% of the respondents had PTSD and PTSD with comorbid depression respectively. The difference in prevalence was statistically significant with adults diagnosed with PTSD in this community being significantly more likely to experience comorbid depression than those without PTSD ($p < 0.001$). Being a female gender and being the head of household were found to be the predictors for comorbid depression among respondents with PTSD.*

Conclusions: *Mental health consequences of conflict continued to endure four years after the armed conflict. In the light of the above, mental health emergency interventions after exposure to traumatic event need to be developed to enhance healing and recovery.*

KeyWords: *PTSD, co-morbid depression, sociodemographic predictors, depression, Armed, Conflict, Dogonahawa*

Introduction

Post-Traumatic Stress Disorder (PTSD) is a prevalent disabling anxiety disorder characterized by re-experiencing, avoidance, numbing, or arousal symptom clusters that may occur after witnessing or experiencing a traumatic event.[1] This condition is often comorbid with other mental disorders, particularly depression.[2] The co-occurrence of PTSD and depression is associated with greater disorder severity and unfavorable outcomes in the overall.[3, 4] Previous findings suggest that symptoms of depression and PTSD in the aftermath of exposure to traumatic events may best be conceptualized as a single general traumatic stress construct,[5] a premise supported by a shared vulnerability diathesis modeling; an underlying

vulnerability to both PTSD and depression.[6] Thus, it is logical to argue that the incidence of depression and PTSD will be high among trauma victims, with depression exceptionally higher among those who developed PTSD compared to those who did not.[6, 7]
The prevalence of major depressive disorder over the course of a life time is estimated to range between 6 – 17 % [8] while the Center for Disease Control and Prevention, (CDC) Atlanta, reported that about 30-70% of people who have lived in war zones suffer from symptoms of depression and PTSD.[9] Previous studies carried out among armed conflict survivors in South-Sudan, [10] Rwanda,[11] Libya[12] and Lebanon[13] revealed a co-occurrence of PTSD and depression prevalence in the range of 9-51%. Kessler et al[4] and Breslau et al[15] also documented comorbid depressive episodes among 48% and 49.7% of the general population diagnosed with PTSD. Correlates of depression among respondents with PTSD found in these studies include gender, marital status, income level, employment and educational status and social support.

Few studies have examined the occurrence of psychiatric disorders in different post-conflict settings in Nigeria, and even fewer have been carried out in the North-Central region, despite the rising incidences of political, ethnic and religious conflicts and terrorism. For example, Dogonahawa, a specific Nigerian community in Jos-South and part of Barkin Ladi Local Government Areas (LGAs) of Plateau State witnessed one of the deadliest armed conflicts on March 7th 2010. Close to 500 people mostly women and children were butchered with machetes, clubs, axes and some shot with guns in a surprise midnight raid that lasted over three hours, left several others injured, with houses and properties destroyed and some survivors rendered homeless.[16] Exposure to conflict-related traumatic events of these nature will lead to an elevation in the prevalence of mental disorders, including depression and post-traumatic stress disorder (PTSD).[2,9] This study aims to determine the prevalence and socio-demographic predictors of co-occurring posttraumatic stress disorder (PTSD) and major depressive disorder (MDD) in a post-conflict population from Dogonahawa, North Central Nigeria. We hypothesized that depression will be significantly common among individuals with PTSD than those without.

Methodology

This study was conducted 4years after the 7th march 2010 communal violence in Dogonahawa, a specific rural community in Jos-South and part of Barkin Ladi LGAs of Plateau State, with an estimated projected population of over 6000 people (projected with the 2006 national census)[17] who are predominantly the Berom ethnic group. Most people in this community are farmers.
Ethical approval was obtained from the ethical committee of the Jos University Teaching Hospital, while permission was granted by the village head of Dogonahawa. Informed consent was obtained from individual study subjects. Data were collected by the researcher and the research assistants who are fluent in both English and Hausa languages. Adults aged 18 years and above, resident in Dogonahawa prior to and during the communal attack were eligible for inclusion. Eligible subjects considered too ill to participate in the study were excluded.

The sample size for this study was 270 which was calculated using Kish formula[18].
A multistage sampling of households was employed to select respondents aged 18 years and above as follows:
In the first stage of the sampling, Dogonahawa which is a geographic sub unit with defined political structure in Jos south and part of Barkin Ladi LGAs of Plateau state was identified. In the second stage, four enumeration areas were systematically selected from Dogonahawa. Enumeration areas are geographic subunits of local government areas created by the National Population Commission and are used by the Commission in the conduct of national censuses.

All the selected enumeration areas were visited and all the household units listed. These lists were thereafter entered into a computer data-file, from where the probability of a household being selected to participate in the study was equal for every household within a selected enumeration area.

In the final stage, a full listing of all residents in each of the selected household was obtained from an informant. Those who fulfilled the criteria for the study were identified. A household member was then randomly selected for the interview by drawing a card from a deck of cards with corresponding numbers assigned to these adults. Only one of such persons was selected per house hold until the desired sample size was obtained. After two failed attempts

to reach an eligible respondent in a household, the next household was selected instead and any household member that declined consent to participate in the study was replaced by the next eligible household member.

The selected subjects were administered the first questionnaire, which sought information on socio-demographic data (age, gender, level of education, marital status, occupation, individual monthly income, religion, ethnicity Household status), someone available to talk with immediately after the trauma and feeling safe living in the community after the trauma.

The Revised Beck Depression Inventory-11 (BDI-11) was thereafter administered. This instrument consists of 21 items that measure characteristics, attitudes, and symptoms of depression. This instrument has an excellent psychometric properties[19]. It has been applied in various cultures and settings including Nigeria.[20]Participants scoring above the cutoff point of 19 were classified as having moderate-to-severe depression (hereafter referred to as depression).

The Mini International Neuropsychiatric Interview (M.I.N.I) was used to assess for PTSD symptoms. This is a brief structured interview for major axis-1 psychiatric disorders in DSM-IV and ICD-10. Validation and reliability studies have been done comparing the M.I.N.I to the structured clinical interview for DSM-1V (SCID)[21] and the composite International Diagnostic interview(CIDI) [22]. The results showed that the M.I.N.I has a similar reliability and validity properties. The PTSD module of M.I.N.I specifically asks question about the past month symptoms of PTSD. The M.I.N.I-PTSD module has been used in Nigeria[23]

The Statistical Package For Social Sciences Version 20 (SPSS-20) software package was used to analyze the data.

Results

Socio-demographic characteristics of respondents at the time of study

All the respondents were screened positive for trauma exposure related to the 7th March 2010 armed attack on Dogonahawa. A total of 270 subjects were interviewed, but 254(97.7%) interviews comprising 137(53.9%) males and 117(46.1%) females, with mean age of 34.6±13.6 years and predominantly Christians (99.6%) of the Berom ethnic group (98.4%) were used in the analyses. The remaining interviews were excluded because of incomplete data. Most of the respondents had at most secondary school education; 190 (74.8%), belonged to the non-professional occupational group; 176 (69.3%) and had individual monthly income below N50,000.00;190(74.8%). More than half of the respondents were married (52%) and less than half were heads of household (47.6%). See Table1.

Prevalence of depression with and without PTSD

The BDI-11 was used to assess for depression. Participants scoring above the cutoff point of 19 were classified as having moderate-to-severe depression (depression), while MINI was used to diagnose PTSD. Thus, 87(34.3%), 141(55.5%) and 24(21.2%) of the entire respondents were diagnosed with co-occurring depression and PTSD, PTSD with and without depression and depression alone. Among those with PTSD, 63(44.7%) had comorbid depression.

The prevalence of depression among those with and without PTSD was found to differ at a level that was statistically significant with adults with PTSD being more likely to have depression than those without PTSD (X^2=15.307; df=1; P<0.001).see Table2

Sociodemographic factors associated with comorbid depression

The comparison of socio-demographic characteristics of respondents with and without comorbid depression among those with PTSD revealed that being in the middle age group (35-59years) (P=0.009), female gender (P=0.013), being the head of household (P=0.043) and not feeling safe living in the community after the trauma (P<0.041) were the statistically significant factors associated with comorbid depression among respondents with PTSD. See Table3.

Logistic regression analysis revealed that female gender (OR=4.4; P=0.002) and being the head of household (OR=3.1; P=0.019) with PTSD were the significant predictors for comorbid depression compared to being a male and not the head of household. See Table4.

Discussion

This study revealed that 4 years after the armed conflict in Dogonahawa, North-Central Nigeria, 34.3% of the respondents had co-occurring PTSD and depression, while 21.2% had depression alone.

We also found that 55.5% of the respondents were diagnosed with PTSD, out of which 44.7% had co-occurring PTSD and depression, which is similar to what Charlson et al,[12] and Ikin et al[24] found whereby 50% and 52% of participants who had PTSD, experienced co-occurring depression, but, relatively lower compared to that observed in studies conducted among armed conflict survivors in South-Sudan[10] and Rwandan.[11] Notably, we found that the prevalence of comorbid depression among respondents with PTSD was considerably high, compared to the rate among those who did not develop PTSD, which is similar in pattern to the previous findings in other post conflict settings.[11,13,25] Beyond studies conducted in post conflict settings, Kessler et al [14] and Breslau *et al* [15] *also documented comorbid depressive episodes among 48% and 49.7%* of the general population diagnosed with PTSD compared to other studies that reported estimated life time prevalence of major depressive episode in the range of 10 – 30 % within the community.[8] Thus, it is logical to conclude that regardless of the recruitment source, type or nature of the trauma experienced, the rate of comorbid depression is higher among persons with PTSD than those without.

The observed differences in prevalence of depression among persons with PTSD in the present study vis-a vis the surveys in the aforementioned studies are presumed to occur due to variability in factors such as nature of trauma, post trauma stressors/cultural factors, different instruments used and time elapsed between trauma exposure and diagnosis. For instance, while MINI was used to diagnose major depressive episode at five years after the Peace agreement in South-Sudan[10] and twelve to fourteen years after the Rwandan genocide[11,25] the present study used BDI-11 to diagnose depression at four years after the conflict.

Though the co-occurrence of PTSD and depression might be generally attributed to the effect of exposure to traumatic events, supporting the shared vulnerability diathesis point of view,[6,7] we suspect that, elements of post-conflict hardships such as financial difficulties, insecurity, in addition to not seeking psychological or psychiatric help over time, might explain the excess rate of PTSD and indeed the comorbid depression with PTSD found in our study.

We found that respondents aged 35-59 years (middle age group), female gender, being the head of household and not feeling safe living in the community after the trauma were the sociodemographic factors significantly associated with comorbid depression among respondents with diagnosis of PTSD. However, only female gender and head of household remained significant after logistic regression analysis. The gender differences may be traced to the violent loss of partners and children with attending high levels of grief as well as fear of becoming a single parent with children to carter for, which may be particularly felt by women. Alternatively, this gender disparity could be explained by the greater tendency of women to express and report their emotional symptoms, men in contrast, might perceive disclosure as a threat to masculinity and consequently might choose to conceal their feelings[26] or resort to alcohol and other substances to mask their symptoms.[27] O'Donnel, Craemer and Pattison[5] conducted one of the comprehensive studies to date that examined predictors of comorbidity; the results showed that increasing age and female gender among other variables were predictive of comorbid depression.
The significant findings of being the head of household as a predictor of PTSD with comorbid depression in this study may indeed be secondary to the higher socio-economic burden placed on the household heads to provide for families amidst post conflict hardships, which in turn, could predict depression among those with PTSD as documented in other studies of trauma victims[28, 29]

The logistic regression analysis however failed to support the variables not feeling safe living in the community after the conflict and the middle age group as significant predictors for comorbid depression among those with PTSD. However, this findings need to be interpreted with caution because the number of respondents with comorbid depression and PTSD who expressed feeling safe rather than unsafe living in the community after the conflict were relatively negligible for comparison of statistical difference. On the other hand, the conflict probably generated enough stress to everyone that was involved irrespective of age. Notwithstanding, the results of study conducted by O'Donnel, Craemer and Pattison[5] showed that increasing age was predictive of comorbid depression with PTSD. Moreover, it has been documented that depression reaches its lowest level in the mid age in general population due to life cycle gains (married, had children acquired maximum level of education and

property).[30] The reversal of life cycle gains occasioned by the conflict situation and the consequent development of depression, which is further maintained by post-conflict hardships, could explained the association between middle age group and depression among respondents with PTSD. The strength of this study lies on the fact that it is the first community-based survey to examine the socio-demographic predictors for depression among adults with PTSD following exposure to armed-attack in Dogonahawa, North-Central Nigeria, and the fact that the predictors were consistent with previous research, supports the validity of the findings.

The study however had limitations that also need to be acknowledged. First, this study cannot be generalized across the population in Nigeria, rather, limited to adults exposed to armed conflict in Dogonahawa, until further studies have replicated similar findings in other traumatized communities in Nigeria. Secondly, we focused on comorbid depression with PTSD, while anxiety disorders such as panic disorders and generalized anxiety disorders may be part of the response to trauma in some respondents. Furthermore, this study assumed that the findings were related to the 7th March 2010 armed attack on Dogonahawa, rather than other past traumatic exposures. It is possible that PTSD and PTSD with comorbid depression diagnosed with some respondents may have occurred as a result of traumatic events experienced prior to or after the 2010 armed attack on this community.

Conclusion

This study confirmed that depression is highly prevalent among trauma victims who developed PTSD in Dogonahawa North-Central Nigeria at four years after the armed attack, with depression significantly commoner among survivors with PTSD than those without. It also highlights the socio-demographic factors that were significantly associated with comorbid depression among respondents with PTSD, and points at categories of people such as females and heads of household who are at particular risk for this comorbid condition.

Recommendation

It is recommended that an effective model for the prediction of the development of PTSD with comorbid depression as well as immediate and long-term mental health support for trauma victims needs to be developed. In addition, mental health awareness campaigns for trauma victims to seek for mental health care and that also target some of the strongest predictors of the comorbidity that we have observed, such as female gender and heads of households could be implemented.

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Table1: Sociodemographic Variables of Respondents

Variable		Frequency(N=254)	Percentage
Age(years)	18-34	153	60.2
	35-59	80	31.5
	60-82	21	8.3
	--	--	34.33+13.64
Gender	Male	137	53.9
	Female	117	46.1
Level of education	No formal education	41	16.1
	some/completed primary	86	33.9
	some/completed secondary	104	40.9
	some/completedtertiary	23	9.1
Marital status	Married	132	52.0
	Never married	76	29.9
	Separated	6	2.4
	Divorced	8	3.1
	Widowed	32	12.6
Occupation	Professionals	16	6.3
	Non-professionals	176	69.3
	Unemployed	62	24.4
Income level	no income	46	18.1
	<20,000.00	131	51.6
	20,000.00-49,000.00	59	23.2
	----	18	7.1
Religion	Christianity	253	99.6
	Islam	1	0.4
Ethnicity	Berom	250	98.4
	Others	4	1.6
House hold head status	No	133	52.4
	Yes	121	47.6
Someone to talk to after trauma	No	232	91.3
	Yes	22	8.7
Sense of safety	No	216	85.0
	Yes	35	15.0
Trauma exposure	No	0	0
	Yes	254	100.0

Table 2: Comparison of Depression between Respondents with and Without PTSD

	PTSD				
Comorbid diagnosis	**Yes (n=141)**	**No (n=113)**	**Total (N=254)**	**Statistics**	
Depression(Beck)	**Frequency (%)**	**Frequency (%)**	**Frequency (%)**	**X^2**	**P**
Present(≥20)	63(44.7%)	24(21.2%)	87(34.3%)	15.307	**<0.001**
Absent(0-19)	78(55.3%)	89(78.8)	167(65.7%)		

Mean score=11.76+5.737, t=32.670, P=**<0.001**

Table3: Comparison of socio-demographic characteristic of respondents with and without depression among those with PTSD

		Frequency:N=141(%)		Statistic		
Variable		**Yes**	**No**	**X^2**	**DF**	**P**
Aga(years)	18-34	32(57.1)	57(73.1)	9.467	2	**0.009**
	35-59	26(41.3)	14(17.9)			
	≥60	5(7.9)	7(9.0)			
Gender	Male	20(32.8%)	41(67.2%)	6.153	1	**0.013**
	Female	43(53.8%)	37(46.2%)			
Level of education	No formal education	13(20.6%)	11(14.1%)	3.965	3	0.265
	Primary education	26(41.3%)	26(33.3%)			
	Secondary education	22(34.9%)	34(43.6%)			
	Tertiary education	2(3.2%)	7(9.0%)			
Marital status	Married	28(44.4%)	32(41.0%)	5.384	4	0.250
	Never married	20(31.7%)	34(43.6%)			
	Separated	1(1.6%)	3(3.8%)			
	Divorced	4(6.3%)	1(1.3%)			
	Widowed	10(15.9%)	8(10.3%)			
Occupation	Non professional	3(4.8%)	2(2.6%)	0.579	2	0.749
	Professional	44(69.8%)	54(69.2%)			
	Unemployed	16(25.4%)	22(28.2%)			
Income level	No stable income	8(12.7%)	17(21.8%)	5.327	3	0.149
	< N20,000.00	46(73.0%)	43(55.1%)			
	N20-N49,000.00	7(11.1%)	16(20.5%)			
	≥N50,000.00	2(3.2%)	2(2.6%)			
Religion	Christianity	63(44.7%)	78(55.3%)	-	-	-
	Islam	0(0.0%)	0(0.0%)			
Ethnicity	Berom	63(45.3%)	76(54.7%)			
	Others	0(0.0%)	2(100.0 %)			
House hold head status	No	30(38.5%)	48(61.5%)	4.098	1	**0.043**
	Yes	35(55.6%)	28(44.4%)			
Someone to talk to after trauma	No	59(44.0%)	75(56.0%)	0.463	1	0.496
	Yes	4(57.1%)	3(42.9%)			
Sense of safety after trauma	No	61(47.3%)	68(52.7%)	4.165	1	**0.041**
	Yes	2(16.7%)	10(83.3%)			

Table4: Predictors for Depression among Respondents with PTSD

Variable	**Odds ratio**	**95% Confidence interval**		
		Lower limit	Upper limit	**P**
Aga group in years				
18-34	1.000			
35-59	0.808	0.220	2.966	0.748
≥60	1.957	0.485	7.894	0.346
Sex				
Male	1.000			
Female	4.412	1.725	11.284	**0.002**
Head of household				
Yes	1.000			
No	3.194	1.212	8.418	**0.019**
Sense of safety				
Yes	1.000			
No	0.266	0.053	1.336	0.108

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