

Predictors of Posttraumatic Stress in Patients Admitted to a Trauma Unit Following Road Traffic Accident (RTA)

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Abstract

Objective: To determine predictors of posttraumatic stress among patients admitted following road traffic accident (RTA).

Method: All patients admitted to the trauma unit following RTA were included in the study, however 121 (90%) agreed to participate. All completed the revised Impact of Event Scale (IES-R), the Hospital Anxiety and Depression Scale (HADS), and a socio-demographic questionnaire.

Result: Mean age of respondents was 36.2 years (SD=14.6), 56 (54%) were married. Lower limb injury was the most common form of injury in 69% of cases. Mean hospital stay before assessment was 27 days. On the IES-R, 47 (45%) had high score on the avoidance scale, 42(40%) had high score on the intrusion scale, and 39 (38%) had high score on the hyper arousal scale. On the depression subscale of the HADS, 38 (36.5%) scored above the cutoff point. Sex ($\chi^2=11.6$, $p=0.001$), marital status ($\chi^2=14.3$, $p=0.001$) and educational status ($\chi^2=20.79$, $p=0.001$) were all significantly associated with posttraumatic stress symptoms. Being female, not having a formal education and being single increased the risk of developing posttraumatic stress following RTA.

Conclusion: Specific psychosocial variables (female gender, low formal education, being single) rather than clinical variables (i.e., site and type of injury or type of medical treatment) are important in the predictors of posttraumatic stress in RTA victims.

Keywords: Road traffic accident; Posttraumatic stress; Anxiety; Depression; Nigeria

Introduction

Posttraumatic stress disorder (PTSD) is a disorder that some people develop after seeing or living through an event that caused or threatened serious harm or death. PTSD was initially described in combat veterans, following exposure to very stressful combat conditions, however it is now recognized more frequently in civilians who experienced severe trauma such as rape and sexual molestation in women, crime related traumas and others [1]. PTSD has been described as the final common pathway with many different entry points for various traumatic events [2].

Symptoms are divided into three categories: 1) Intrusive memories such as recurrent recollection of the event or dreams about the event, 2) Hyper arousal resulting in hyper vigilance, irritability and outbursts of anger, and 3) Avoidance symptoms, the patient actively avoids places, thoughts and activities associated with the traumatic event [3]. However while a substantial number of people exposed to traumatic events develop PTSD (34% at 1 month, 14% at 12 months) [4], most people do not (more than 50% at any time) reasons for this include

individual vulnerability to the features of the trauma and susceptibility to other psychological effects of the trauma [4,5].

Studies have shown that road traffic accidents (RTA) or motor vehicular accidents (MVA) is an important cause of psychiatric morbidity. Ursano et al. [5] reported rates of acute posttraumatic stress disorder (PTSD) ranging from 34% at 1 month, 18% at 6 months and 14% at 12 months post RTA. Conlon et al. [6] also reported PTSD incidence of 19% over a 3 month period post RTA and a point prevalence of 9%, 3 months post RTA.

In general, more frequent or prolonged exposure and greater intensity of exposure to violence, injuries or death are associated with PTSD [7]. It has also been recognized that trauma type also play a very important role in development of PTSD, Breslau (1998) reported that assaultive violence is more likely to trigger PTSD [8]. However, most trauma victims do not develop PTSD even when exposures are considered severe, thus suggesting that other vulnerability factors affect the emergence of and recovery from PTSD. Factors that have been implicated include personal variables such as, belonging to ethnic minorities, female gender, low socioeconomic status, and lower education [9]. Other factors reportedly associated with PTSD among accident victims include, fear of dying in the RTA, injury severity, litigation, and prior diagnosis of depression [10].

Studies on posttraumatic disorder in Nigeria are few, Okulate et al. [11] investigated PTSD in the military and reported a prevalence rate of 22%, Adewuya et al. [12,13] investigating PTSD following child-birth and HIV/AIDS reported a prevalence rate of 5.7% and 27.4% respectively. RTA is a recognized cause of trauma resulting in severe morbidity and mortality worldwide Nigeria inclusive. In Nigeria RTA is responsible for so much death and morbidity [14] some reports indicating that 1 out of every 3 Nigerian is at risk of getting injured or killed in a RTA [15]. Coping with the psychological consequences of RTA's is therefore an important part of rehabilitation for these groups of patients. To Our knowledge there has not been any study addressing this important condition in RTA victims in Nigeria.

The aim of this study is to determine the prevalence rate of posttraumatic stress in survivors of RTA and assess risk factors that predispose to posttraumatic stress following RTA.

Materials and Method

Participants

Participants were patients seen at the trauma units of two tertiary institutions in Nigeria. Obafemi Awolowo University Teaching Hospitals Complex is located in Ile-Ife; the hospital has an orthopedic and trauma unit with 56 beds manned by 5 consultant orthopedic surgeons and 10 resident doctors. The second hospital is the Federal Medical Centre Owo located in Ondo State along the busy Owo-Benin road, which is one of the major roads linking Western part of Nigeria to the oil rich Midwest and Niger delta. The hospital has a trauma unit manned by 2 consultant orthopedic surgeons, trainee doctors and medical officers. Both hospitals serve Osun, Oyo, Ondo, Ekiti and Edo states.

Inclusion criteria:

Patients 18 years and above, who must have been admitted in the hospital following RTA for at least 2 weeks and who gave consent were included in the study

Exclusion criteria:

Patients with evidence of head trauma, coma, and organic brain syndrome were excluded from the study.

All patients with a previous history of mental disorder were also exempted. (This information was obtained by asking patients directly and verifying from their care givers/relatives)

Ethical approval for the study was obtained from the Obafemi Awolowo University Teaching Hospital Ethical committee and the Ethical committee of the Federal Medical Centre Owo.

Measures

Socio-demographic Questionnaire: This questionnaire was prepared to obtain data on patient's age, sex, marital status, educational attainment and occupational status. Clinical data about the patient was also obtained such as type of injury, current treatment, and duration of hospital stay using this questionnaire.

Impact of Event Scale (IES-R) [16]. The original impact of event scale was developed by Horowitz in 1979 prior to the adoption of PTSD as a legitimate diagnosis in DSM III [17]. The revised version developed by Weiss and Marmar [16] in 1997 included questions on

symptom of hyper arousal by adding 7 more items, 6 of which identify the hyper arousal symptom cluster making a total of 22 items. The IES-R is a self-report measure designed to assess current subjective distress for a specific life event. Respondents are asked to rate each item on a liker scale of 0-4, (0=not at all, 4=extremely) with higher score indicating a higher likelihood that the symptom is present in the respondent. The internal consistency for the three subscales have been found to be high ranging from 0.87-0.92 for the intrusion subscale, 0.84-0.86 for the avoidance subscale and 0.79-0.80 for the hyper arousal subscale [18]. In this study the Cronbachs alpha for the different subscales are as follow: intrusion subscale 0.87, avoidance subscale 0.87, and for the hyperarousal subscale 0.77. A mean score of 2.0 on a specific subscale has been found to be an appropriate cut off; all patients who scored above the mean score of 2.0 were regarded as having posttraumatic stress. The questionnaire was translated to Yoruba the most common language spoken in western Nigeria using the back translation method; it was then administered to patients who could not read English language but can read and understand Yoruba language. For illiterate patients, the questions and options were read to them by the interviewer after which their preferred options were ticked.

Hospital Anxiety and Depression Scale (HADS) [19]: The HADS is a 14-item self-administered questionnaire designed to measure anxiety and depressive symptoms. Seven items measure symptoms of anxiety while the other seven measure depressive symptoms on a 4-point scale (0=no distress to 3=significant distress). The instrument has been validated for use as a screening instrument for mental morbidity in hospital and community settings in Nigeria [20]. Individuals scoring 8 and above on either the anxiety or depressive subscales are classified as having clinically significant anxiety and depressive symptoms [20]. The HADS was presented either in English or Yoruba language forms, depending on the subjects' indicated preference. For illiterate subjects, the interviewer read out the questions and ticked the subjects' answers [20].

Procedure

Patients admitted for treatment following road traffic accident, and who had spent at least 2 weeks on the ward were approached to be included in the study. Each patient who agreed to participate in the study completed the socio demographic questionnaire, the Revised Impact of Event Scale (IES-R) the Hospital Anxiety and Depression Scale (HADS) [16,19].

During the period of study 157 patients were admitted following injuries sustained from RTA in both centers; however only 134 met the criteria for the study, out of which 121(90%) agreed to participate in the study. However only 104 (86%) questionnaires were analyzed, others were not included in the analysis due to incomplete information.

Data analysis:

Data were entered and analyzed using the statistical package for the social sciences (SPSS) version 12. Simple percentages were done; association between age, gender, marital status, educational status and presence or absence of posttraumatic symptoms was tested using chi square test (χ^2). Pearson's correlation (r) was used to test association between IES-R and HADS scores, while logistic regression analysis was used to identify variables that significantly predicted posttraumatic stress. Statistical significance was put at less than 0.05.

Results

The mean age of respondents was 36.2 years (SD=14.6), with a male female ratio of 1.2:1, 56 (53.8%) were married, while 24(23.1%) had no formal education (Table 1). The lower limb was the most commonly affected part of the body 72 (69.2%) while closed fracture 44 (42.3%) and open fracture 42 (40.4%) were the most common form of injuries. Traumatic amputation occurred in 4(3.8%) of the patients. Mean duration of hospital stay before assessment was 36.8days (Table 1).

Variable	Mean Frequency	Percentage
Age		
Mean (sd)	36.17 (14.55)	
18-25	10	9.6
26-45	72	69.2
>45	22	21.2
Sex		
Male	57	54.2
Female	47	45.2
Marital Status		
Married	48	46.2
Single	56	53.8
Educational status		
None	24	23.1
Up to Secondary	55	52.9
Tertiary	25	24.0
Occupation		
Unemployed	30	28.8
Self employed	57	58.8
Government employed	17	16.3
Clinical Variables		
Level of injury		
Upper Limb	24	23.1
Lower Limb	72	69.2
Others	8	8.0
Type of injury		
Closed fracture	44	42.3
Open fracture	42	40.4
Crush injury	8	7.7
Traumatic amputation	4	3.8
Multiple injuries	6	5.8

Type of treatment	43	41.3
Conservative (POP traction)		
ORIF	33	31.7
External Fixation	28	26.9
Depressive symptoms		
Present	38	36.5
Absent	66	63.5
Anxiety symptoms	35	33.7
Present		
Absent	69	66.3

Table 1: Sociodemographic and Clinical variables.

The mean score on the IES-R subscale were 1.93 (SD=0.9) on the avoidance subscale, 1.88 (SD=0.9) on the intrusion subscale and 1.6 (SD=0.7) on the hyper arousal subscale. With score of 2 taken as cut off point for each of the subscales, 47 (45.2%) scored higher than 2 on the avoidance subscale, 42 (40.4%) scored higher than 2 on the intrusion subscale and 39 (37.5%) scored higher than 2 on the hyper arousal scale. Thirty five (33.7%) respondents scored higher than 2.0 on all three subscales and were regarded as having posttraumatic stress. On the depression subscale of the HADS, 38 (36.5%) scored above the cutoff point, while 35 (33.7%) scored above the cutoff point on the anxiety subscale.

A test of association between socio-demographic and clinical variables, and the respondents that scored above the cut off on all IES-R subscales showed that age of respondents ($\chi^2=8.3$, $p=0.02$), sex of respondent ($\chi^2=11.6$, $p=0.001$), marital status ($\chi^2=14.3$, $p=0.001$) and educational level ($\chi^2=20.79$, $p=0.001$) all were significantly associated with posttraumatic stress (Table 2). None of the clinical variables were significantly associated with posttraumatic stress symptoms. Depressive symptoms ($\chi^2=48.8$, $p=0.0001$) and anxiety ($\chi^2=20.2$, $p=0.0001$) were both significantly associated with posttraumatic stress symptoms (Table 2). There was a positive correlation (Pearson's correlation) between IES-R score and age ($r=0.26$, $p=0.01$), depression ($r=0.67$, $p=0.001$) and anxiety ($r=0.44$, $p=0.001$). Among respondents, 29 (76.3%) had both depressive and posttraumatic stress symptoms, while 22 (64%) had both anxiety and posttraumatic stress symptoms.

Variables	Posttraumatic stress symptoms Absent (mean score < 2.0) N (%)	Posttraumatic stress symptoms Present (mean score > 2.0) N (%)	Chi Square (P value)
Age in years			
18-25	8 (80.0)	2 (20.0)	8.32 (0.02)
26-45	52 (72.2)	20 (27.8)	
>45	9 (40.9)	13 (59.1)	
Sex			

Male	46 (80.1)	11(19.9)	11.64
Female	23 (48.9)	24 (51.1)	(0.001)
Marital status			
Married	41 (85.4)	7 (14.6)	14.25
Single	28 (50.0)	28 (50.0)	(0.001)
Educational level			
None	7 (29.2)	17 (70.8)	20.79
Up to Secondary education	45 (81.2)	10 (18.8)	(0.001)
Tertiary education	17 (68.0)	8 (32.0)	
Occupation			
Unemployed	20 (66.7)	10 (33.3)	1.74 (0.42)
Self employed	40 (70.2)	17 (29.8)	
Govt. employed	9 (52.9)	8 (47.1)	
Level of injury			
Upper Limb	18 (75.0)	6 (25.0)	1.05 (0.6)
Lower Limb	46 (63.9)	26 (36.1)	
Others	5 (62.5)	3 (37.5)	
Type of injury			
Closed fracture	28 (63.6)	16 (36.4)	2.63 (0.63)
Open fracture	31 (73.8)	11(26.2)	
Crush injury	4 (50.0)	4 (50.0)	
Traumatic amputation	2 (50.0)	2 (50.0)	
Multiple injuries	4 (66.7)	2 (33.3)	
Type of treatment			
Conservative (POP traction)	28 (65.1)	15 (34.9)	0.25 (0.9)
ORIF*	23 (69.7)	10 (30.3)	
External Fixation	18 (64.3)	10 (35.7)	
Depression			
Present	9 (23.7)	29 (76.3)	48.81
Absent	60 (90.9)	6 (9.1)	(0.0001)
Anxiety	13 (37.1)	22 (62.9)	20.15
Present	56 (81.2)	13 (18.8)	(0.0001)
Absent			

Table 2: Association between variables and Posttraumatic Stress Symptoms. *ORIF: Open Reduction and Internal Fixation of fractures.

Logistic regression analysis showed that female respondents were twice likely to develop posttraumatic stress compared to male patients (Odd=2.10, 95%CI=1.77–6.99), single respondents were twice likely to

have posttraumatic stress (Odd=2.24, 95%CI=1.19-4.04), while patients with no formal education were 3 times more likely to develop posttraumatic stress (Odd=3.43, 95%CI=1.23-4.12) compared to those with tertiary education.

Discussion

Road traffic accidents are common, yet unexpected traumatic events consequences of which can be chronic, disabling and sometime catastrophic [21]. Earlier studies on this subject had reported PTSD rates ranging from as low as 8% to as high as 46% [22,23]. Dougall et al. [4] reported that 61% of RTA victims had PTSD at 1 month, 45% at 6 months and 37% at 12 months after the accident. In the present study more than 50% of the subjects scored above cut off point on at least one of the subscales of IES-R while 35% scored above the cutoff point on all three subscales, which is high compared to the general population rate of 6.8% [24]. This finding shows that posttraumatic stress following RTA is relatively common among this group of patients and should be taken into consideration during rehabilitation of these patients.

We also noted the significant association between age, gender, marital status, and educational status, and the occurrence of posttraumatic stress symptoms in this group of patients. With respect to age, association between age and PTSD has not been consistent, Norris et al. [25]. Comparing PTSD and age after similar disasters in different parts of the world concluded that social, cultural and economic factors play a more important role than age in the development of PTSD than age. Our result however showed that older respondents tend to develop posttraumatic stress; this could be because older people exhibit more distress when faced with severe stress and also that psychiatric morbidity generally is higher among the older age group [26].

In this study we found that females were twice as likely to develop posttraumatic stress compared to males following RTA. Women have generally been reported to have a higher risk of developing posttraumatic stress disorder compared to men, epidemiologic studies in the general population indicate that women are 2.38-2.49 time more likely to develop lifetime PTSD than men after exposure to similar traumas [5,27]. Fullerton et al. [21] in a study on gender differences in PTSD following RTA suggested that dissociative behavior during peri-traumatic period may explain this difference, rather than factors such as prior PTSD, prior depression, or type of injury.

Our result also showed that single respondents were twice as likely to report posttraumatic stress compared to married respondents. The association between marital status and posttraumatic stress may be related to the degree of support, and the possible consequence(s) of the RTA on the person's ability to get married in the future, especially where the injury leaves observable scars. Social support is an important factor in the development of PTSD; this has been associated with the positive effect of helping victims develop proper coping strategies [4].

Educational level was also associated with posttraumatic stress, retaining its significance as a predictor of posttraumatic stress when other variables were controlled for in this study. Those with no formal education were three times more likely than those with tertiary education to develop posttraumatic stress. A similar finding was reported by Dougall et al. [4] in their study, they found that educational level affected the development of PTSD early in the period following RTA, although the effect recedes over time. Education allows

individuals to have a better understanding of their situation, thus improving their coping ability and the use of positive coping methods. Higher education may also mean better occupation and improved financial ability to support him/her.

Both anxiety and depressive symptoms were significantly associated with the presence of posttraumatic stress in our study. The presence of a co-morbid psychiatric disorder with PTSD is well recognized; major depression has been found to be significantly associated with posttraumatic stress disorder in trauma patients [28]. O'Donnell et al. [29] also reported a co-morbid PTSD/Depression prevalence rate of 5% three months post trauma, they suggested that this occurrence is evidence that the majority of psychopathology in the aftermath of trauma is best conceptualized as a general traumatic stress factor. In this study 76% of the patients with posttraumatic symptoms also have depressive symptoms, supporting the explanation by O'Donnell et al. [29] at least in the early post RTA period.

It is to be noted that clinical variables such as type of injury, level of injury and mode of treatment were not significantly associated with posttraumatic stress. This finding disagrees with that by Starr et al. [30] who reported a positive association between posttraumatic stress and injury severity and extremity injury. The difference may be explained by the patients selected for the study, while this study used patients still in the hospital, whose injuries are still being managed and deficits may not be totally clear, Starr et al. [30] used patients who on the average have been on treatment for over 12 months, thus the full extent of deficit(s) are clear and psychological effects already exerting their full weight on the respondents. Another possible explanation is that they measured chronic PTSD, while this study accessed a more acute psychological reaction to RTA. Thus it will appear that psychosocial variables rather than clinical variables are important in the occurrence of early posttraumatic stress following RTA. There is however evidence that this affects the eventual outcome of treatment, are givers should therefore take this into consideration in planning rehabilitation [31].

Limitations to this study include the effect of hospitalization which was not measured, this is also a cross sectional study thus changes over time was not assessed. Also the IES-R, while having good psychometric properties, does not correspond exactly to DSM based definitions of PTSD, this therefore limits the diagnostic accuracy of the instrument.

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