



ORIGINAL RESEARCH ARTICLE

# War-related trauma and post-traumatic stress disorder prevalence among undergraduate students in Iraq in 2010

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## Abstract

**Objectives:** Determining the prevalence rates of trauma and post-traumatic stress disorder (PTSD) among undergraduate students in the University of Kerbala in Iraq and its association with students' demographic variables.

**Methods:** A cross-sectional self-administered questionnaire survey was conducted among one third undergraduate students in the University of Kerbala in Iraq in 2010 (5446 students). The questionnaire used depended on a reliable and valid source PTSD check list-civilian (PCL-C) questionnaire.

**Results:** The internal reliability of the 17 questions about PTSD symptoms in the PCL-C section was high (Cronbach's  $\alpha$  was 0.90). More than three quarters (79%) of the undergraduate students reported life-time exposure to trauma, and this was significantly more among males (15% higher). Road traffic accidents formed the majority of accidents (71%) while war-related traumas were reported in about one fifth of the participants. On the contrary, PTSD prevalence was low (3%), and it was more common among female and younger students, however, PTSD symptoms were common (>30%). The reasons behind low PTSD prevalence in Iraq and surrounding countries might be related to sociocultural factors and higher population resilience. Finally, a prediction model suggested through structural equation modelling incorporating all potential predictors showed gender as the sole significant predictor.

**Conclusion:** Four fifths of undergraduate students were exposed to life-time trauma mostly road traffic accidents, and these were more among males. War-related trauma was also prevalent among one third; however, PTSD was at a much lower prevalence and more in females. Accident management premises should keep mental drawbacks in mind on treating violence victims.

**Keywords:** trauma exposure, post-traumatic stress disorder, post-traumatic stress disorder symptoms, university students, Kerbala

## Introduction

The study was conducted in Kerbala, a city in the middle part of Iraq, 100 km to the south of Baghdad (the capital). The city is famous for the golden domes holy shrines it contains. It is inhabited by more than one million citizens and is continuously visited by a large number of 'Shia' visitors (more than 10 million on some religious occasions). The University of Kerbala was established in 2002 and has since then grown in size and stature to include now 16 colleges.

Iraq is part of the Eastern Mediterranean Region where disasters, emergencies and conflicts represent a continuous

challenge to health in the region. Most countries in the region are in complex emergency situations of conflicts. Moreover, natural disasters, globalization and its accompanied rapid social changes and unplanned urbanization have collectively amplified the stress of daily life in this region<sup>1,2</sup>.

Violence and trauma exposure is a major global public health issue,<sup>3</sup> resulting in 191 million deaths in the twentieth century, with over half being civilians<sup>4</sup>. The direct immediate effect of violence (death or injury) is well documented; however, the late effects, including post-traumatic stress disorder (PTSD), might not be so easy to assess and estimate. PTSD is an anxiety disorder that develops following exposure to actual or threatened injury or death<sup>5</sup>. Shell shock, war sheer combat fatigue and

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many other names were used to describe PTSD, which was clinically classified first in 1980<sup>6</sup>.

People in Iraq are suffering about four decades of wars, sanction and terrorism. A national survey in 2007–2008 reported that about one fifth of the population (19%) complained of lifetime mental disorder. The survey showed that mental disorder was significantly increasing across successive generations. Anxiety disorders were the most common class of disorders (14%), while the prevalence of PTSD was (4%)<sup>7</sup>. A similar low PTSD rate was reported among Lebanese undergraduate students and was explained on the basis of the population's high resilience<sup>8</sup>. A further low PTSD prevalence rate (<1%) was also reported in a national sample in Iran<sup>9</sup>. Higher rates (8%) were reported among the general population in the US<sup>10,11</sup>.

In contrast, much higher rates (43%) were reported among survivors of suicidal explosions in Iraq,<sup>12,13</sup> and among risk groups in other countries<sup>14,15</sup>. Similarly, higher rates were reported among undergraduate and secondary school students in Baghdad but using different measurement instruments<sup>16</sup>. The great variation in PTSD prevalence among human populations mimic variation reported in different animal experimental models<sup>17</sup>.

Road traffic accidents (RTA) epidemic is costing humanity more than five million deaths annually, and more victims of disability and handicap. Iraq is within the belt of moderate to high incidence rates of RTA<sup>18</sup>. Males are exposed to traumas more than females as they represent the principal victims of the main trauma type (road traffic accidents). However, women are exposed to higher rates of some other less common types of trauma<sup>19</sup>. This study aimed at determining the prevalence rates of trauma, positive PTSD and PTSD symptom complexes and exploring the association of these indices with students' demographic characteristics.

## Materials and Methods

After a thorough review of commonly used questionnaires, a questionnaire was developed and piloted before use. The questionnaire was based on DSM-IV criteria for PTSD using the Post traumatic Checklist (PCL-C)<sup>6,20</sup>. Ethical approval was obtained from the ethical committee in the university before a total of 5446 students in Kerbala University participated voluntarily in a cross sectional survey in October- December 2010. Chi-square test was used to determine any association with demographic and other related variables while logistic regression analyses were used to explore potential predictors for output variables. Structural Equation Modelling was employed to substantiate further any associations. Statistical tests were set at a significance level of <.01 to compensate for multiple comparisons made in the analyses.

## Results

The response rate was high (>90%) and consistent with the response rate reported in most surveys in Iraq and

neighbouring countries<sup>21,22</sup>. High internal reliability was found on analysing participants' response to different questions of PTSD symptom complex clusters (Cronbach's alpha for the 17 questions of PCL-C questionnaire = 0.90), which indicated that the measurement tool was reliable.

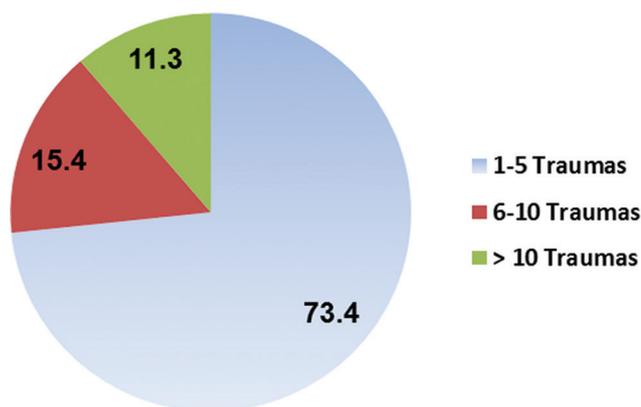
Females formed (54%) of the study sample and the mean age of the participants was (18.03 ± 3.67) year. The majority (79%) reported being exposed to life-time trauma of sufficient intensity to elicit PTSD. The mean number of traumas was (4.13 ± 4.1 time). One third of the total sample reported being exposed to a single trauma while (42%) reported 2–5 times exposure and the rest (24%) reported more than five. More than one quarter of the students (27%, *n* = 917) were exposed to trauma more than five times in their lives which represents a high proportion, while three quarters were exposed to 1–5 traumas (Fig. 1).

For the type of trauma, Road Traffic Accidents (RTA) formed the majority of traumas (70%), while the next common type was war-related trauma (WRT), including explosions and kidnapping and few war-related RTA (Table 1). About one third (30%) of those exposed to trauma had indicated it to be war related, and both types (RTA and WRT) were significantly more common among males.

A significantly higher proportion of males were exposed to lifetime trauma than females (86.7% vs. 71.9%). Males

**Table 1 The type of trauma distribution among Kerbala University students in 2010**

Type of trauma	Frequency	Percentage
Road traffic accident	1748	71.26
Explosion	172	7.01
Death of relative or a friend	144	5.87
Brawl or fight incident	81	3.3
Murders	59	2.41
Familial problems	52	2.12
Personal injury	49	2
Fire incident	37	1.51
Terrorism incident	27	1.1
Sinking or drowning accident	18	0.73
Kidnapping	11	0.45
Electrical shock	10	0.41
Problems with friends	9	0.37
A fall from a building	9	0.37
Incident of theft	7	0.29
Personal disease or operation	7	0.29
Psychological disease	4	0.16
Suicide	3	0.12
Robbery	2	0.08
A fall of the house	2	0.08
Capturing a criminal	1	0.04
Occupation caused accident	1	0.04
<b>Total</b>	<b>2453</b>	<b>100</b>



**Figure 1** The distribution of the number of traumas among students exposed to trauma at Karbala University in 2010.

also were exposed to a higher mean number of traumas than females (5.1 vs. 3.2,  $P < 0.05$ ). Additionally, the frequency of trauma increased significantly with age (from 75% to 85%, Table 2). A significantly higher proportion of married (83.1%) than single (77.9%) students reported trauma exposure ( $P = 0.002$ ). The pattern of study was significantly associated with trauma exposure (82% among evening studying compared to 78% among daytime students). However, no significant difference in the trauma exposure was found among different colleges or study years: ranging from 70% in the college of Agriculture to

88% in the college of Veterinary Medicine; and from 75% in the first year to 81% in the fourth year students.

About one third (29.8%) of those exposed to trauma were exposed to WRT (21.3% of the total sample). Males showed significantly higher rates than females (32% vs. 28%), but there was no significant association with age, marital status, college attended or study year. However, exposure to WRT was significantly positively associated with witnessing serious injury or death during the event (37% vs. 21%), feeling intense fear during the event (35% vs. 26%) and having symptoms for more than one month (31% vs. 25%).

PTSD prevalence was low (2.6%) and was significantly higher among females (3.2% vs. 2.9%) and increased with age. PTSD prevalence was higher among those exposed to WRT compared to other types of trauma (5.3% vs. 2.9%).

Different demographic and other students' characteristics groups were compared for the prevalence of PTSD (Table 2).

The prevalence of PTSD symptom complex clusters was (50%) for re-experience, (31%) for avoidance/numbness and (40%) for hyper-arousal of those exposed to trauma. 'Feeling very upset' ranking the most common symptom among the total and among male students while 'Repeated, disturbing dreams' ranking first among females (Table 3).

To determine the significant predictors of PTSD, a regression model was used, where all potential predictors were included in the model. The three main significant PTSD predictors in the model were college subspecialty, gender

**Table 2** Trauma exposure and PTSD and symptom distribution among different demographic groups among Kerbala university students in 2010 showing frequency and percentage (in brackets)

Variable	Categories	Trauma exposure	War-related trauma exposure	PTSD positive
Gender*	Male	2055 (86.7)	599 (32)	45 (2)
	Female	2060 (71.9)	515 (28)	94 (3)
Marital status	Single	3495 (77.9)	936 (29)	109 (2)
	Married	560 (83.1)	156 (31)	25 (4)
	Divorced	17 (89.5)	7 (44)	2 (11)
	Widow or widower	20 (87.0)	10 (59)	2 (10)
Age*	17–20 Years	1602 (75)	428 (30)	48 (2)
	21–25 Years	1921 (81)	486 (28)	70 (3)
	over 25 Years	411 (85)	139 (37)	18 (4)
College	Natural sciences	1518 (77)	445 (32)	51 (3)
	Humanity and social sciences	2597 (80)	669 (29)	88 (3)
Study year	First year	808 (75)	207 (29)	22 (2)
	Second year	1255 (82)	350 (30)	39 (3)
	Third year	1026 (77)	301 (32)	35 (3)
	Fourth year	970 (81)	235 (26)	39 (3)
	Fifth year	56 (77)	21 (43)	4 (5)
Pattern of study	Day time study	3098 (78)	810 (29)	99 (2)
	Evening study	1017 (82)	304 (33)	40 (3)

\*Significant difference.

**Table 3 The gender distribution of PTSD symptoms in descending order among Kerbala University students in 2010**

Symptom	Females		Males		Total	%
	Number	%	Number	%		
Repeated, disturbing dreams	1095	58.5	883	48.0	1942	52.2
Feeling irritable	1059	56.3	865	47.1	1876	50.6
Being "super alert"	1011	53.9	764	42.4	1859	50.6
Feeling emotionally numb	899	48.3	719	40.1	1618	44.2
Reliving the event	841	45.2	718	39.7	1512	41.2
Having difficulty in concentration	770	41.4	699	38.9	1488	40.5
Feeling distant	748	40.2	671	37.1	1443	39.5
Trouble falling or staying asleep	744	40.1	529	29.8	1489	38.5
Avoiding activities	709	37.2	552	29.7	1278	35.1
Feeling as if your future	666	36.1	530	29.7	1261	33.5
Loss of interest in activities	591	31.9	513	29.1	1179	32.7
Trouble remembering	498	27.6	512	28.8	1075	29.5
Physical reactions	483	26.3	484	27.0	1012	28.0
Repeated, disturbing memories	475	25.8	367	20.2	987	27.3
Feeling jumpy	448	24.1	343	19.7	841	23.8
Feeling very upset	819	18.3	670	13.6	815	22.2
Avoiding thinking	354	18.3	257	13.6	611	16.0

and age. The odds ratios (OR) of humanity sciences colleges was 2.61 compared to the natural science colleges while female OR compared to males was 1.87 and the OR for age group (the oldest compared to the youngest) was 1.50 (Table 4).

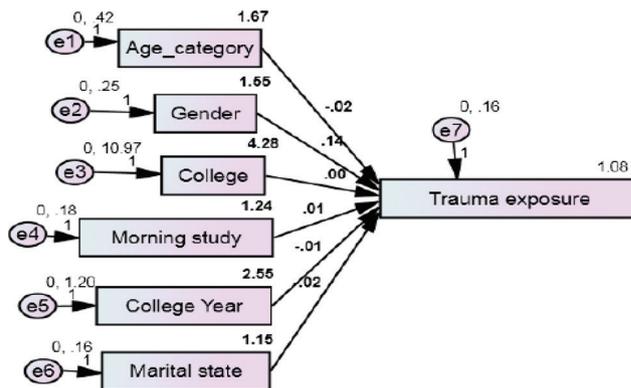
Similar findings were obtained in a model for trauma exposure (Table 5). When other models for each PTSD symptom complex were tried, the predictors were similar except for gender.

Regression analysis models are not useful for multiple simultaneous predictors' estimation. So further the step in the analysis tried exploring multivariate predictors of PTSD using Structural Equation Models (SEM) where only gender was the significant predictor when all significant predictors in regression model were let to correlate simultaneously in these models (Figs 2 and 3).

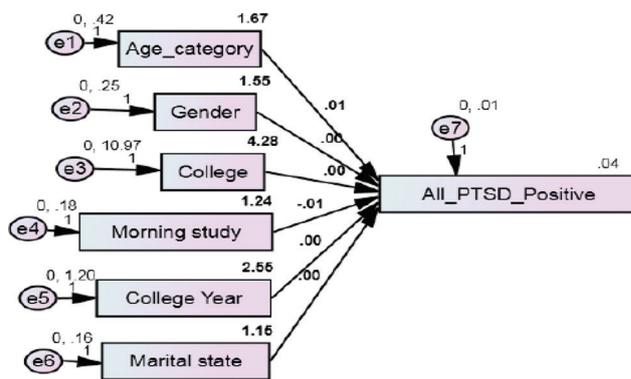
**Discussion**

The highest response rate in this study (90%) was comparable to many other local and national surveys in Iraq which claimed response rates around 100%<sup>7,22,23</sup>. Similar high response rates were reported in neighbouring countries such as Iran,<sup>24-26</sup> Saudi Arabia<sup>27</sup> and Turkey<sup>28</sup>. However the detailed response rates for different questions were variable and ranged between 58% and 100%. The reasons behind the high response rate might be related to the sociocultural context in Iraq and the strict administrative measures applied in the educational system. Additionally, the utmost care given for the detailed factors (anonymous confidential forms) in the questionnaire preparation and during study implementation might have added to this high response rate.

The prevalence of trauma exposure in this study was consistent with those reported among undergraduate and



**Figure 2** Structural equation model for trauma exposure showing the unstandardized regression weight of predictors.



**Figure 3** Structural equation model for PTSD showing the unstandardized regression weight of predictors.

**Table 4 PTSD logistic regression model results table with students demographic characteristics**

Variable	Odds ratio	Significance
Humanities or sciences colleges	1.25 (1.07 – 1.45)	<i>P</i> < 0.001
Gender	0.39 (0.33 – 0.45)	0.002
Age category	1.18 (1.05 – 1.33)	0.003

Reference category: those who did not have positive PTSD score, model fitting  $\chi^2 (3) = 34.92, P < 0.001$ , Goodness of fit Pearson  $\chi^2 (44) = 51.38; P = 0.185$ .

**Table 5 Trauma exposure logistic regression model results table with students' demographic characteristics**

Variable	Odds ratio	Significance
Humanities or sciences colleges	2.61(1.58 – 4.33)	0.006
Gender	1.87 (1.26 – 2.76)	<0.001
Age category	1.52 (1.15 – 2.01)	0.005

Reference category: those not exposed to trauma, model fitting  $\chi^2 (1) = 191.15, P < 0.001$ , Goodness of fit Pearson  $\chi^2 (44) = 444.97; P = 0.431$ .

secondary school students in Iraq<sup>29,30</sup>, Iran<sup>31</sup>, and most developed countries<sup>32,33</sup>.

A noteworthy finding was the low PTSD prevalence compared to developed countries in spite of high trauma exposure prevalence and the known long history of exposure to war and torture in the country. Similar low PTSD prevalence rates were reported in Lebanon and Iran in spite of facing two decades of war<sup>8,9</sup>. One potentially significant social characteristic in these countries concern the extended and large family pattern with strong social support of all family members, relatives and even neighbours for those exposed to trauma. Higher population resilience might be the reasons behind these low rates and could be related to the socio-cultural context in these countries,<sup>8,34,35</sup> however, exploring the exact underlying factors requires further studies. An additional reason behind the low PTSD rate in Iraq might be methodological, related to the stringent significance level used or the high missing symptom answers in this study. When trauma characteristics were ignored, a much higher PTSD prevalence was detected. The high missing rate for trauma might be related to a misunderstanding of the questions or denial of the "fear sensation" by males or the so called "machismo" phenomena<sup>36,37</sup>. These reasons have been reported by other researchers who had also suggested corrections of criteria

of PTSD calculation in DSM-IV by deleting these subjective criteria<sup>38-40</sup>. The new DSM-V took these notes seriously and applied the suggested changes in trauma characteristics for PTSD algorithm calculation<sup>41</sup>. A possible explanation for the low PTSD prevalence might be related to the high population resilience which was also implicated in similar studies in Lebanon<sup>8,34</sup>.

A recent study using a different tool (Harvard questionnaire) among high risk samples had reported a much higher PTSD rate (43%) among survivors exposed to suicidal explosions in Kerbala city,<sup>12</sup> and in other cities in Iraq,<sup>13</sup> and in many other studies in Gaza strip and North Ireland<sup>14,15</sup>.

The gender difference in PTSD prevalence with female predominance was similar to most reviewed studies in the developed countries<sup>42</sup>. It is worth mentioning, that the social context in the Middle East with cultural oppression against women could be an additional reason for such gender difference<sup>43</sup>.

## Conclusion

Three quarters of the undergraduate students were exposed to life-time trauma but less than 3% complained from PTSD. However, PTSD symptom complex prevalence rates were high (31–50%). The PTSD prevalence rate was higher among females, married and younger students. The reasons behind the low PTSD prevalence in Iraq and surrounding countries might be related to sociocultural factors and higher population resilience. A structural Equation Model revealed gender as the sole significant predictor of PTSD.

## Conflict of Interest

None.

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