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Trauma and posttraumatic stress disorder in transcultural patients with chronic pain

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Abstract
Background Traumatic events are commonly experienced in the general population and can lead to both psychological and physical consequences. While some may process the experienced event without developing trauma related symptoms in the long term, others develop persistent symptomatology in the form of chronic pain depending on the type of trauma as well as various other risk factors.

Objective The aim of this study was to examine the relationship of the number of lifetime traumas and chronic pain in a sample of transcultural patients to further develop existing research highlighting an association between the number of traumas and chronic pain that may be independent of a categorical diagnosis of PTSD.

Methods Using a case-control design, this study compared 29 chronic pain patients (Gerbershagen II/III) born in former Yugoslavia (21 female; age: 52.5 years, SD 7.3) to 21 patients of a general psychiatric sample who were matched by age- (±5 years), migratory-background, and gender. The number of traumas and PTSD symptomatology were assessed using the Harvard Trauma Questionnaire (HTQ). Somatisation, social dysfunction and anxiety were assessed by the General Health Questionnaire 28 (GHQ-28). The Beck Depression Inventory (BDI) was used to determine the presence of depression.

Results 96.9 % of the chronic pain patients reported at least one traumatic event compared to 76.2 % within the control group ($p=0.029$). Likewise, the mean number of reported traumas was significantly higher among the chronic pain group at 12 vs. 7 respectively ($p=0.024$). Regarding anxiety, depression and social dysfunction, no significant difference between the two groups was found.

Conclusions Chronic pain patients with migratory background report an unusually high number of traumatic events. Clinicians should carefully screen for trauma history in this group of patients. The present study supports prior research suggesting a cumulative effect of trauma on chronic pain.

Keywords Chronic pain · Trauma · PTSD · Comorbidity

Trauma und posttraumatische Belastungsstörung bei transkulturellen Patienten mit chronischem Schmerz

Zusammenfassung
Hintergrund Traumatische Ereignisse gehen häufig mit psychischen und physischen Folgen einher. Während ein Teil der Betroffenen die Erlebnisse ohne bleibende Beeinträchtigung bewältigen kann, entwickeln andere in Abhängigkeit der Art des traumatischen Erlebnisses und weiterer Risikofaktoren jedoch langfristig Symptome, unter anderem chronische Schmerzen.

Studienziele Ziel der vorliegenden Studie war es, den Zusammenhang zwischen der Anzahl erlebter Traumata und chronischer Schmerzen bei PatientInnen mit Migrationshintergrund zu untersuchen. Bisherige Forschung zeigte Hinweise auf einen Einfluss von Traumatisierung

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auf die Entstehung chronischer Schmerzen unabhängig vom Vorliegen einer PTSD.

Methoden In einem Fall-Kontroll-Design wurden 29 PatientInnen mit chronischen Schmerzen (Gerbershagen II/III), die im ehemaligen Jugoslawien geboren sind (21 Frauen; Alter 52,5 Jahre, SD 7,3), mit 21 nach Alter (±5 Jahre), Geschlecht und Migrationshintergrund gematchten psychiatrischen PatientInnen verglichen. Die Anzahl an Traumata sowie PTSD-Symptome wurden mit dem Harvard Trauma Questionnaire (HTQ) erfasst. Somatisierung, soziale Dysfunktion und Angst wurden mit dem General Health Questionnaire 28 (GHQ-28) erfasst. Das Beck Depression Inventory (BDI) wurde verwendet, um Depressivität zu messen.

Ergebnisse 96,9 % der SchmerzpatientInnen gaben zumindest ein Trauma an, verglichen mit 76,2 % in der Kontrollgruppe ($p = 0{,}029$). Auch die mittlere Anzahl der Traumata war in der Schmerzgruppe deutlich höher (12 vs. 7; $p = 0{,}024$). Hinsichtlich Ängstlichkeit, Depressivität und psychosozialer Beeinträchtigung gab es keinen signifikanten Unterschied zwischen den Gruppen.

Schlussfolgerungen PatientInnen mit Migrationshintergrund und chronischen Schmerzen zeigen eine ungewöhnlich hohe Traumaprävalenz. Eine Traumaanamnese sollte bei dieser PatientInnengruppe besondere Beachtung finden. Die vorliegende Studie unterstützt weiters bisherige Ergebnisse, die einen kumulativen Effekt von Traumatisierung auf Schmerzen fanden.

Schlüsselwörter Chronischer Schmerz · Trauma · PTBS · Komorbidität

Background

Chronic widespread pain is a condition affecting between 12 and 30 % of the general population [1] usually defined as long lasting pain of more than 6 months and often persists in the absence of physical causes. Chronic low back pain accounts for the most years lived with disability globally, thus illustrating its tremendous burden of disease [2]. Low back pain and neck pain appear to be the most common locations of chronic pain, however, multiple locations are common in affected patients. While chronic pain itself can be the central part of a mental disorder, such as somatic symptom disorder [3] or somatoform pain disorder [4], it is often associated with other psychiatric disorders.

Psychiatric comorbidities are frequently found in patients with chronic pain, most notably mood disorders, anxiety disorders and posttraumatic stress disorder (PTSD) [5, 6]. These comorbidities have significant clinical implications and there is an increasing interest in investigating the relationship between these conditions. Posttraumatic stress disorder, a disorder characterised by the exposure to traumatic events followed by symptoms of hyper arousal, re-experiencing, avoidance and negative alterations in cognition and mood, significantly affects physical health. PTSD is of particular interest in the context of chronic pain, as a large percentage of patients with PTSD also reports chronic pain, with numbers ranging from 35–85 % [7–9].

Several studies have investigated the association of trauma and chronic pain in large scale epidemiological samples [5, 6, 10] and particular sub groups such as war veterans [8, 11] or survivors of disasters [7]. High rates of chronic pain in patients with PTSD have been found in survivors of disasters [7], veterans [8, 11] and refugees reporting torture [12].

Migrants from former Yugoslavia are at particularly high risk of having PTSD or a history of trauma due to their exposure to war and migration. This is particularly evident in patients with somatoform pain disorder [13]. Likewise, patients with PTSD in this region seem to be particularly affected by physical comorbidity. One study found exceptionally high rates of chronic pain in patients with PTSD in Bosnia [9], hence leading to the hypothesis that this sub group of migrants may be at very high risk of having undetected comorbidities.

The number of traumas as well as the type of trauma have been identified as significant predictors of symptom severity in patients with both PTSD and chronic pain [10, 14, 15]. Some authors have argued that a cumulative effect of trauma rather than the categorical diagnosis of PTSD may be the determining factor for the development of physical symptoms following traumatic experiences. Sledjeski et al. found a mediating role of the number of lifetime traumas on the relationship between PTSD and chronic pain [10]. Once this number was taken into account, the diagnosis of PTSD was not a significant predictor. Another more recent study came to similar conclusions [15]. Following this line of argumentation, we hypothesised that patients with chronic pain would (1) report a history of trauma more frequently compared to controls, (2) report a higher number of traumas and (3) report more traumas associated with psychical violence.

The present study investigates trauma and PTSD in a sample of patients with migratory background from former Yugoslavia who were in treatment for severe chronic pain at the Department for Psychiatry and Psychotherapy, Medical University of Vienna. In a case-control design, these patients are compared to carefully matched controls, consisting of a mixed sample of psychiatric patients, to eliminate confounding factors such as depression and anxiety.

Methods

Sample

Between June 2012 and August 2013, all psychiatric patients with a history of migration from former Yugoslavia were considered for inclusion if they were in treatment for chronic pain and attended a psycho-educative group therapy held in Bosnian/Croatian/Serbian language. After obtaining informed consent, chronic pain was assessed using the Mainz Pain Staging System (MPSS) and

only those patients with severe and very severe chronic pain (stage II and III) were included. The control group consisted of a sample of psychiatric patients who did not report having any pain on more than 2 days within the last month. Controls were recruited in wards and outpatient clinics by consultant psychiatrists and a clinical psychologist. Controls were matched for gender, age (±5 years) and migratory background and each control was assigned to one patient in the chronic pain group in order to make both groups as comparable as possible. Exclusion criteria for both groups were inability to consent, acute intoxication, psychotic symptoms, dementia and neoplasms.

The study was approved by the human ethics committee of the Medical University of Vienna. Chronic pain patients were recruited by one of the authors before and after the group therapy sessions. Controls were approached in the ward by the authors and consultant psychiatrists. No drop outs occurred between the time of consent and completion of the study. Five participants were excluded due to incomplete or missing data.

Measures

After obtaining informed consent, participants were asked to complete three questionnaires. All questionnaires were available in a Bosnian/Croatian/Serbian version.

Lifetime trauma and PTSD

Lifetime history of trauma and posttraumatic symptoms were assessed using the Bosnian version of the Harvard Trauma Questionnaire (HTQ). The HTQ consists of 4 subsections and only Sect. 1 and 4 were used for this study. The first section comprises 46 items of potentially traumatic experiences with yes/no answer categories. The fourth section covers trauma related symptoms in 40 items, with the first 16 items being specific for PTSD. Despite the dimensional nature of the HTQ, a cut off score of 2.50 shows high correlation with a clinical diagnosis of PTSD (positive predictive value 0.85–0.88), thus providing the option for a categorical diagnosis for screening and research purposes [16, 17]. The Bosnian version of the HTQ was designed specifically for civilian victims of the Balkan conflicts and has been widely used since its development. Other versions of the questionnaire show high inter-rater reliability of the traumatic experiences ($r=0.93$) and symptoms ($r=0.98$) and high test-retest reliability of the traumatic experiences ($r=0.89$) and symptoms ($r=0.92$) and high internal consistency (Crohnbach's $\alpha=0.90$) [16,17].

Depressive symptoms

Depressive symptoms were assessed with the Beck Depression Inventory (BDI). Given its high sensitivity (0.86–0.97) and positive and negative predictive value (0.83 and 0.99), it is a widely used screening instrument for depression. Furthermore, the BDI has high internal consistency (Crohnbach's $\alpha=0.91$) and test-retest reliability after a week ($r=0.93$), showing the robustness of the scale for day-to-day changes in mood [18, 19].

Anxiety and social dysfunction

The General Health Questionnaire 28 (GHQ-28) is a screening instrument for psychological well being, covering a broad range of general mental health. Section A screens for somatic symptoms, section B for anxiety, section C for social dysfunction and section D for depression. The 28 item version is the most widely used one and has high reliability (0.78–0.95) [20].

Statistical analysis

The statistical analysis was performed using IBM™ SPSS 20.0 for MAC OS X. Group comparisons of categorical variables were carried out by means of Pearson's X^2-tests, and those of continuous variables were performed by means of *t*-tests for independent samples. An explorative analysis to examine the association of traumatic experiences (independent variable) and chronic pain (dependent variable) was performed using a multivariate linear regression model (forward stepwise). GHQ-28 scores were calculated using a Likert scale. For the categorical diagnosis of PTSD, a cut-off value of 2.50 was set for the first 16 items of section 4 of the HTQ as recommended by Mollica et al. [16].

Results

Sociodemographic data

The final sample consisted of 29 chronic pain patients (21 female) and 21 controls (14 female). The two groups did not differ significantly in age, with a mean age in the chronic pain group of 52.3 years (SD 7.1) and 48.8 (SD 8.7) in the control group. 55.2 % of the chronic pain patients had completed secondary education compared to 52.1 % of the control patients. While 9.5 % of the control group had a university degree, none of the chronic pain patients did. 38 % of both groups were unemployed, 31 vs. 28.6 % retired and only 20.7 vs. 28.6 % in the workforce. 48.3 % of the chronic pain patients were married or in a de facto relationship compared to 61.9 % of the control group (see Table 1).

Trauma

The prevalence of lifetime traumatic experience was significantly higher in the chronic pain group. Of the 29

Table 1 Sociodemographic data

	Chronic pain patients ($n=29$) *N* (%)	Controls ($n=21$) *N* (%)	X^2	*p*
Gender			0.192	0.662
M	8 (27.6)	7 (33.3)		
F	21 (72.4)	14 (66.7)		
Age	52.3 (SD = 7.1)	48.8 (SD = 8.7)		0.123
Education			14.039	0.007
< 9 yrs	0 (0)	2 (9.5)		
9 yrs	12 (41.4)	7 (33.3)		
Secondary education	16 (55.2)	9 (42.6)		
Tertiary education	0 (0)	2 (9.5)		
Occupation			2.191	0.822
Working	6 (20.7)	6 (28.6)		
Stay-at-home parent	1 (3.4)	0 (0)		
Unemployed	11 (37.9)	8 (38.1)		
Retired	9 (31.0)	6 (28.6)		
Marital status			1.629	0.804
Single	1 (3.4)	1 (4.8)		
Married/de facto	14 (48.3)	13 (61.9)		
Divorced	11 (37.9)	5 (23.8)		
Widowed	2 (6.9)	1 (4.8)		

Table 2 Group comparison of trauma and PTSD

	Chronic pain patients ($n=29$)		Controls ($n=21$)		*p*-value
	N	%	*N*	%	
Trauma	28/29	96.9	16/21	76.2	0.029*
No Trauma	1/29	3.1	5/21	23.8	
PTSD	23/29	79.3	15/21	71.4	n.s.
No PTSD	6/29	20.7	6/21	28.6	
*marginally significant $p<0.05$					

chronic pain patients, 28 (96.9 %) reported at least one qualifying trauma compared to 16 (76.2 %) of the controls. Similarly, the mean number of reported traumas was also higher among chronic pain patients at 12.2 vs. 7.1 respectively (see Table 2).

Importantly, differences regarding the mean number of lifetime traumas were found within the chronic pain group. Patients with more severe chronic pain (Gerbershagen III) were more likely to report at least one traumatic event (100 %) and reported more traumatic events (13.1) compared to patients with less severe pain, of which 88.9 % reported a history of trauma and on average less traumatic events (9.4).

79.3 % of the chronic pain patients reported such a score in the HTQ that they fulfilled the criteria for PTSD. This number was marginally lower in the control group at 71.4 %. The mean scores for PTSD specific symptoms and non-specific posttraumatic symptoms were both higher in the chronic pain group (see Table 2).

The scores for depression (BDI) and general mental health (GHQ-28) revealed no significant difference between the two groups. Both groups, however, showed high levels of depression (34 vs. 29.9 in the BDI and 12.97 vs. 11.33 in section D of the GHQ-28), corresponding to severe depression and overall low mental health (57.03 vs. 55.33 in the GHQ-28) (see Table 3).

A logistic regression model (forward stepwise) was performed to examine the types of traumas associated with greater likelihood for chronic pain. This analysis revealed that traumas associated with physical injury and forced evacuation were associated with chronic pain (see Table 4). The interpretation of this model, however, is clearly limited by the small sample size used in this study.

Discussion

The present study investigated trauma and PTSD in patients with chronic pain from former Yugoslavia. Three major findings emerged: (1) Trauma was more prevalent among chronic pain patients compared to psychiatric controls. More patients reported at least one traumatic event, and the mean number of reported traumas was higher. (2) Among the chronic pain patients, those with more severe chronic pain reported more traumas and were also more likely to reach the cut-off level for PTSD. (3) No significant difference in PTSD prevalence was found between the groups. However, both groups showed high rates of PTSD.

The high prevalence of trauma among chronic pain patients found in this study is in consensus with a body of literature reporting high comorbidity between chronic pain and PTSD and high incidence of trauma among chronic pain patients [5, 7, 8, 10, 15]. These findings are also in line with a growing body of literature suggesting that the cumulative effect of trauma, i.e. the number and severity of traumas, is a more significant predictor for several physical conditions including chronic pain than the categorical diagnosis of PTSD [10, 15].

This may reflect the view that rather than taking PTSD as a discrete categorical diagnosis, it may be seen as a stress-response continuum, with PTSD at the far end. In the framework of such a continuum it seems plausible that physical symptoms such as chronic pain occur in the aftermath of traumatic events even though a patient does not reach the criteria for PTSD.

In contrast to this study, most previous studies have differentiated between different pain localisations and came to different conclusions regarding the relationship with PTSD [10, 15]. For instance, one study found no significant relationship between PTSD and most pain localisation once the number of traumas was taken into account with the exception of headaches [10]. While the reasons for this remain unclear, it is noteworthy that the patients included in this study had at least two pain localisations as this is a requirement for the classification as stage II in the MPSS.

Table 3 Scores of HTQ, BDI, GHQ-28

	Chronic pain patients	Controls	Test statistics	95 % CI
	Score	Score	*p*-Wert	
BDI	34.03	29.90	n.s.	– 10.9–2.6
GHQ-28	57.03	55.33	n.s.	– 11.2–7.7
Somatic symptoms (GHQ A)	14.41	14.71	n.s.	– 2.5–3.1
Anxiety (GHQ B)	14.17	14.90	n.s.	– 1.7–3.1
Social dysfunction (GHQ C)	15.48	14.38	n.s.	– 3.8–1.6
Depression (GHQ D)	12.97	11.33	n.s.	– 4.4–3.1
HTQ I Traumatic Events	12.21 (SD 7.5)	7.10 (SD 8.1)	0.029	
HTQ IV Symptoms	2.86 (SD 0.63)	2.51 (SD 0.67)	n.s.	
HTQ IV 1–16 PTSD Symptoms	2.91 (SD 0.70)	2.65 (SD 0.76)	n.s.	

BDI Beck Depression Inventory, *GHQ-28* General Health Questionnaire-28, *HTQ* Harvard Trauma Questionnaire; Part I of the HTQ shows the mean number of reported traumas, Part IV of the HTQ shows posttraumatic symptom severity, items 1–16 cover the diagnostic criteria for for PTSD

Table 4 Multiple logistic regression analysis of reported traumatic events

Trauma	AOR	95% CI	*p*	Wald X^2	Chronic pain patients %	Controls %
Forced evacuation	14.688	(2.4–91.8)	0.004**	8.26	69.0	61.5
Physical violence	18.868	(3.2–112.7)	0.001*	10.38	31.0	23.8
Forced isolation from others	0.124	(0.2–0.8)	0.030**	4.70	13.8	28.6

Multivariate model (Likelihood Ratio) controlled for gender, age, depression (*BDI*) and psychiatric morbidity (*GHQ*)
AOR Adjusted Odds Ratio, *CI* Confidence Interval
*significant $p < 0.001$; **marginally significant $p < 0.05$

Both groups had similar results in the scales for depression, anxiety, and overall mental health. This indicates that both groups were comparable in terms of overall psychiatric morbidity. Both depression and anxiety have been described to be associated with a history of trauma and childhood adversity, hence comparing chronic pain patients to healthy controls would create the risk of bias.

At a mean age of 52.3 years, only 20.7 % of the chronic pain patients were part of the workforce at the time of assessment. This illustrates the burden of disease to this group of patients and underlines the need to consider the impact of chronic pain on the patient's life.

The exploratory analysis of traumatic events revealed that traumas associated with interpersonal violence and forced evacuation predicted the greatest odds for chronic pain. Forced evacuation does not form an own category and this finding can most likely be explained by the similar biographic history of the participants. It is understandable though that forced evacuation poses a serious traumatic threat to the individual as it involves leaving close ones and belongings behind and moving under difficult circumstances and perhaps threatened by violence.

The results of this study have to be seen in the light of several limitations. Firstly, the cross sectional design used for this project does not allow causal conclusions about the nature of trauma as a risk factor for chronic pain. Only longitudinal studies are able to show the development of posttraumatic symptoms following trauma and allow for testing of hypotheses regarding the relationship of trauma and various symptoms. Secondly, the sample size was small and while a significant association of trauma and chronic pain was found, a valid analysis of individual traumatic events is not possible. A limiting factor here was the number of available patients and controls. The unequal sample size of the two groups was the result of difficulties recruiting the required number of controls fulfilling the inclusion criteria within the observation period. Furthermore, both groups consisted of voluntary inpatients and outpatients; however, the control group was not matched for inpatient status. This may have resulted in selection bias. Thirdly, we investigated trauma and chronic pain in a particular sub population, i.e. migrants from former Yugoslavia. This group may have certain characteristics through its particular biographical history, the migratory experience and post-migration factors, i.e. circumstances of living in the new environment. Therefore, the results found in this study may not be generalizable. One more limitation of the study is the fact that number and kind of traumas was assessed, but not age at traumatisation and the sequence of traumatic events. The age at which one is traumatised and the time between single traumatic events occur or the overlap of chronic traumatic circumstances may make a difference with regards to the risk for physical comorbidity and therefore future studies should consider taking these variables into account.

Chronic pain and a history of trauma are often seen together and the relationship remains somewhat unclear. A number of hypotheses regarding this relationship have been published and these are a matter of ongoing discussion. The mutual maintenance model posits that both pain and PTSD contribute to ongoing disease pro-

cesses, maintaining each other through attention bias, anxiety sensitivity, avoidance, depression and intrusion [21]. While depression has been described as a mediating factor between trauma and pain [22], there is a lack in empirical evidence supporting this model. The shared vulnerability model on the other hand uses the premise of anxiety sensitivity as a factor of vulnerability for both PTSD and chronic pain [23]. Anxiety sensitivity, the fear of behaviour or perceptions associated with the experience of anxiety, has recently been shown to be increased by PTSD symptoms and in turn increases the perception of chronic pain [24]. However, a unidirectional influence of trauma on the chronic pain has been found in a longitudinal study [25]. In the context of such a unidirectional model, changes in the aftermath of traumatic events lead to an increased susceptibility for pain, most likely through altered arousal mechanisms and pain processing [26] and perhaps an impaired negative feedback in the hypothalamic-pituitary-adrenal (HPA) axis, resulting in altered cortisol secretion [27, 28]. Indeed, altered gene expression has been found in genes involved in the HPA axis [29]. While at the current level of evidence this may not explain the high incidence of chronic pain well enough, it does explain several other comorbidities, particularly cardiovascular diseases.

Future research should address the limitations of previous studies by using longitudinal designs, investigating mediating factors and altered pain processing in patients with a history of trauma.

The growing evidence for trauma as a risk factor for chronic pain may have implications for clinical settings and the improvement for health care for patients suffering from chronic pain. Patients with widespread chronic pain should be carefully screened not only for PTSD, but perhaps equally important for a history of trauma.

Conflict of Interest

The authors declare that there is no conflict of interest.

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