RESEARCH ARTICLE   OPEN ACCESS

Traumatic Exposure and PTSD Symptoms in a Sample From a Tertiary Pain Clinic

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ABSTRACT

Background: Post-traumatic stress disorder (PTSD) is a significant psychiatric comorbidity in individuals with chronic pain. To date, the link between PTSD and chronic pain has mostly been described using the outdated DSM-IV PTSD criteria. Stronger evidence utilizing the updated DSM-5 criteria is needed to ensure comparability with earlier prevalence rates.

Methods: This observational study reported the percentage of individuals who had experienced at least one traumatic event and fulfilled the DSM-5 PTSD criteria, based on self-report, at a tertiary pain clinic in Sweden. The study also investigated the associations between PTSD symptom severity and sociodemographic characteristics, trauma-related factors, and pain-related factors, using regression analysis in the trauma-affected subsample.

Results: A large proportion of the sample (76.8%) reported having experienced at least one traumatic event, with the prevalence of self-reported PTSD being 23.0% for the sample. Female sex, being born outside of Sweden, anxiety, and multiple traumatic events were identified as significant predictors of more severe PTSD symptoms. The most common trauma types were accidents, life-threatening illness or injury, sudden accidental or violent death, and multiple traumas.

Conclusions: Based on the results from this study, it seems important to integrate PTSD assessment in clinical settings focused on chronic pain. The findings align with the broader literature on the impact of sex, migration, and cumulative traumas as predictors of PTSD symptomatology. Furthermore, the results highlight the complex interconnection between PTSD and chronic pain, underscoring the importance of considering sociodemographic and trauma-related factors in the clinical assessment and treatment of chronic pain populations.

1 | Introduction

Post-traumatic stress disorder (PTSD) affects as many as 17.7% of those who experience a traumatic event [1] and can lead to distinct functional disability, health impairment, and social dysfunction [2, 3]. Previous literature points to a bidirectional relationship between PTSD and pain resting on shared factors that act to maintain symptoms or predispose individuals to develop these disorders [4–6]. A recent systematic review demonstrated an overall PTSD rate of 9.8% in chronic pain samples, with a remarkably wide range of observed prevalence, from 0.69% in chronic low back pain to 50.1% in veterans [7]. Furthermore, studies within specialized pain clinics have reported PTSD prevalence rates between 23.0% and 28.9% [8, 9], but these studies have used the now outdated Diagnostic and Statistical Manual of Mental Disorders fourth edition (DSM-IV) criteria for PTSD.

The DSM-5 criteria include adjustments to the diagnostic criteria, and a recent study reported a prevalence rate of 16.4% in a chronic pain sample using the updated criteria [10]. Further and robust evidence utilizing the updated DSM-5 criteria is needed to ensure comparability to earlier prevalence rates and to advance our understanding of PTSD within chronic pain populations [11].

Recognizing the high comorbidity between pain and PTSD, it is critical to understand why PTSD assessment is paramount in chronic pain management. Over the past decade, research has started to show that PTSD can intensify pain perception and pain-related impairment as well as hinder rehabilitation [3, 5, 8, 12–14]. Consequently, recommendations that trauma history and PTSD symptoms should be integrated into the assessment of chronic pain have been put forward [4, 15]. Still, PTSD assessment is often overlooked in pain clinics, leading to a gap in comprehensive patient care [16, 17]. In fact, PTSD goes undetected in more than half of patients seen in medical settings due to factors such as stigma, restricted focus on physical symptoms, and inadequate integration between primary care, somatic care, and mental health services, along with a lack of understanding or knowledge in both practitioners and patients regarding the relationship between traumatic exposure and current symptoms [16, 18]. In comparison, there is a considerably longer tradition within the pain field to assess, conceptualize, and treat other frequent psychiatric comorbidities, such as symptoms of depression and anxiety [16, 19]. The absence of routine PTSD assessment in these settings can result in misdiagnosis, inadequate treatment approaches, and prolonged patient distress. Thus, our study aims to highlight and address this significant gap in the field of pain management.

This observational, retrospective study also aspires to provide a more rigorous characterization of traumatic exposures and resultant PTSD in individuals with chronic pain using the DSM-5 criteria. The overlap between PTSD and chronic pain cannot be fully accounted for by the traumatic etiology of chronic pain [15]. Still, meta-analytic findings have revealed an association between exposure to physical injury during a trauma and an increased risk of developing PTSD [20]. However, with the exception of torture, the impact of physical injury on PTSD has been found to be less pronounced than the impact of specific sociodemographic characteristics, other peritrauma factors, and pre-trauma vulnerabilities [20]. Specific trauma types, such as intentional/assaultive traumas (involving interpersonal violence), also have greater associations with PTSD [1, 21, 22]. In addition, there is evidence that individuals with a history of multiple traumatic events are more likely to develop PTSD than individuals with a single traumatic event [20, 22, 23]. Female sex, younger age, limited social support, increased life stress, and a history of mental disorders (particularly anxiety and depression) have similarly been pointed out as risk factors to develop PTSD [21, 22, 24].

Due to these identified gaps, the first aim of this study was to report the percentage of individuals who had experienced a traumatic event and fulfilled the DSM-5 PTSD criteria, based on self-report at the Pain Rehabilitation Unit at Skåne University Hospital, Sweden. This includes describing trauma-related characteristics for the trauma-affected individuals. The second aim was to investigate the associations between PTSD symptom severity and sociodemographic characteristics, pain-related factors, and trauma-related factors using regression analysis in the trauma-affected subsample.

2 | Methods

2.1 | Participants

Participants were 181 adults consecutively referred for assessment at the Pain Rehabilitation Unit at Skåne University Hospital between August and November 2018. This government-funded tertiary pain clinic is based within Swedish national health services and functions as a regional, specialist center dedicated to assessment and treatment of chronic pain and related disabilities. The clinic has proactively integrated trauma history and PTSD screening into the standard battery of self-report questionnaires. This study is in line with the Strengthening the Reporting of Observational studies in Epidemiology guidelines (STROBE) and includes the necessary items to properly report an observational study according to the STROBE checklist [25]. All participants gave informed consent, and the study was approved by the Swedish Ethical Review Authority (2019-03997).

2.2 | Measures

The self-reported measures were completed by the patients prior to their assessment at the clinic.

2.2.1 | Sociodemographic Variables

Self-reported sociodemographic variables included age, sex, and country of birth.

2.2.2 | Pain-Related Factors

Pain type was recorded as periodic or constant. Primary pain diagnosis fibromyalgia was recorded as "yes" or "no." Primary pain diagnosis neck-associated pain (cervicocranial syndrome and cervicobrachial syndrome) was recorded as "yes" or "no."

2.2.2.1 | Hospital Anxiety and Depression Scale (HADS). HADS measured depression and anxiety symptomatology [26]. Separate anxiety and depression scores were calculated based on the items that were rated from 0 to 3. Higher scores indicate higher levels of depression and anxiety over the past week. The psychometric properties of the English original and the Swedish version have been deemed acceptable [26, 27].

2.2.2.2 | Insomnia Severity Index (ISI). ISI assessed the impact and severity of insomnia symptoms [28]. All items were rated on a scale from 0 to 4. A total score was produced by adding all items together, and higher scores indicate worse impact of insomnia symptoms. This measure has been found to possess acceptable psychometric properties [28, 29].

2.2.2.3 | Multidimensional Pain Inventory Version 2 (MPI).

MPI measured pain interference, pain severity, and social support with specific subscales [30]. The items were rated on a 7-point scale (0 = never; 6 = very often) and a mean score for each subscale was computed, where higher scores represent greater pain interference, pain severity, and social support. The psychometric properties of the MPI have been deemed satisfactory [31]. The Swedish version used here has displayed sensitivity when measuring pain-related outcomes [32].

2.2.2.4 | Pain Locations.

The number of pain locations or pain extent was assessed using 36 predefined anatomical areas (18 on the front and 18 on the back of the body) where the patients recorded areas with pain: (1) head/face, (2) neck, (3) shoulder, (4) upper arm, (5) elbow, (6) forearm, (7) hand, (8) anterior aspect of chest, (9) lateral aspect of chest, (10) belly, (11) sexual organs, (12) upper back, (13) low back, (14) hip/gluteal area, (15) thigh, (16) knee, (17) shank, and (18) foot. A total score was produced by summing the number of pain locations reported by the respondent (range: 1–36) together.

2.2.3 | PTSD and Trauma-Related Factors

2.2.3.1 | Life Events Checklist for DSM-5 (LEC-5) and PTSD Checklist for DSM-5 (PCL-5).

LEC-5 investigated 17 categories of potentially traumatic events in a respondent's lifetime, and this version included an extended Criterion A assessment [33]. It was administered together with the PCL-5, which is a self-report scale that captures PTSD symptom severity [34] and measures clusters B–E from the DSM-5. A 5-point scale (0 = not at all; 4 = extremely) was used to rate all symptom severity items. Total scores range from 0 to 80, where higher scores correspond to a higher degree of PTSD symptom severity. A provisional PTSD diagnosis was first established by ensuring that the participants fulfilled criterion A by self-reporting that they had been exposed to actual or threatened death, serious injury, or sexual violence that occurred directly or indirectly by witnessing the event, learning of the event occurring to a loved one, or repeated confrontation with aversive details of such an event (e.g., first responders, police officers) [2]. Additionally, a provisional PTSD diagnosis was established by treating each item rated as 2 ("Moderately") or higher as a symptom endorsed, then following the DSM-5 diagnostic rule which requires at least: 1 B item (questions 1–5), 1 C item (questions 6–7), 2 D items (questions 8–14), and 2 E items (questions 15–20). The participants filled out the LEC-5 and PCL-5 alone. To avoid potential negative consequences induced by the questionnaires after completion, the participants were informed that they could contact the clinic for support and, if needed, a psychologist from the team would contact the participant. The questionnaires were also followed up by the psychologist during the initial assessment at the clinic. Satisfactory psychometric properties have been seen in both the original and the Swedish version of the PCL-5 [34–36].

From the PCL-5 and LEC-5 the following trauma-related factors were taken: the worst event (that currently bothers you the most); time since the traumatic event (in months); if the individual had experienced a single traumatic event or multiple traumatic events (one or more); if the individual had experienced the event directly (yes or no); if the individual was seriously injured (yes or no); if the life of the individual was in danger (yes or no); if the individual experienced sexual violence (yes or no). The primary or worst event reported by the participant was recoded into 10 different trauma types for the purposes of analysis: natural disaster (item 1); fire/explosion (item 2); accident (item 3 and 4); physical assault/assault with a weapon (item 6 and 7); sexual assault (item 8 and 9); combat or exposure to war zone (item 10); life-threatening illness or injury (item 12); severe human suffering or other very stressful event (item 13 and 17); sudden accidental or violent death (item 14 and 15); and multiple traumas. The categories that were not reported by the participants were excluded. The primary events were further categorized into assaultive/intentional traumas and non-assaultive/intentional traumas. Assaultive/intentional traumas were defined as interpersonal violations (threatened or actual) of physical integrity, such as sexual assault, physical assault, combat or exposure to war zone, and violent death. Direct experience or being a witness of the incident as well as indirect experiences, where the person's close friend or family member was the victim, were included. Non-Assaultive/intentional traumas were defined as violations (threatened or actual) of physical integrity that were not dominantly interpersonal in nature, such as accidents, natural disasters, life-threatening illnesses, and severe human suffering. Again, we included both direct experiences, being a witness, and indirect experiences of such events.

2.3 | Analysis

Descriptive analyses were first used to describe the prevalence of traumatic exposure and PTSD among the participants. A multiple linear regression was then used in the subgroup ($n = 136$) with traumatic exposure as the major analysis to establish the relationship between PTSD symptom severity (i.e., PCL-5 total symptom severity score) and the study variables (sociodemographic characteristics [age, sex, country of birth]; pain-related factors [pain type, primary pain diagnosis fibromyalgia, primary pain diagnosis neck-associated pain, anxiety (HADS), depression (HADS), pain severity (MPI), pain interference (MPI), social support (MPI), insomnia (ISI)]; trauma-related factors [time since the traumatic event (in months), assaultive/intentional traumas, direct experience of trauma, perceived danger to one's life, seriously injured, experience of multiple traumatic events (more than one)]). Among the predictors, missing rates of variables ranged from 2.9% to 24.3%. The full information maximum likelihood method was thus applied to treat missing data. Visual inspection indicated a positively skewed distribution of the outcome variable (skewness = 0.44; kurtosis = −0.84). To mitigate this issue, the regression was estimated through the maximum likelihood method with robust standard errors, referred to as MLR estimator in "lavaan" 0.6–16 [37]. Variance Inflation Factor (VIF) was evaluated before the performance of the regression model; no potential multicollinearity issues were detected as the VIFs of all the predictors were under 2.50. For all the tests, the criterion for statistical significance was the 0.05 significance level. Data were managed in IBM SPSS 28, and major analyses were performed in R 4.3.1.

3 | Results

3.1 | Sociodemographic and Pain-Related Variables

The sample consisted of 181 participants with the presence (for a minimum of 3 months) of persistent symptoms of chronic pain that significantly interfered with everyday life. The most frequent primary pain diagnoses, taken from assessment using the International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10), were fibromyalgia (28.5%), other chronic pain (code R52.2) (20.3%), cervicocranial syndrome (8.9%), and cervicobrachial syndrome (4.4%). The mean age was 44.5 (SD = 12.4) years, and the individuals in this sample were predominately women (74.7%). More than half were born in Sweden (69.0%) and most participants (88.4%) had constant pain. The average number of pain locations was 16.8 (SD = 9.7) and the average insomnia score on the ISI was 18.7 (SD = 6.6). As assessed with the MPI, the average pain severity was 4.6 (SD = 1.1), the average pain interference was 4.7 (SD = 1.1), and the average social support was 4.3 (SD = 1.6). Measured on the HADS, the average anxiety was 9.9 (SD = 5.1) and the average depression was 10.1 (SD = 5.0).

3.2 | Trauma-Related Characteristics

There were 76.8% of the participants who had experienced at least one previous trauma(s) fulfilling criteria A for PTSD and 23.0% of the participants who fulfilled a provisional PTSD diagnosis based on the PCL-5, following the DSM-5 diagnostic rule (criteria A–E). The majority (62.5%) of those who reported a traumatic event had experienced it directly. During the traumatic event, 28.2% perceived that their own life was in danger, 23.6% were seriously injured, and 8.8% experienced sexual violence. The majority of those reporting a traumatic experience (58.3%) had experienced more than a single traumatic event that was as stressful or nearly as stressful as the worst event. The most common trauma types in this sample were accidents (where motor vehicle accident was the most frequent type of accident), life-threatening illness or injury, sudden accidental or violent death, and multiple traumas. For more details on trauma-related characteristics see Table 1.

As illustrated in Figure 1, the highest mean value of PTSD symptom severity (PCL-5) was observed in participants with combat or exposure to a war zone ($M = 45.00$), followed by multiple traumas ($M = 34.81$). The lowest means were seen in participants with fire/explosion ($M = 16.00$) and physical assault or assault with a weapon ($M = 19.20$) as their primary/worst traumatic event.

3.3 | Predicting PTSD Symptom Severity

As shown in Table 2, a few predictors were identified as significant. Specifically, being a woman, being born outside of Sweden, having higher anxiety levels, and more than one traumatic event (that was as stressful or nearly as stressful as the worst event) were associated with higher PTSD symptom severity. Comparatively, country of birth and sex were the two strongest predictors in the model.

TABLE 1 | Trauma-related characteristics for the trauma-affected individuals.

Variable	M (SD) or %
Time since the traumatic event (in months)	152.3 (122.3)
% Assaultive/intentional trauma	43.2
% Direct experience of trauma	62.5
% Perceived danger to one's life	28.2
% Seriously injured	23.6
% Experienced sexual violence	8.8
% Experienced multiple traumatic events (more than one)	58.3
Primary traumatic event	
% Natural disaster	0.8
% Fire/explosion	0.8
% Accident	20.5
% Physical assault/assault with a weapon	7.6
% Sexual assault	3.0
% Combat or exposure to war zone	1.5
% Life-threatening illness or injury	15.9
% Severe human suffering or other very stressful event	9.8
% Sudden accidental or violent death	15.2
% Multiple traumas	25.0

4 | Discussion

This study aimed to report the percentage of individuals who had experienced a traumatic event and fulfilled the DSM-5 PTSD criteria, based on self-report at a tertiary pain clinic in Sweden. This included describing trauma-related characteristics for the trauma-affected individuals. The associations between PTSD symptom severity and sociodemographic characteristics, pain-related factors, and trauma-related factors were also investigated using regression analysis in the trauma-affected subsample. The results showed that a large proportion of the sample (76.8%) reported experiencing at least one trauma, with the prevalence of self-reported PTSD in the sample being 23.0%. Female sex, being born outside of Sweden, anxiety, and multiple traumatic events were identified as significant predictors of more severe PTSD symptoms.

Traumatic exposure, a prerequisite for being diagnosed with PTSD [2], is reportedly experienced by a significant segment of the general population, with prevalence estimates ranging from 28% to 90% in developed countries [38]. The majority of the participants in this sample (76.8%) reported having experienced at least one previous trauma, defined as exposure to actual or threatened death, serious injury, or sexual violence that occurred directly or indirectly by witnessing the event, learning of the event occurring to a loved one, or repeated confrontation with aversive details of such an event (e.g., first responders,
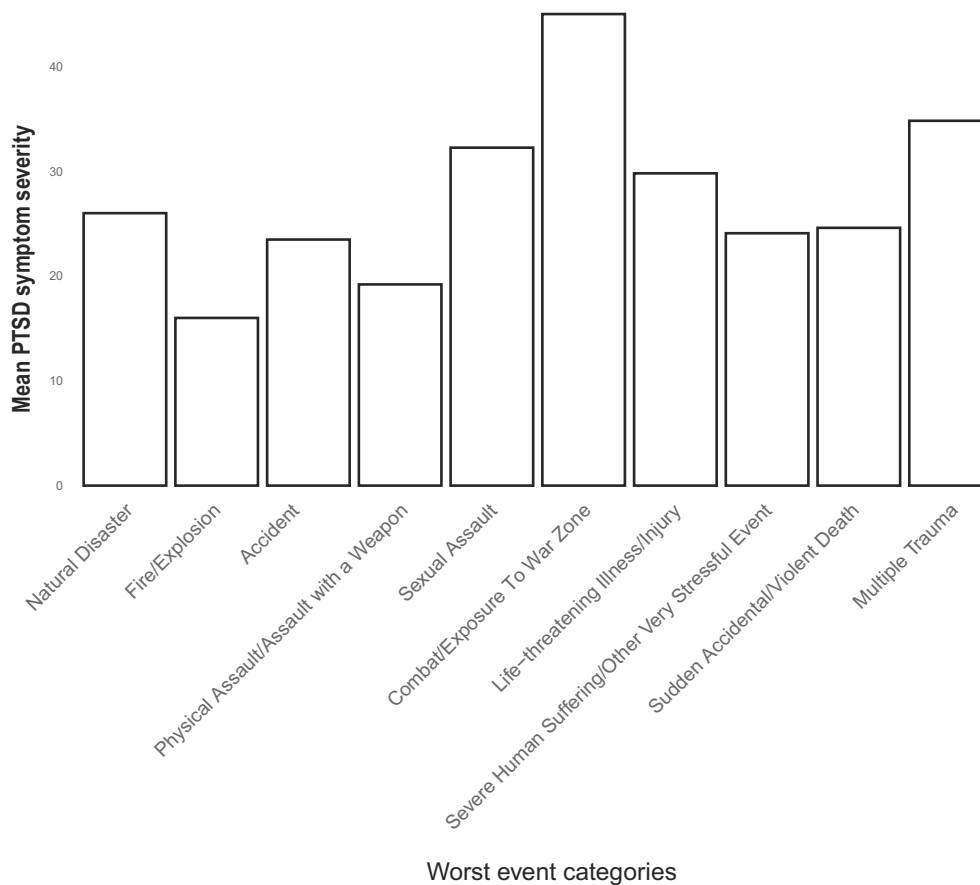
FIGURE 1 | Distribution of average PTSD symptom severity in worse event categories.

police officers) [2]. This is only marginally higher than a recent epidemiological survey across 24 countries where 70.4% of the respondents had experienced lifetime traumas [21]. This suggests that traumatic exposure alone does not explain the elevated levels of PTSD symptoms in this chronic pain population. Contrary to expectations of higher traumatic exposure in such clinical settings, the results indicate that trauma exposure is not a distinguishing factor in this pain population compared to the general population. This finding underscores that other factors related to trauma and pain may play more crucial roles in the development of PTSD in these patients. The most common trauma types in this sample were accidents (motor vehicle accident was the most frequent type of accident), life-threatening illness or injury, sudden accidental or violent death, and multiple traumas. These findings are broadly in accordance with earlier research where accidents (motor vehicle), unexpected death of a loved one, witnessing death or serious injury, and life-threatening illness or injury have been identified as common trauma types [21, 38].

The prevalence of a provisional PTSD diagnosis using the DSM-5 criteria in this mixed chronic pain sample was noteworthy (23.0%) and higher than the rates from a systematic review of diverse trauma-exposed populations (mean prevalence 17.7% 12 months post trauma) and a study at a specialized pain clinic (16.4%), both utilizing the DSM-5 criteria [1, 10]. The identified prevalence was equal to an earlier study in a specialized pain clinic using the DSM-IV criteria [9], but lower than a previous study from the same tertiary pain clinic which reported a

prevalence rate of 28.9% using a self-report measure based on the DSM-IV criteria [8]. Still, this difference is understandable given the clear differences in the PTSD diagnostic criteria presented in DSM-5, involving a more restrictive definition of criterion A as well as noticeable adjustments in the symptom clusters needed for diagnosis and the number and nature of individual symptoms [11]. Generally, these changes have resulted in lower PTSD prevalence rates when using the DSM-5 criteria as compared to DSM-IV criteria [39]. However, the high prevalence of PTSD in our sample raises important considerations for clinical practice. It underscores the necessity of integrating PTSD assessment and treatment in chronic pain management, especially considering that PTSD can have a negative effect on the pain experiences and vice versa [3, 5, 8, 12–14].

Given the predominance of middle-aged women with fibromyalgia in our sample (28.5%), it is relevant to consider how this demographic may influence the reported rates of PTSD in pain samples. Previous research has established a link between fibromyalgia, traumatic exposure, and PTSD symptoms and pointed to high prevalence levels of PTSD in individuals with fibromyalgia [40], which suggests that the identified prevalence rate could reflect the elevated PTSD rate in this subgroup. Furthermore, high levels of PTSD are seen in individuals whose pain experience is tied to an injury during the traumatic event, as is often the case for individuals with whiplash injuries from motor vehicle accidents [7]. In accordance, this sample also included a significant subgroup with neck-related pain (13.3%), mostly due to neck trauma caused by rear-end collisions and the whiplash

TABLE 2 | Multiple linear regression of the relationship between predictors and post-traumatic stress disorder (PTSD) symptom severity (N = 136).

Predictors	Coefficient	SE	*p*
Age	−0.04	0.14	0.764
Sex	8.70	3.16	0.006
Country of birth	11.85	4.03	0.003
Pain type	−0.35	0.19	0.064
Fibromyalgia	1.50	3.65	0.681
Neck-associated pain	5.34	3.49	0.126
Anxiety (HADS)	1.30	0.44	0.003
Depression (HADS)	0.45	0.42	0.280
Pain severity (MPI)	1.93	1.73	0.264
Pain interference (MPI)	−0.85	1.70	0.619
Social support (MPI)	−1.32	0.89	0.135
Insomnia (ISI)	0.09	0.33	0.781
Time since the traumatic event (in months)	−0.02	0.02	0.171
Assaultive/intentional trauma	2.05	3.57	0.566
Direct experience of trauma	6.34	3.43	0.065
Perceived danger to one's life	3.12	4.51	0.490
Seriously injured	3.55	4.60	0.441
Multiple traumatic events (more than one)	7.68	3.21	0.017

Note: Sex: 1 = male, 2 = female. Country of birth: 1 = Sweden, 2 = outside of Sweden. Pain type: 1 = periodic pain, 2 = constant pain. Fibromyalgia (primary pain diagnosis): 1 = yes, 0 = no. Neck-associated pain (primary pain diagnosis): 1 = yes, 0 = no. Assaultive/intentional trauma: 1 = yes, 0 = no. Direct experience of trauma: 1 = yes, 0 = no. Perceived danger to one's life: 1 = yes, 0 = no. Seriously injured: 1 = yes, 0 = no. Multiple traumatic events (more than one): 1 = no, 2 = yes.
Abbreviations: HADS = Hospital Anxiety and Depression Scale, ISI = Insomnia Severity Index, MPI = Multidimensional Pain Inventory.

mechanism [41]. The existence of these large subgroups in this sample raises crucial questions about the extent to which our results can be generalized to other chronic pain populations and underscores the importance of considering specific patient demographics when interpreting PTSD prevalence in pain clinics. Future research should aim to replicate these findings in diverse clinical settings. Still, neither fibromyalgia as a primary pain diagnosis nor neck-associated pain served as a significant predictor of PTSD symptom severity in our study.

The etiology of chronic pain is complex, involving multiple contributing factors, for some including a physical injury, often experienced under traumatic circumstances [42, 43]. Refugees stand out as the group with the highest percentage of comorbid PTSD and chronic pain (up to 87%), and this relationship is most clear in those having experienced physical torture [44, 45]. A large subgroup in our sample (31%) consisted of individuals born outside of Sweden, and this factor emerged as a significant

predictor of more severe PTSD symptoms. The distribution of refugees across member states of the European Union has been highly uneven during the last decades, where Sweden has received a large proportion of refugees [46]. The significant relationship between being born outside of Sweden and more severe PTSD symptoms is likely due to the fact that many of these individuals are refugees and migrants who have experienced war and traumatic events in their home countries. However, this study does not entail data specifically asserting that this subgroup are predominantly refugees.

Correspondingly, the highest average PTSD symptom severity scores were observed in individuals whose primary traumatic events involved combat or exposure to war zones. The existing literature consistently shows that refugees face more substantial mental health challenges compared to the general population in their host communities. High levels of post-traumatic stress, anxiety, and depression are well-documented in these groups [47]. In addition, significant rates of chronic pain have also been highlighted [48]. The high prevalence of these mental health problems is unsurprising, considering that refugees often endure multiple traumas, not only in their countries of origin but throughout their migration journey. Factors such as unemployment, family separation, and ongoing conflict in their countries of origin further impact their mental health [49].

The results of this study indicated that female sex was associated with more severe PTSD symptoms. Research has highlighted a crucial gender-related predisposition to PTSD generally. Women, in comparison to men, are approximately two times more likely to develop PTSD and often undergo a more chronic course of the disorder [50]. Gender and sex might impact PTSD through various mechanisms, including societal gender roles, genetic factors, and hormonal influences [51]. Notably, sex differences in PTSD prevalence persist even when men and women undergo similar traumatic experiences, such as accidents, acts of terrorism, and natural disasters [50]. The individuals in this sample were predominately women, which is typical for specialized pain clinics in Sweden [17]. Sex-related differences in pain experiences have also been widely reported, with women at a higher risk of developing several chronic pain disorders. Various mechanisms have also been proposed to explain these sex differences in pain experiences [52]. Consequently, women appear to be at increased risk for both PTSD and chronic pain conditions.

Higher anxiety predicted worse PTSD symptom severity in this study. This finding is in line with previous research where prior mental disorders, such as anxiety and mood disorders, and anxiety sensitivity have been pointed out as risk factors for developing PTSD [22]. However, the noted association could also be due to reverse causation (i.e., elevated anxiety symptoms due to unresolved PTSD symptoms) and future studies need to investigate this association further using longitudinal data where causation can be established.

The significant association between having experienced multiple traumas and PTSD symptom severity highlights the cumulative impact of trauma. The impact of multiple traumatic events is well described in the PTSD literature, and the recent addition of complex PTSD in the International Classification of Diseases

11th Revision (ICD-11) [53] is a recognition of an altered and more complex symptomatology experienced by survivors of prolonged or repeated traumatic events in comparison to survivors of mono trauma exposure [54]. The concept of cumulative trauma refers to the additive impact of experiencing multiple traumatic events throughout one's life. This accumulation is often quantified by considering the variety of trauma types an individual has encountered [55], which is particularly relevant in our study's findings on the heightened PTSD symptom severity in individuals with a history of multiple traumas. Individuals experiencing multiple traumatic events are at a greater risk, suggesting the need for thorough trauma-informed care in clinical pain settings.

The results in this study should be viewed within the context of certain limitations. The use of self-report measures for a PTSD diagnosis, though practical, only allows for a provisional diagnosis. PTSD is typically assessed using structured and unstructured diagnostic interviews from different diagnostic systems, and a wide range of standardized self-report scales provide information on diagnostic thresholds, individual symptom frequency, and overall disorder severity. Across PTSD studies, identified patients and prevalence rates vary depending on the diagnostic system (ICD-11 or DSM-5) and the screening tool used, and this warrants further exploration in upcoming studies [10]. Future studies might benefit from incorporating structured clinical interviews for a more robust diagnosis and symptom description. This study also included nonrandom sampling, and cause and effect could not be established since it was built around correlational data. Lastly, the study included individuals with varying PTSD symptom levels and with PTSD at the symptom and syndrome level.

4.1 | Conclusions

This study addresses a gap in the current clinical approach to chronic pain management. While there is a well-established tradition of assessing and treating comorbidities like depression and anxiety, PTSD often remains under-assessed. The integration of trauma history and PTSD screening in the clinical setting of this study could serve as a model for other clinical settings, emphasizing the importance of comprehensive screening for various psychiatric comorbidities in chronic pain patients. This study contributes valuable insights into the prevalence and predictors of PTSD using the DSM-5 criteria in a chronic pain sample, highlighting the need for an integrated approach in assessing and treating PTSD in co-occurrence with chronic pain. The significant predictors identified in this study (female sex, being born outside of Sweden, anxiety, and multiple traumatic events) provide direction for targeted assessments and interventions and underscore the importance of a nuanced understanding of the patient's sociodemographic background and trauma history in clinical practice.

Author Contributions

Sophia Åkerblom: conceptualization, methodology, data curation, formal analysis, investigation, project administration, writing – original draft; **Linda Nordin:** conceptualization, methodology, writing – review and editing, investigation. **Xiang Zhao:** conceptualization, methodology, formal analysis, investigation, writing – review and editing.

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