Lasting personality pathology in adults following exposure to war trauma

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ABSTRACT

**Background:** By definition personality disorders (PD) are evident in adolescence and early childhood, but evidence for adult onset personality pathology following traumatic experience is much less clear.

**Aims:** My primary objective was to investigate whether exposure to war trauma can lead to personality pathology in adults.

**Methods:** Following a systematic review of extant literature on this topic, I conducted a case-control study in a war-affected region of southern Croatia. I recruited 268 participants: 182 cases who scored positively on the International Personality Disorder Examination scale (IPDE), and 86 controls who were IPDE negative. In addition to the IPDE, all participants completed Harvard Trauma Questionnaire, measures of mental health, social functioning, childhood trauma and childhood behavioural problems. I used a clinical interview to assess when personality-related problems started.

**Results:** Cases (IPDE positive) were eight times more likely to report exposure to catastrophic trauma than controls. This association increased after adjustments for demographic factors (OR= 10.1, 95% CI 5.0 to 20.4). Among 182 IPDE positive participants, 65 adults (35.7%) had no history of pre-trauma personality pathology suggesting change in personality following their exposure to trauma in adulthood. When compared to the PD group, patients with adult onset personality pathology had poorer mental health, social functioning and similarly high rates of unemployment more than 15 years after trauma. They were three times more likely to meet criteria for personality traits across all three DSM-IV
clusters (OR= 3.28, 95% CI 1.51 to 7.13). The most frequent personality traits reported were avoidant, borderline, schizotypal, schizoid and paranoid, but only schizotypal (75.4% vs. 47.3%) and schizoid traits (73.8% vs. 41.1%) were more prevalent among those with adult onset personality pathology compared to those with PD.

**Conclusion:** People with no clear pre-trauma personality problems can develop long-term personality pathology following exposure to severe trauma in adulthood. These findings have implications for future research, clinical practice and the classification of personality disorder.
I, Jasna Munjiza, declare that the thesis titled *Lasting personality pathology in adults following exposure to war trauma* and the work presented in this thesis are both my own, and have been generated by me as the result of my own original research.

I confirm that:

- This work was done wholly while in candidature for a research degree at Imperial College London
- The published work of others was always clearly attributed throughout the thesis
- Where I have quoted from the work of others, the source was always given
- I have acknowledged all main sources of help
- A paper based on the systematic literature review in this thesis has been published and various parts have been presented at several conferences.

Signed: Jasna Munjiza

Date: 16 March 2015
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List of Abbreviations

AN – anorexia nervosa

APA – American Psychiatric Association

ASPD – antisocial personality disorder

BN – bulimia nervosa

BPD – borderline personality disorder

COMT – catechol-O-methyltransferase

CRF – corticotrophin releasing factor

DA – dopamine

DESNOS – disorder of extreme stress not otherwise specified

DZ - dizygotic

ED – eating disorder

EPCACE – enduring personality change after catastrophic experience

ES – effect size

HPA – hypothalamus pituitary axis

HSCL-25 – Hopkins Symptoms Checklist -25

HTQ – Harvard Trauma Questionnaire

IPDE - International Personality Disorder Examination

ICD – 10 CDDG International Classification of Diseases - Clinical Descriptions and Diagnostic Guideline

ICD – 10 DCR - International Classification of Diseases – Diagnostic Criteria for Research

MAOA – monoamine oxidase A

MZ - monozygotic

OR – odds ratio
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**PFC** – prefrontal cortex

**PD** – personality disorder

**PD NOS** - personality disorder not otherwise specified

**PTSD** - posttraumatic stress disorder

**SMD** – standardised mean difference

**WBV** – whole brain volume

**WHO** – World Health Organisation
1. INTRODUCTION

Exposure to trauma has long been recognised to have an adverse effect on mental health. This is particularly true of patients suffering from posttraumatic stress disorder (PTSD) and in a considerable proportion of people diagnosed with personality disorders (PD), both of these conditions being linked to traumatic experience at some point in a person’s life. While the effects of adverse and traumatic childhood experiences have been extensively researched and frequently associated with the development of maladaptive personality traits and personality disorder, much less is known about long-term personality related problems that arise following trauma in adulthood. Experts working in the field of trauma (Herman, 1992; Van der Kolk et al., 1996) have long argued that severe trauma in adult life can result in lasting psychopathology which is much broader than that currently included in the PTSD diagnostic criteria (WHO, 1992). They proposed that exposure to prolonged and severe trauma can result in a constellation of symptoms suggesting a lasting change in an individual’s personality. However, the evidence base supporting this concept is less clear.

The main aim of my thesis is to investigate an association between trauma experienced in adulthood and the subsequent development of personality pathology. To achieve a better understanding of potential aetiological links between the two, the introduction part of this thesis will provide an overview summarizing the research evidence of both personality disorder and PTSD as two separate diagnostic concepts before focusing more specifically on personality change in adults following catastrophic trauma. Therefore, the initial two chapters of the introduction will address aetiology, epidemiology, prognosis and treatment in both personality disorder and PTSD. These will be followed by a systematic review of the literature investigating the development of personality pathology following severe trauma in
adults. Finally, a synthesis of all of the above justifying the purpose of this project will be presented in the final chapter of the introduction.

1.1. Personality Disorders

According to the Diagnostic and Statistical Manual of mental disorders, 5th edition (DSM–5) personality disorders are defined as ‘An enduring pattern of inner experience and behaviour that deviates markedly from the expectations of the individual’s culture, is pervasive and inflexible, has an onset in adolescence or early adulthood, is stable over time, and leads to distress and impairment’ (APA, 2013). The ICD-10 Classification of Mental and Behavioural Disorders provides a similar definition emphasizing deeply engrained behavioural patterns which appear in childhood or adolescence and continue into adult life (WHO, 1992). These inflexible thoughts, feelings and behaviours affect an individual’s ability to cope with daily stresses leading to impaired social relationships and social functioning in general.

According to the DSM classification system (APA, 2013) personality disorders are grouped into three main clusters (Cluster A – odd-eccentric, Cluster B – dramatic-emotional and Cluster C – anxious-fearful). Each cluster has three to four subcategories (Cluster A: paranoid, schizoid, schizotypal; Cluster B: borderline, antisocial, histrionic, narcissistic; Cluster C: avoidant, dependent, obsessive-compulsive). The following personality characteristics correspond to the more detailed descriptions for each PD subtype:

- SCHIZOID traits - social withdrawal, emotional coldness and detachment, reduced capacity for close relationships
- SCHIZOTYPAL traits - social withdrawal, odd and eccentric behaviour, inappropriate or constricted affect, reduced capacity for close relationships
- PARANOID traits - suspiciousness and distrust of others, persistently holding grudges against others
- BORDERLINE traits - persistent feelings of emptiness and affect regulation problems, anger modulation difficulties, impulsiveness, suicidal behaviour, identity disturbance and dissociative experience
- ANTISOCIAL traits – failure to conform to social norms, reckless disregard for safety of self or others, lack of remorse, frequent involvement in physical fights or assaults, deceitfulness
- NARCISSISTIC traits – increased sense of self-importance, believes to be ‘special’, arrogant behaviour, lacks empathy
- HISTRIONIC traits – shallow and exaggerated emotions, self-dramatising and theatrical behaviour, suggestible and excessive use of physical appearance to draw attention to self
- ANANKASTIC traits - rigidity, stubbornness, inflexibility in interpersonal interactions, preoccupation with certain rules and things being done in certain ways
- AVOIDANT traits - social inhibition and avoidance of interpersonal contacts accompanied by hypersensitivity to negative evaluation
- DEPENDENT traits – difficulty in making everyday decisions or initiating own projects without reassurance from others, feeling helpless when alone, difficulties in expressing disagreement with others and urgent need to find another relationship when a close relationship ends

Although in ICD-10 Classification of Mental and Behavioural Disorders (WHO, 1992) personality disorders are not grouped into clusters, it has the same personality disorder categories with the exception of the schizotypal category which is included under F20-F29.
(psychosis group) and narcissistic PD which is not included in the current IDC-10. Instead of borderline PD alone, ICD-10 has an emotionally unstable category which is divided into impulsive and borderline subtypes (WHO, 1992).

Patients diagnosed with personality disorder experience considerable distress, have chaotic lifestyle, are more likely to present to A&E services and are more frequently admitted in crisis to inpatient mental health units. They have higher rates of health and social problems, including depression, substance misuse, deliberate self-harm and violence towards others (Coid et al., 2006).

Having a PD diagnosis is frequently unfavorably judged and stigmatized by members of the general public but also interpreted as pejorative by some health professionals (Thornicroft et al., 2010). PD patients are described as ‘difficult’ and the most challenging group of patients which in turn can result in increasingly pessimistic and unhelpful attitudes in mental health workers. Combined with a patient’s own interpersonal difficulties, this can have a negative impact on the development of a therapeutic relationship.

In the remaining part of this chapter, I will focus on the aetiology of personality disorder, its prevalence, treatment and the impact of having a diagnosis of PD on the individual and wider society. Finally, a brief summary of the proposed changes for classification of personality disorders in ICD-11 will be presented at the end of this section.

### 1.1.1. Aetiology of personality disorders

A substantial body of research suggests that personality disorders have a complex biopsychosocial aetiology. In this chapter, I will focus mainly on the effects of heritability,
adverse childhood events, and attachment theories in the development of personality disorders. Also, a dysregulation of hypothalamic-pituitary-adrenal axis (HPA) as a potential factor in aetiology of personality disorder will be briefly described.

Heritability

There has been increasing appreciation of gene-environment interplay on all mental health disorders, including personality disorders. Twin studies with monozygotic (MZ) and dizygotic (DZ) twin pairs have been used to quantify to what extent individual susceptibility stems from genetic factors. This is defined by a concept called heritability which measures the proportion of phenotype variability between individuals that can be attributed to genetic variation. If concordance rates of a disorder are higher between MZ twins compared to DZ pairs, the genetic effects are assumed. Additionally, twin studies allow separation of the total variance of a phenotype into genetic, common environmental and unique environmental factors (Reichborn-Kjennerud, 2008). Common or shared environmental effects are the environmental exposures that make twins similar, in contrast to unique and individually specific environmental factors that make twins different.

An early twin study indicated a substantial genetic influence in the development of personality traits/disorders with heritability estimates from 40% to 60% (Torgersen et al., 2000). This was a twin study based on a clinical sample in Norwegian twin pairs in which at least one twin met diagnosis of PD. Concordance rates of any PD were higher in MZ twins (40%) in comparison to DZ pairs (29%) indicating significant genetic influence (p=0.001) on the development of PD. The findings indicated that the genetic proportion of the variance of Cluster A personality disorders (except for schizotypal PD) was lower (37%) whilst the heritability for Clusters B and C was around 60% (Torgersen et al., 2000). It is likely that the
initial heritability estimates drawn from the patient populations were too high as the results from a general population-based twin study suggested that genetic effects were lower and ranged between 20% and 40% (Kendler et al., 2008). Heritability rates for Cluster A were between 20% and 26%, Cluster B 25% and 41% and Cluster C 27% and 37%. These findings were further supported by population-based twin studies investigating dimensional representations of Cluster A and Cluster B personality disorder (Kendler et al., 2006; Torgersen et al., 2008). Kendler et al. (2006) found modest heritability for all three Cluster A categories: paranoid (21%), schizoid (28%) and schizotypal (26%). Heritability estimates for antisocial personality disorder were at 38%, borderline personality disorder at 35%, histrionic personality disorder at 31% and narcissistic personality disorder at 24% (Torgersen et al., 2008). No shared environmental influences or sex effect were found. In contrast, findings from a study which assessed personality disorder at two different time points showed the heritability estimates are much higher for Cluster C, particularly for avoidant and dependent personality disorder which were around 65% (Gjerde et al., 2012). No shared environmental effects or sex differences were found. A common genetic vulnerability was reported between avoidant personality disorder and social phobia in women (OR= 11.9, 95% CI 5.4-24.5) (Reichborn- Kjennerud et al., 2007).

Results from a meta-analysis investigating associations between the ‘big five’ personality factors (neuroticism, extraversion, agreeableness, conscientiousness and openness to experience) indicate that personality disorders can be conceptualized in a meaningful and predictable way with the big five personality traits (Saulsman et al., 2004). Positive associations were found between Neuroticism and personality disorder types which are characterized with high levels of emotional distress (Borderline, Paranoid, Schizotypal, Avoidant and Dependent). Similarly, conscientiousness is highly correlated with anankastic
personality disorder. Negative associations were found between Agreeableness and personality disorders with particularly impaired interpersonal interactions (Antisocial, Paranoid, Schizotypal, Borderline and Narcissistic). Also, Extraversion was negatively associated with Schizoid, Schizotypal and Avoidant personality disorder. These findings add further evidence towards genetic contributions to the development of personality disorder.

Several studies investigated associations between personality disorders and Axis I diagnoses. Schizotypal PD has been found more frequently in relatives of people who have diagnosis of Schizophrenia (Torgersen et al., 1993; Tienari et al., 2003). ASPD, conduct disorder and substance misuse disorders share genetic vulnerability (Krueger et al., 2002). Neuroticism has shown a strong genetic correlation with major depression (Kendler et al., 2006).

Recently advanced techniques in molecular genetic methods have made it possible to identify genes associated with a number of Axis I disorders. Although still at a very early stage, rapidly advancing molecular genetic studies in personality disorders suggest involvement of multiple genes with small effect. Polymorphism in the gene coding involved in the degradation of several biogenic amines including serotonin, norepinephrine and dopamine have been found to be associated with PD (Reichborn-Kjennerud, 2008). For example, a polymorphism in the gene coding for dopamine 2 receptor (DRD2) and Catechol-O-methyltransferase (COMT) has been associated with schizotypal personality disorder whilst a polymorphism in the gene coding for MAOA (monoamine oxidase A) has been associated with Cluster B personality disorders. However, these studies are still at infant stages and caution is needed when interpreting these findings, particularly as some findings have been inconsistent and not replicated by others (Reichborn-Kjennerud, 2008).
Brain imaging studies have revealed some structural abnormalities in people with personality disorders most frequently linked to the amygdala and hippocampus. The amygdala is a nucleus in the anterior temporal lobe, which mediates neural processing of sensory experience with emotional connotations. The hippocampus is a region in the temporal lobe cortex adjacent to the amygdala and involved in learning, memory systems and particularly in declarative memory processes (Purves et al., 2012). Findings from a meta-analytic review of ten studies involving patients diagnosed with borderline personality disorder (BPD) by Hall et al. (2010) suggest that people with BPD have a significant bilateral reduction in hippocampal and amygdala volumes when compared to healthy controls. These regional volume reductions did not result from general differences in the whole-brain volume (WBV) between BPD and healthy controls as there was no significant variation in the WBV between the two groups. In addition, the findings indicated that hippocampal volume decreases were greater with increased age in BPD group than in controls. Although these results indicate clear structural changes in the medial temporal lobe, the review does not clarify if these findings suggest pre-existing vulnerability for the development of BPD or if the observed structural abnormalities are the consequence of many years of emotional dysregulation and impaired function in the amygdala and hippocampal regions, thus indicating reverse causality. Similarly, Wingenfeld et al. (2010) summarised the findings from structural brain changes suggesting more consistent evidence for reduced hippocampal volume, whilst research on amygdala has been more heterogeneous, thus limited conclusions can be drawn from the latter. Very few studies used functional imaging in patients with personality disorder and there is no consistent pattern of hypo- or hypermetabolism among BPD patients (Wingenfeld et al., 2010). It is very likely that the relationship between the observed structural abnormalities and BPD is much more complex than pure volume reduction and involves other brain structures involved in emotional regulation (ventromedial and orbital prefrontal cortex).
In summary, growing research evidence from twin studies suggest the heritability rates for personality disorders vary between 20% and 40% with most studies showing little evidence for the effects of common environmental factors. These are further supported by brain imaging findings and advancing molecular genetic studies in personality disorders suggesting involvement of multiple genes with small effect. However, much more research with independently replicated findings is needed in this area before any causal inferences are made.

**Adverse childhood events**

Exposure to early trauma has been frequently linked to adult psychopathology, including personality disorder. Preschool children that experienced maltreatment early in their life exhibit a range of serious psychological and behavioural problems (angry and disruptive behaviour, oppositional behaviour, negative self-esteem, withdrawal, avoidance and difficulties in interpreting emotional expression in others) (Naughton et al., 2013). A number of studies have indicated possible causal relationships between early childhood traumatic experience and long-term effects on a child’s cognitive, behavioural and emotional development which all contribute to a young person’s personality formation (Bandelow et al., 2005; Bernstein et al., 1998; Purtscher, 2008; Riggs et al., 2007). This is particularly true of borderline personality disorder (BPD) with extensive supportive literature on the association between history of childhood sexual maltreatment and diagnosis of BPD suggesting sexual abuse as a potential causative factor (Bandelow et al., 2005; Figueroa & Silk, 1997; Purtscher, 2008; Riggs et al., 2007). More recent research evidence suggests that sexual abuse before the age of 16 has been associated with having any personality disorder and it is not specific only to emotionally unstable (borderline) type (Moran et al., 2011). Furthermore, research evidence shows that other types of childhood traumatic experiences, such as emotional and physical
abuse, separation from parents, witnessing violence, parental psychopathology and family instability, prolonged and serious childhood illness are important risk factors in development of personality disorders (Bandelow et al., 2005; Helgeland & Torgersen, 2004). Childhood history of physical abuse was found to be a risk factor for antisocial, borderline and schizotypal PD (Bernstein et al., 1998, Johnson et al., 1999). Cohen et al. (2014) found a significant association between Cluster A and maternal neglect, between emotional abuse and Cluster C personality disorder, whilst physical abuse was highly associated with antisocial, narcissistic and paranoid traits. Higher rates of abuse, neglect, parental psychopathology and family instability were found in BPD patients when compared with patients who had been diagnosed with other type of psychiatric disorders (Axis I and II) (Helgeland & Torgersen, 2004). Emotional and physical neglect have been associated with a range of mental disorders, including personality disorders, especially with borderline personality disorder (Carr et al., 2013; Norman et al., 2012). Non-sexual childhood maltreatment can be equally damaging as sexual abuse (Norman et al., 2012).

Higher rates of conduct disorder, school dropout and juvenile crime were reported amongst children experiencing different kinds of abuse and/or neglect early in their lives (Driessen et al., 2006). These frequently lead to increasing psychopathology including personality disorder and co-morbid alcohol and substance misuse (Bernstein et al., 1998; Riggs et al., 2007; Tyrka et al., 2009). Several studies found higher rates of childhood trauma among both male and female prisoners. A study involving 260 prisoners and forensic patients from several maximum security units showed that antisocial personality disorder was associated most with parental discord, having delinquent siblings, being in care, criminal parents and being raised in poverty (Coid, 1999). These examples of adverse early environment and multiple
detrimental events primarily experienced within family of origin, were found to be important risk factors in development of personality disorder.

**Dysregulation of Hypothalamic-Pituitary-Adrenal axis (HPA)**

Early life stress has been associated with alteration in glucocorticoid receptor functioning and Hypothalamic-Pituitary-Adrenal axis dysregulation (McGowan et al., 2009). The effects on the HPA axis have been extensively researched in animals and humans exposed to stress and long known to be associated with increased levels of corticosteroids in the blood (Southwick et al., 2010). Corticotrophin Releasing Factor (CRF) is the most important mediator of the stress response stimulating the anterior pituitary gland to produce adrenocorticothropic hormone (ACTH) which acts on the adrenal glands, inducing them to produce the steroid hormones that mediate our response to stress. The negative feedback loop from cortisol targeting the hypothalamus, pituitary, and hippocampus is vital in maintaining the homeostasis of the HPA system. Glucocorticoids bind to two subtypes of receptors, the glucocorticoid receptors (located throughout the brain including the pre-frontal cortex) and the mineralocorticoid (mainly located in the hippocampus) (de Kloet et al., 2005). It has been hypothesised that the impaired sensitivity of the HPA axis to this negative feedback has been implicated in anxiety disorders and depressive disorder (Southwick et al., 2010). The effects on the HPA axis in PTSD patients and patients suffering from depression will be explained in more detail in Chapter 1.2.1 of this thesis which focuses on the different aetiological factors related to the development of PTSD. In brief, hypercorticolism has been observed in depressed individuals which is consistent with this well-known acute stress cascade, whilst hypocorticolism was found in PTSD patients (Yehuda, 1998).
In comparison to depression and PTSD, far less research has focused on the HPA axis activity in people with personality disorder. Wingenfeld et al. (2010) summarised extant evidence from studies examining the HPA axis in patients with borderline personality disorder. Findings suggest that BPD patients, similar to depressive patients, tend to have reduced axis feedback sensitivity. However, findings from a small number of studies that investigated BPD patients with significant comorbid PTSD, are characterised by enhanced HPA axis feedback sensitivity resulting in hypocorticolism.

**Attachment theories**

A theoretical background linking attachment and adult interpersonal dysfunction was developed by Bowlby, a British psychiatrist who studied children separated from their parents during WWII and brought up in institutions (Bowlby, 1969). He proposed that infants go through several stages during their early development where the primary caregiver, usually the mother, becomes a secure base from which infants explore their environment and make meaningful representations of their experience. He referred to this bond, between the infant and primary caregiver as an ‘attachment’. Mother–child interactions were further explored by Mary Ainsworth in ‘strange situations’ experiments (Ainsworth et al., 1971; Ainsworth et al., 1978). Based on these experiments, she classified parent-infant relationship in three categories: secure, anxious/avoidant (insecure) and anxious/resistant (insecure). A fourth category named disorganised was added by Main & Solomon (1990) to describe infants who had attachment difficulties but did not fit into the above three categories. Mothers of secure infants were found to be responsive and sensitive to their infants needs. Primary caregivers of anxious/avoidant infants tended to be rejecting and withdraw when children were distressed, whilst parents of anxious/resistant children were inconsistent, at times intrusive and at other times preoccupied with their own needs. Consequently, children mirrored these behaviours
resulting in the development of maladaptive attachment styles. Anxious/avoidant babies were indifferent whether their mothers were in the room or not, were likely to be comforted by strangers when mothers were not present, and were indifferent towards them on their return. Anxious/resistant babies were anxious all the time even in mothers’ presence, appeared very distressed on mothers’ absence but not comforted by their return, crying angrily and arching away when picked up by primary caregivers. Infants with disorganised attachment who were brought up in troubled and abusive environments seemed to lack any coherent or organised way of coping when distressed. In contrast, babies that were securely attached to their mothers appeared visibly distressed by separation but were quickly settled when reunited with their mothers. They were unlikely to be consoled by strangers in their mother’s absence (Cole & Cole, 2001). These attachment patterns were found to be stable over the time. Findings from the ‘strange situations’ experiments although observed in early developmental stages, point out the importance of attachment styles and their potential long-term consequences on interpersonal functioning (Ainsworth et al., 1979).

Development of adult attachment measures over the past two to three decades led to numerous studies investigating attachment styles in adults. It is beyond the scope of this chapter to describe these studies in a great detail, so only the most important findings relating to disturbed attachment styles in people with personality disorder will be described here. Most research evidence investigating attachment patterns stems from studies on patients with borderline personality disorder. Findings from a narrative review by Agrawal et al. (2004) suggested that there is a strong association between BPD and insecure attachment styles. In adults with BPD the most frequently reported attachment styles were anxious/preoccupied and fearful/avoidant. Although the childhood attachment styles cannot be directly translated into the adult ones, they are broadly compatible on main key constructs. **Anxious/preoccupied**
Lasting personality pathology after trauma

attachment in adults corresponded to anxious/resistant childhood attachment and was characterised by a negative self-image combined with a positive evaluation of others. Fearful/avoidant attachment style is consistent with disorganised/unresolved childhood attachment and defined a negative self-image and distrust of significant others. 50-80% of BPD patients were found to have disorganised/unresolved attachment (Agrawal et al., 2004). These findings supported the important role of the abnormal attachment styles, particularly disorganised (fearful/avoidant) which has been regarded as an important risk factor for development of BPD. Similarly, findings from a comprehensive review of attachment related constructs in patients with BPD (Levy et al., 2011) found higher levels of preoccupied and fearful attachments than in non-BPD individuals. These also predicted increased sexual risk taking and aggressive behaviour during adolescence. Additionally, children of mothers with BPD had impaired emotional regulation, distorted self-other representations influencing their later interpersonal functioning. Parents with personality disorder were three times more likely to report having engaged in problematic parenting practices resulting in poor parent-child interactions and impaired attachment (Laulik et al., 2013).

These findings have implications not only on our understanding of patient’s interpersonal difficulties but also on therapeutic engagement and treatment in clinical practice. The importance placed on the understanding attachment pathology in adult clinical settings could be demonstrated through Mentalization-based therapy (MBT) which is an attachment-based treatment aimed specifically for patients with borderline personality disorder. MBT’s theoretical foundations are based on the impaired attachment constructs and hypothesizes that individuals with disorganised attachment style have suppressed mentalization abilities (capacity to understand one’s own behaviour in relationship to internal mental states and awareness of its impact on others) (Fonagy & Bateman, 2006). Due to mentalization deficits
BPD patients have a tendency to misread and misinterpret their own and other people minds, and to respond to personal distress by ‘acting out’ behaviour through self-harming or aggressive behaviour. However, despite the above persuasive evidence (Agrawal et al., 2004; Levy et al., 2011), these findings should be viewed with some caution. There is great variation in study designs and methodologies, a variety of measures were used to assess adult attachment styles and sample sizes were generally small, thus limiting conclusions that could be drawn from the attachment studies in adults.

In summary, although there is a strong association between adverse childhood experiences, abnormal attachments and hereditary factors in the development of personality disorder, the precise aetiological role of each of them remains unclear. The above research evidence taken together leads to the conclusion that the aetiology of personality disorders is both complex and multifactorial bringing together heterogeneous environmental and hereditary factors influencing personality formation in young individuals.

1.1.2. Prevalence of personality disorders

Personality disorders are a heterogeneous group of conditions which have a much higher prevalence than some Axis I disorders such as schizophrenia and bipolar disorder. It is estimated that between one in ten to one in twenty people in the general population have personality disorder and the prevalence of PD is considerably higher in clinical settings.

Several major epidemiological studies of personality disorders published over the past twenty years (Table 1) indicate that prevalence of personality disorders in the general population is between 4.4% and 14% (Coid et al., 2006a; Grant et al., 2004; Huang et al., 2009; Jackson & Burgess, 2000; Maier et al., 1992; Torgersen et al., 2001). The studies show a wide variation
of prevalence of any PD type (0.1% – 7.9%). The most frequent personality disorder subcategory is the anankastic type ranging from 2% to 8% (4/5 studies) followed by the avoidant type (1% - 5%) suggesting that Cluster C is most prevalent. However, it is less clear which type of personality disorder is the least common in the general population as findings varied widely between the studies, with different personality disorder subtypes found to be least frequent such as dependent (2/5), schizotypal (1/5), narcissistic (1/5) and antisocial (1/5).

Results from National Epidemiologic Survey in the USA suggested that overall 14.79% (95% CI 14.1 to 15.5) of adult Americans have at least one personality disorder (Grant et al. 2004). They found obsessive-compulsive personality disorder to be most prevalent (7.88%), followed by paranoid (4.4%), antisocial (3.6%) and schizoid personality disorders (3.1%). The least common was dependent personality disorder with prevalence of 0.49%. In a general population study of British households (N=628), Coid et al. (2006) found 4.4% weighted prevalence for personality disorders with obsessive-compulsive, avoidant, schizoid and borderline being most common. Dependent and schizotypal personality disorders were the least common. All personality disorder types were more prevalent in men apart from the schizotypal PD. Antisocial PD was five time more frequent in males than females (1% vs 0.2%). The findings also suggested that 54% of participants fulfilled criteria for one personality disorder, whilst 22% had two and 25% had three or more personality disorders.

A multinational survey involving 13 countries across all six continents reported prevalence estimate of 6.1% for personality disorder worldwide (Huang et al., 2009). The results indicated that more developed countries and low-income countries have the similar overall prevalence estimates (Mexico 6.1%, Lebanon 6.2%, Colombia 7.9%). Interestingly, the
results also suggested the difference in prevalence of different types of personality disorders between developing / low-income countries and developed countries like the USA and Western Europe. They showed that Cluster A is estimated to be the most prevalent in developing and low-income countries. In contrast, Cluster C appeared to be the most frequent in the USA and Western Europe (Huang et al., 2009), which is consistent with other personality disorder prevalence studies in developed countries of Western Europe (Torgersen et al., 2001; Coid et al., 2006).
### Table 1: Studies reporting PD prevalence in general population

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<tbody>
<tr>
<td>Sample size</td>
<td>452</td>
<td>10 641</td>
<td>2053</td>
<td>626</td>
<td>2053</td>
<td>21 162</td>
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<tr>
<td>Measure for PD assessment</td>
<td>Structured Clinical Interview for DSM III (SCID II)</td>
<td>International Personality Disorder Examination (IPDE questionnaire)</td>
<td>The Structured Clinical Interview for DSM-III-R Personality Disorders (SIDP-R)</td>
<td>Structured Clinical Interview for DSM IV (SCID II)</td>
<td>Alcohol Use Disorder and Associated Disabilities Interview Schedule- DSM IV (AUDADIS-IV)</td>
<td>International Personality Disorder Examination (IPDE questionnaire)</td>
</tr>
<tr>
<td>Sample (method)</td>
<td>Random sampling assisted by a marketing company</td>
<td>National household survey (weighted data)</td>
<td>Individuals from National Register (weighted data)</td>
<td>Household survey in England and Wales (weighted data)</td>
<td>Civilian non-institutionalised population (weighted data)</td>
<td>Household survey (weighted data)</td>
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<tr>
<td>Any PD (%)</td>
<td>10.0</td>
<td>6.6</td>
<td>13.4</td>
<td>4.4</td>
<td>14.8</td>
<td>6.1</td>
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<tr>
<td>Cluster A</td>
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<td>. a</td>
<td>4.1</td>
<td>1.6</td>
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<td>3.6</td>
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<tr>
<td>Cluster B</td>
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<td>. a</td>
<td>3.1</td>
<td>1.2</td>
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<td>1.5</td>
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<tr>
<td>Cluster C</td>
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<td>. a</td>
<td>9.4</td>
<td>2.6</td>
<td>. a</td>
<td>2.7</td>
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<tr>
<td>PPD¹</td>
<td>1.8</td>
<td>1.3</td>
<td>2.4</td>
<td>0.7</td>
<td>4.4</td>
<td>. a</td>
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<tr>
<td>SczPD²</td>
<td>0.4</td>
<td>1.8</td>
<td>1.7</td>
<td>0.8</td>
<td>3.1</td>
<td>. a</td>
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<tr>
<td>SczyPD³</td>
<td>0.7</td>
<td>. a</td>
<td>0.6</td>
<td>0.06</td>
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<tr>
<td>ASPD⁴</td>
<td>0.2</td>
<td>0.0</td>
<td>0.7</td>
<td>0.6</td>
<td>3.6</td>
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<tr>
<td>BPD⁵</td>
<td>1.1</td>
<td>1.0</td>
<td>0.7</td>
<td>0.7</td>
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<tr>
<td>NaPD⁶</td>
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<td>. a</td>
<td>0.8</td>
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<tr>
<td>HiPD⁷</td>
<td>1.3</td>
<td>0.5</td>
<td>2.0</td>
<td>. a</td>
<td>1.8</td>
<td>. a</td>
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<tr>
<td>AnPD (OC)⁸</td>
<td>2.2</td>
<td>3.1</td>
<td>2.0</td>
<td>1.9</td>
<td>7.9</td>
<td>. a</td>
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<tr>
<td>DPD⁹</td>
<td>1.5</td>
<td>1.0</td>
<td>1.5</td>
<td>0.1</td>
<td>0.4</td>
<td>. a</td>
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<tr>
<td>AvPD¹⁰</td>
<td>1.1</td>
<td>2.2</td>
<td>5.0</td>
<td>0.8</td>
<td>2.4</td>
<td>. a</td>
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</table>

¹ PPD = paranoid personality disorder; ² SczPD = schizoid personality disorder; ³ SctyPD = schizotypal personality disorder; ⁴ ASPD = antisocial personality disorder; ⁵ BPD = borderline personality disorder; ⁶ NaPD = narcissistic personality disorder; ⁷ HiPD = histrionic personality disorder; ⁸ AnPD (OC) = anancastic personality disorder; ⁹ DPD = dependent personality disorder; ¹⁰ AvPD = avoidant personality disorder.

Huang et al. (2009) also found gender differences across all three clusters with men being more prevalent in Cluster A, antisocial, narcissistic and anankastic personality disorder, whilst women were more represented in Cluster C (dependent and avoidant), borderline and
histrionic. Similarly, a large cross-sectional survey conducted in the capital of Norway (Torgersen et al., 2001), found gender difference in personality disorder prevalence with higher rates of schizoid, antisocial, narcissistic and anankastic personality disorder in men, whilst histrionic, dependent and avoidant were more frequently observed in women. Personality pathology was more frequent among single individuals with lower educational attainment, from lower socio-economic background and living in the inner city area (Torgersen et al., 2001).

The prevalence of personality disorders in clinical settings is considerably higher. Around 24% of primary care attenders have personality disorder (Moran et al. 2000). The most frequent personality disorders reported were Cluster C (47%), followed by Cluster A 33% and Cluster B (20%).

The number of people with a diagnosis of personality disorder attending secondary mental health services is even higher. A study in a psychiatric outpatient setting (Zimmerman et al. 2005) found 31.4% of patients fulfilled diagnostic criteria of at least one personality disorder. When PD not otherwise specified (NOS) was included in the analysis, almost half of the sample met criteria for personality disorder (45.5%). Among PD patients, 60% met criteria for more than one PD and a quarter were diagnosed with more than two PD. Cluster C was the most frequent (22%), followed by Cluster B (13%) and much less frequent Cluster A (5.6%). Avoidant (14.7%), PD NOS (14.1%), borderline (9.3%) and obsessive-compulsive personality disorders (8.7%) were found to be the most frequent PD categories. Schizotypal, histrionic and dependent PD were found to be the least frequent (0.6%, 1.0% and 1.4%). Keown et al. (2002) found that 52% of patients in an inner-city community mental health team met the criteria for one or more personality disorders. A cross-sectional study of patients in secondary
outpatient mental health services in urban England (Newton-Howes et al., 2010) found that 40% of patients had at least one PD. Although prevalence of different clusters were slightly higher than in the study by Zimmerman et al. (2005), findings from this study also indicated that Cluster C was the most prevalent (25.5%) followed by Cluster B (18.4%) and Cluster A (7.8%). Much higher prevalence of personality disorders (92%) was found in a study by Ranger et al. (2004), whose participants were recruited from an assertive outreach team in an inner-city area in London. Perhaps one of the reasons for such a high prevalence of PD in this study was due to their clients being of a much higher complexity and chronicity, frequently meeting criteria for both Axis I and Axis II diagnoses.

A recently published systematic literature review (Beckwith et al., 2014) reported a high prevalence of personality disorders among psychiatric outpatient services worldwide. The prevalence of personality disorders varied enormously from 1% in India to 92% in the UK based study. The review included studies published in English language only. It is important to note that there was a considerable methodological heterogeneity among the nine selected studies, which included the use of unstructured personality disorder assessments in making a diagnosis and potentially some clinical/cultural biases which could account for the extremely low prevalence of personality disorders in community outpatient mental health services reported by some countries.

Similarly high prevalence of personality disorder is found in more specialized tertiary mental health services. A comprehensive multi-centre cross sectional survey in which personality pathology among patients attending substance misuse services was assessed, reported personality disorder prevalence of 37% in the drug misuse patients and 53% in patients abusing alcohol (Bowden-Jones et al., 2004). Cluster B was most prevalent in patients with
drug misuse (30%) followed by Cluster C (13%). The reverse was the case with people misusing alcohol whereby Cluster C was most common (53%) followed by Cluster B (24%). Similarly, patients suffering from an eating disorder (ED) have higher prevalence of comorbid PD. A Danish population based twin study (Ilkjaer et al., 2004) reported 49% of ED patients have at least one PD with Cluster C personality disorder being most prevalent among all ED types (Anorexia Nervosa- AN and Bulimia Nervosa- BN). Out of the three Cluster C subtypes, anankastic PD was the most frequent. It is estimated that 35% patients with AN and 25% of individuals with BN meet diagnostic criteria for anankastic PD (De Reus & Emmelkamp, 2012). Having a pre-morbid anankastic personality disorder was found to be an independent predictor of poor outcome of AN (Wentz et al., 2009). Cluster B (mainly borderline PD) was more prevalent in patients with BN and bingeing/purging type of AN (Ilkjaer et al., 2004). The study reported the odds ratio for any PD was 2.91 (95% CI 1.46 to 5.50).

A survey of psychiatric morbidity among prisoners in England and Wales showed that the prevalence of any personality disorder was high (Singleton et al., 1998). It indicated that 78% of male remand prisoners and 66% of sentenced male inmates met diagnostic criteria of any personality disorder whilst the rates for women were slightly lower (50%). The prevalence was highest for antisocial personality disorder with 49% of sentenced men and 31% of sentenced women meeting diagnostic criteria. Next most frequent were borderline PD and paranoid PD with a reverse pattern between the sexes whereby more sentenced men had paranoid PD (20% vs 16%) and more female prisoners had borderline PD (20% vs 14%) (O’Brien et al., 2001; Singleton et al., 1998). Prevalence of PD in both male and female prisoners decreased with age. For example, around 86% of females under 21 had personality disorder compared to 50% of over 45s. Among those, ASPD was observed in 50% of under
21 which reduced to less than 10% in over 45s (O’Brien et al., 2001). Most common offences in prisoners with diagnosis of personality disorder were burglary, theft and robbery.

Findings from a population-based study using a high quality national register of homicide offenders, suggested that 54% of them had personality disorder as a primary or secondary diagnosis (Fazel & Gran, 2004). This was more than twice the level of the homicides committed by psychotic patients (25.2%). The most frequently diagnosed subtype was PD NOS and Cluster B among the offenders with primary diagnosis of personality disorder.

Similarly a high prevalence of personality disorder was found in psychiatric forensic services. De Ruiter and Trestman (2007) reported 66% of patients in a psychiatric forensic unit met diagnostic criteria for Cluster B, whilst the prevalence for Cluster A and Cluster C were considerably lower (29% and 22% respectively). The most common Cluster B diagnoses were: antisocial (45%), narcissistic (26%) and borderline (24%).

In summary, personality disorders are a prevalent and heterogeneous group of conditions affecting one in ten people in the general population with the prevalence of PD in mental health services and prisons being considerably higher (40-78%). Whilst Cluster C seems to be the most prevalent in the general population and primary care settings, Cluster B patients are seen more frequently in adult mental health services, forensic units and prisons.

1.1.3. Comorbidity of personality disorders

Mental illness is an established risk factor having a negative impact on a person’s life in general, including physical health, social functioning and overall life expectancy (Harris & Baraclough, 1998).
Comorbidity with other mental illnesses is high in patients with PD. Zimmerman et al. (2005) reported high rates of depression and generalised anxiety disorder (51% and 64% respectively). In a cross-sectional survey of community mental health settings in four urban areas in the UK, Newton-Howes et al. (2010) reported personality disorder patients were 5-times more likely to suffer from co-morbid depression and anxiety when compared to non-PD patients attending secondary care services. Several studies reported that personality disorders are common in people suffering from depression (Casey et al., 2004; Kelly et al., 2009). Findings from a multi-centre community study across five European countries (Kelly et al., 2009) indicated that nearly 50% of patients with depression were found to have personality related problems (31% personality disorder and 19% personality difficulties). Nearly 56% of patients with adjustment disorder had likely personality disorder in a multi-centre study of three inner-city hospitals (Doherty et al. 2014). Both Cluster C and Cluster B disorders were associated with affective disorders (Casey et al., 2004, Coid et al., 2006), whilst the latter was also found to be associated with functional psychosis (Coid et al., 2006).

Over 50% of patients diagnosed with first episode psychosis met criteria for one or more PD disorder with schizoid, schizotypal, avoidant and paranoid types being most prevalent (11%-38%) (Keshavan et al., 2005; Simonsen et al., 2008). Personality disorder patients are also more likely to have higher levels of substance misuse (Bowden-Jones et al., 2004, Zanarini et al., 2010). They frequently present in crisis and are three times more likely to be prescribed psychotrophic medication (Crawford et al., 2011). They are also more likely to report sexually transmitted disease related to prostitution, unprotected sex and having more than 20 lifetime partners (Chen et al., 2007).
Over the past decade there has been increasingly more empirical evidence linking poor physical health with personality related problems. Research evidence suggests that people with personality disorder are at higher risk of developing cardiovascular disease (Moran et al., 2007). Findings from this large community survey of British adults indicated that people with personality disorder were almost two times more likely to report experiencing a stroke and 1.4 times more likely to report symptoms of ischemic cardiac disease after the adjustment for potential confounders (self-reported hypertension, diabetes mellitus, smoking and alcohol misuse). People with personality disorder are more likely to have poor glycaemic control if suffering from diabetes mellitus and have more physical health problems related to substance abuse (Frankenburg & Zanarini, 2006). Whilst the above research evidence comes from clinical and treatment seeking samples, findings from a recent population-based cross-sectional survey (Fok et al., 2014) suggested that people with personality related problems (screened positive on the Standardised Assessment of Personality – Abbreviated Scale – SAPAS) were more likely to report poor physical health than those who scored negative for PD (41.3% versus 15%). This association remained significant after adjusting for a range of covariates such as sociodemographic factors, smoking, substance misuse, long-standing illness and common mental disorders (OR = 1.53, 95% CI 1.02 to 2.29). Also, a greater proportion of people who screened positively for PD reported suffering from three or more physical illnesses.

**1.1.4. Impact of personality disorders**

Mental illness is an established risk factor having a negative impact on person’s life in general, including physical health, social functioning and overall life expectancy. It is a well-established risk factor for premature death from both natural and unnatural causes (Harris & Barraclough, 1998). It has been known for some time that people with chronic and enduring
mental illness such as schizophrenia live on average 20 years shorter than expected (Parks et al., 2006) and have a 2.5 times higher risk of dying when compared to the general public (Saha et al., 2007). More recent research evidence from a retrospective cohort study using a large psychiatric register covering four boroughs in south London, suggested that people with personality disorder die 18 years earlier than those who do not have PD (Fok et al., 2012) which is similar to the life expectancy of people suffering from an enduring and chronic mental health condition. Although the mortality rate in PD patients was four times higher than in the general population, in the younger age group (18-44 years) there was a ten-fold increased mortality risk. The high mortality rate was partly due to death from unnatural causes (suicide, homicide), but also to increased mortality originating from poor physical health. People with personality disorder are at higher risk of developing cardiovascular disease and more likely to have poorer control of an existing chronic physical illness (Moran et al., 2007; Frankenburg & Zanarini, 2006). Some potential reasons for higher mortality rates in PD patients could also be due to iatrogenic factors related to psychototropic medication and polypharmacy in this client group. Crawford et al. (2011) reported that 80% of patients with a primary diagnosis of personality disorder in contact with secondary mental health services have been prescribed psychototropic medication with 20% being on three or more medications despite the weak evidence base for this practice (Crawford et al., 2011).

Deliberate self-harm is more common in patients with personality disorders due to impulsive behaviour and comorbidity with substance misuse. It is associated with increased risk of suicide. Results from a comprehensive meta-analysis (Harris & Barraclough, 1997) suggested that suicide risk in patients with personality disorders was seven times higher then expected. Suicide completion rate in patients with borderline personality disorder is around 10% with most suicide occurring in the younger age group (before age of 40) (Paris & Zweig-Frank,
The risk of suicide is increased in BPD patients with a lower socioeconomic background, poor psychosocial adjustment, family history of suicide, previous psychiatric hospitalization and absence of any outpatient treatment before the attempt (Soloff & Chiappetta, 2012). A study that investigated ‘parasuicide’ attempts in a general hospital found 46% of patients had diagnosis of personality disorder (Haw et al., 2001). Parasuicide was most common among anxious, anankastic and paranoid personality disorders (the study excluded acts of self-cutting which were part of a repetitive pattern of self-mutilation which explains lower rates for borderline PD).

Apart from increased risks to themselves, people with personality disorders also pose higher risks to others. Fifty four percent of homicide offenders in Swedish prisons had a diagnosis of personality disorder (Fazel & Gran, 2004). Risks of violent convictions and re-offending following a release from medium secure forensic psychiatric services is higher in patients with any personality disorder, and it was reported that one in five prisoners with ASPD were reconvicted during the average follow-up period of six years (Coid et al., 2007).

In addition to the emotional distress experienced by PD patients themselves and associated risks to self and others, staff working in PD services report more strain and work-related stress which in the long-term can have a negative impact on staff morale (Moore, 2012). Emotionally distressed patients frequently use unhelpful coping strategies resulting in compromised ability to handle their emotional stress safely. Presenting in ‘crisis’, ambivalence/rejection of treatment, ‘splitting’ and ‘acting out’ are frequently used terms by health professionals in contact with PD patients. Staff can become a target of projective feelings of hostility, neediness and aggression, so professionals’ awareness of both transference and countertransference is crucial. The challenge for the professionals involved
in care of this patient group is to retain an optimistic attitude and maintain neutrality and therapeutic working relationships. Boundary setting whilst maintaining therapeutic working relationship is crucial in daily patient-staff interactions. Good clinical practice in personality disorder services involves regular team supervision to help the staff process unhelpful and negative transference whilst at the same time being aware of their own countertransference, as understanding of both is fundamental in maintaining a balanced therapeutic relationship (Moore, 2012).

In a published report ‘Paying the Price’ commissioned by the King’s Fund (McCrone et al., 2008), the estimated number of people with personality disorders in the UK is 2.46 million and it is expected that the number will increase by 9.3% by 2026. In 2007, the total service costs for patients with personality disorder in contact with primary care were estimated to be around £704 million per year. With the unemployment rate being high in this group of patients, when the loss of employment was included in the above figure the estimated costs rose to £7.9 billion, which further increased the economic burden on the Government’s limited resources (McCrone et al., 2008). These estimates highlight the public health and economic burden related to personality disorder patients.

In summary, personality disorders are a heterogeneous group of conditions which have high rates of mental and physical health comorbidity. Personality disorder is a well-established risk factor for premature death from both natural and unnatural causes. PD patients have similar life expectancy to people suffering from an enduring and chronic mental illness such as schizophrenia. Having a diagnosis of personality disorder impacts on the individual’s health, increases utilisation of health care services and adds considerable public health and economic burden to society as a whole.
1.1.5. Prognosis of personality disorders

Personality disorders are generally considered to have a chronic course and show little improvement during an individual’s lifetime. This seemed to be supported by early studies during the 1980s which found little change in patients at five year follow-up (Pope et al., 1983), and others that raised concerns that the initial remission (improvement) may not be sustainable over a longer period (McGalshan, 1986). However, research evidence over the past twenty years seems to be more encouraging and suggests that, although personality disorders are chronic conditions, they are not necessarily intractable. A ten-year follow-up study (Zanarini et al., 2006) of 290 inpatients found that 88% of patients with borderline PD diagnosis achieved remission (no longer meeting full criteria for BPD), with more that 60% remitting within first four years. Positive predictors for an earlier remission were younger age, absence of childhood sexual abuse, absence of anxious PD, low neuroticism, high agreeableness, no family history of substance use disorder and good vocational record. BPD patients continued to function worse in the vocational area when compared to other PD. A sixteen-year follow-up of the same patient sample showed the cumulative rates of remission for BPD ranging from 78% for an eight-year remission to 99% for a two-year remission. However, the findings also showed that BPD patients are more likely to relapse compared to patients with other subtypes of PD whose remission rates were 97-99% (Zanarini et al., 2012).

Even more favourable long-term prognosis was reported at 27-year follow-up in a study of patients with borderline PD (Paris & Zweig-Frank, 2001) which suggested that only 8% of patients still met criteria for BPD. They found a significant decrease in symptoms on the Diagnostic Interview for Borderlines – Revised (DIB-R) and improvement on the relationship subscale, although there were no significant changes on the impulsivity and affect subscales. Equally encouraging were the findings observed in the younger age groups where stability of
personality disorder traits decreased by 48% from age 14 to 33 in a sample of around 800 children (Cohen et al., 2005) followed-up for nearly 30 years.

In contrast, the two other PD clusters (A and C) do not have as favourable prognosis as Cluster B. A 12-year follow-up study of patients recruited from primary care settings indicated that Cluster A (paranoid, schizoid and schizotypal PD) and Cluster C (anankastic and avoidant) personality traits become more pronounced (Seivewright et al., 2002). Findings from another longitudinal study of patients with a personality disorder diagnosis indicated that 38% of anankastic PD and 23% of schizotypal PD experienced a 12-month remission within the first two years of follow-up (Skodol et al., 2005).

In summary, research evidence over the past two decades seems to suggest that the PD Clusters do not have a similar course and prognosis. Whilst most longitudinal studies suggest that Cluster B patients improve and ‘mellow’ as they get older, Cluster A and C traits/disorders may become more pronounced with age (Seivewright et al., 2002).

1.1.6. Treatment of personality disorders

People with personality disorder experience considerable personal distress and frequently present to health services in crisis. Consequently, they are very often prescribed psychototropic medication even when there is little or no evidence base to support it (Crawford et al., 2011a). Most randomised comparisons have investigated the efficacy of psychothropic medication in patients with borderline personality disorder. Lieb et al. (2010) summarised the research evidence in a Cochrane systematic review of 27 RCTs. They found little evidence for effectiveness for all three major antidepressant drug groups (SSRIs/SNRI, tricyclics and MAOI). There was some evidence of beneficial effects for mood stabilisers and second
generation antipsychotics. Among the mood stabilizers topiramate, lamotrigine and sodium semivalproate (but not carbamazepine) were more effective than placebo in reducing anger and impulsivity. Topiramite was also significantly better in treating anxiety symptoms and was associated with weight reduction. From the second generation antipsychotics, olanzapine and aripiprazole were both significantly more effective in reducing affective instability, anger, impulsivity and psychotic symptoms. They were also more effective in improving comorbid anxiety symptoms, but not parasuicidal and suicidal behaviour. Most studies reported reduction in symptoms rather than a full remission. Therefore, the evidence from these studies suggests that medication potentially can target some specific symptoms rather than the condition as a whole. However, caution is needed when interpreting these results, as the effect sizes were small. Additional concerns are related to the methodological quality of some of the included studies such as a small sample size, short follow-up period (mean duration was 84 days), high attrition rate, differences between research and clinical population (most studies included patients with mild to moderate level of personality psychopathology) and some of the results being based on single-study findings (e.g. aripiprazole study). All these factors make generalizability of these results to the clinical population questionable.

In contrast to Lieb et al. (2010) initial conclusions, the subsequent formal Cochrane report published by the same group of authors took a more cautious view stating that the existing research evidence was not robust enough and possibly not reflective of the clinical environment (Stoffers et al., 2010). Based on the above evidence, the UK guideline (NICE 2009a; NICE 2009b) does not recommend the use of medication for both borderline and antisocial personality disorders, or for the individual symptoms or behavioural problems,
unless the medication is used for the treatment of comorbid disorders (anxiety and mood disorder, psychotic illness) or an acute crisis when it should be used for a short period only.

Although the above evidence was specific for the treatment of BPD, a systematic review by Ingenhoven et al. (2010) which included both BPD and schizotypal PD reported similar findings. Use of antipsychotics for schizotypal symptoms and psychotic-like features, was found to be effective in reducing anger but with no effects on impulsive behaviours. Most supportive evidence seems to be associated with mood stabilizers in improving impulsive behaviour, anger and anxiety. However, similar to other reviews (Lieb et al., 2010; Stoffers et al., 2010), considerable methodological flaws in the included studies pose serious limitations on the generalizability of these results.

Despite the limited evidence base for prescribing psychotropic medication in personality disorder patients, clinical practice in prescribing for personality disorder patients suggests that patients are prescribed all types of psychotherapeutic medications (hypnotics, antidepressants, antipsychotics and mood stabilizers) and polypharmacy is not uncommon (Crawford et al., 2011a). These inconsistencies in prescribing for patients with personality disorders are also a reflection of the current differences between the two most frequently cited clinical guidelines (Tyrer & Silk, 2011). The UK guidelines (NICE 2009a; NICE 2009b) do not recommend use of psychotropic medication specifically for BPD and ASPD or for the individual symptoms or behavioural problems, unless they are used for the treatment of comorbid disorders or in crisis when their use should be short-term only. In contrast, the US guideline is supportive of the use of drug treatment for affective dysregulation symptoms and impulsive behaviours in patients with borderline personality disorder including the use of SSRIs although the recommended algorithms are not based on RCTs (APA, 2001).
In contrast, there is much more consistency among researchers and clinicians about the use and potential benefits of psychotherapy in treatment of personality disorders. Over the past few decades, there has been increasing evidence of different psychological interventions being associated with improvements in symptoms of personality disorders. The most robust evidence supporting psychotherapy in treatment for borderline personality disorder comes from studies comparing dialectical behavioural therapy (DBT) with treatment as usual (TAU). A Cochrane review and meta-analysis found DBT to be superior to TAU, on anger, parasuicidal behaviour and health status (Stoffers et al., 2012). The review also suggested positive effects of other types of psychological interventions (mentalization based therapy, schema-focused therapy, transference-focused therapy) although evidence for these was based mostly on single-study results which would need further replications. In contrast, there was no enough evidence to support psychological therapy for ASPD (Gibbon et al., 2010). There was some evidence that the treatment known as contingency management is helpful in reducing the amount of substance misuse in ASPD patients. CBT seems to be slightly more effective than standard treatment in young offenders with antisocial features at 12 months, but there is no evidence that these beneficial effects are maintained at 24 months following the treatment (Armelius & Andreassen, 2007).

However, not all patients are able to make use of psychological interventions offered, and non-completion of treatment is a major concern with patients diagnosed with personality disorder. A systematic review of 25 studies indicated that more than a third of patients drop out of psychological treatment (McMurran et al., 2010). Various factors leading to a premature end of treatment have been implicated from a patient’s characteristics, complexity of diagnostic presentations, development of a therapeutic alliance between a patient and a therapist to the factors related to treatment itself (duration, type, mode).
In summary, presently there is more empirical evidence supporting psychotherapeutic approaches than pharmacotherapy in the treatment of personality disorders. In fact, pharmacotherapy in personality disorder patients continues to be a contentious topic. Currently we are faced with discrepancies between the UK and US guidelines, one being more conservative and recommending ‘holding off’ in prescribing medication and the other much more supportive of a pharmacological approach for the emotional dysregulation symptoms of BPD. On the other hand, clinicians are faced with emotionally distressed patients on a daily basis and frequently see them presenting in crisis, which combined together undoubtedly result in a prolonged and not always justified prescribing of psychotropic medication and polypharmacy. These are more likely to reflect clinicians’ own uncertainty about what would be the optimal treatment for personality disorder patients and a lack of resources for psychological treatment. One could also argue that at times increased levels of prescribing psychotropic medication and polypharmacy for PD patients observed in clinical practice reflects clinicians’ frustration and ‘helplessness’ when treatment does not work. The findings from clinical settings of widespread polypharmacy use and a high proportion (80%) of patients with a primary diagnosis of personality disorder in contact with secondary mental health services being prescribed psychotropic medication (Crawford et al., 2011a), are both suggestive of a wide discrepancy, at least in the UK, between NICE guidelines and clinical practice. One could also argue that if clinicians are prescribing psychotropic medication, it would be more clinically justified and beneficial to patients if specific symptoms are targeted for which at least there is some evidence that a specific medication can improve symptoms even if it does not improve the condition per se. For instance, patients who present with anger and behaviour that is more impulsive including bingeing on food (frequently seen in borderline female patients) could potentially benefit from topiramate. On the other hand, in the same patient group olanzapine would not be the
best choice as it increases the appetite and would potentiate weight gain adding to psychopathology linked with long-standing self-esteem problems.

1.1.7. Current proposals for reclassification of personality disorder in ICD-11

Severity of personality disorder is a construct that has been increasingly used, although not clearly defined. In an attempt to gain better understanding of what is meant by this term, Crawford et al. (2011b) conducted a literature review which provided a comprehensive account of the reported features associated with this construct, ranging from high service utilisation, risk of serious self-injury or death, to diffuse personality pathology covering more than one PD cluster. Some studies even equated it to psychopathy.

Over the past three decades there have been numerous epidemiological studies indicating the importance of the concept of PD severity whilst at the same time emphasizing that the existing categorical classification of personality disorders is unsatisfactory. One of the frequently raised concerns is that the majority of patients do not fit into a specific personality disorder category and there is a substantial overlap between the categories making these diagnostic thresholds arbitrary rather than true and distinctive diagnostic entities (Tyrer et al., 2011a). These resulted in the limited clinical use of many of the categories and the frequent use of non-specific PD diagnoses such as PD not otherwise specified or mixed personality disorder, often used with a high degree of inconsistency (Verheul & Widiger, 2004; Verheul et al., 2007). Also, current classification does not help clinicians to decide on the most appropriate treatment (psychotherapeutic, pharmacological or combined) for personality disorder patients (Tyrer & Bateman, 2004). This is complicated further by the use of numerous personality assessment measures in research with generally poor reliability between
them (Tyrer et al., 2007). However, even more problematic is that this categorical classification does not capture the variation in interpersonal and emotional disturbance between patients who receive the same personality disorder diagnosis. For example, a person can be diagnosed with the emotionally unstable personality disorder if presenting with intermittent deliberate self-harm, emotional distress and having unstable relationships but still being able to preserve some of them. The same diagnosis may be applied to someone whose emotional dysregulation and behavioural dyscontrol has led to imprisonment, her/his children being taken away and has a marked inability to maintain any meaningful relationships. Tyrer and Johnson (1996) argued that this dychotomous personality disorder classification system is unsatisfactory from the clinical and research perspective and proposed a dimensional approach to PD classification based on the severity of personality disorder. They initially proposed a simplified method of rating the severity of personality disorders on a four-point scale which was later adjusted to a five-point scale defining the levels of severity to: no personality disorder, personality difficulty (lowest levels of personality abnormality accentuated at times of increased stress), simple personality disorder (one or more PD within the same cluster), complex personality disorder (meets criteria for personality pathology in more than one cluster) and severe personality disorder (similar to complex but also includes antisocial personality) (Tyrer & Johnson 1996; Tyrer, 2005).

The aforementioned deficiencies of the current classifications of personality disorders (WHO, 1992; APA, 1994) have led to proposals for a change to the existing PD classification (Skodol et al., 2011; Crawford et al., 2011b; Tyrer et al., 2011b; Tyrer et al., 2015). After lengthy consultations, the DSM-5 Task Force for the Revised Classification of Personality Disorder decided to retain the existing classification to preserve continuity with clinical practice (APA, 2013). However, they have added a separate section named ‘Alternative DSM-
5 Model for Personality Disorders’ introducing a dimensional approach to classification of PD with pathological personality traits (APA, 2013). The proposed classification still retained PD categories, although reducing the total number of PD types down to six from the previous eleven (including PD NOS).

The ICD-11 working group on reclassifications of personality disorder proposed a more radical change by suggesting the introduction of a dimensional classification with four levels of severity which could be further defined by five monothetic trait domains (Crawford et al., 2011b; Tyrer et al., 2011b; Tyrer et al., 2015). Although the work on the proposed reclassification of personality disorder in ICD-11 is still ongoing and has not been finalised, according to this new system, the personality pathology would be defined as personality difficulty (meeting subthreshold criteria), mild personality disorder, moderate personality disorder and severe personality disorder. Clinicians would also have an option to further depict a person’s personality problems by selecting one or more of the five domains (negative affectivity, disinhibition, dissocial, detachment, anankastic features) (WHO, 2014). The main benefits of this new system are that it would capture different levels of severity of personality disorder, including the introduction of a new category of personality difficulty, the availability of an option of secondary classification based on five domains, which correspond to underlying features of personality dysfunction. This new system should be much less onerous to use in ordinary practice and hopefully be less stigmatising for the patients (Tyrer et al., 2011b; Tyrer et al., 2015). Furthermore, the ICD-11 working group on reclassifications of personality disorder also proposes to introduce the ‘late onset’ qualifier for cases where personality disturbance originates in adulthood and there is no evidence of personality related problems before age of 25 years (Tyrer et al., 2015). This is an important step forward as until now all previous versions of the two main disease classification systems insisted that there
should be evidence of personality problems at least in adolescence if not in late childhood to receive a diagnosis of personality disorder (APA, 2013; WHO, 1990).

Although seen as refreshing, the current proposal for the reclassification of personality disorder has also attracted some criticism mainly due to lack of clarity on how to differentiate between the proposed severity levels, concerns about the radical break from the existing categories used extensively in prior research (particularly borderline) and queries about the authors’ claim that it would reduce stigma associated with the diagnosis of PD (Bateman, 2011; Gunderson & Zanarini, 2011; Livesley, 2011). The radical break from the existing PD categories has been a particular cause of concern and whether mental health professionals will find the proposed trait domains clinically useful and relevant. Some preliminary comparisons between ICD-10 and ICD-11 classifications of personality disorder showed that the latter yields higher levels of personality dysfunction than the ICD-10 (Tyrer et al., 2014).

1.2. Post-traumatic stress disorder (PTSD)

During the first half of 20th century several concepts have emerged to describe acute psychological trauma in soldiers and civilians related to WW I and WW II such as shell shock syndrome, Da Costa’s syndrome, railway spine, battle neurosis, neurocirculatory asthenia (Jones & Wessely, 2005). The symptoms of these traumatic syndromes were subsequently included in the DSM-I (APA, 1952) under the joined diagnostic term of ‘traumatic neuroses’. Military psychiatric literature following the post-WWII era continued to point to an acute combat stress reaction, a condition frequently described in combat soldiers. This syndrome included a constellation of symptoms: restlessness, psychomotor retardation, exaggerated startle response, autonomic hyperactivity, confusion, nausea and vomiting, withdrawal and paranoid reactions. However, despite the increasing evidence of
post-trauma psychopathology, the diagnosis of traumatic neurosis was omitted from the subsequent edition, resulting in no diagnostic category for stress disorders being available until the next DSM revision in 1980.

In the 1960s and 1970s, the era of several wars in South East Asia, research interest in psychological sequelae of prolonged traumatic exposure and victimization expanded enormously in attempts to account for the challenging mental health pathology observed in Vietnam war veterans on their return to home countries. This led to introduction of a new diagnostic category of Post Traumatic Stress Disorder (PTSD) in DSM-III (APA, 1980). The syndrome was characterized by three main clusters of symptoms: re-experiencing, hyperarousal and avoidance which had to be present for at least one month (APA, 1980). However, to receive a diagnosis of PTSD the person has to be exposed to a traumatic event during which he/she experienced or witnessed an event or events that involved the actual or threatened death or serious injury to which the person responded with intense fear, helplessness or horror. These events would cause pervasive distress in almost anyone. Three main clusters of PTSD symptoms include:

1. Re-experiencing (reliving) of the traumatic event manifested through one (or more) of the following:
   - recurrent and distressing recollections of the traumatic event
   - recurrent distressing dreams of the traumatic event
   - acting or feeling as if the traumatic events were recurring (dissociative flashback)
   - intense psychological distress at exposure to cues (internal or external) that resemble an aspect of the traumatic stressor
2. Avoidance of stimuli associated with the trauma as indicated by three (or more) of the following:
   - Efforts to avoid thoughts, feelings, or conversations associated with the trauma
   - Efforts to avoid activities, places or people that arouse recollections of the trauma
   - Inability to recall partially or completely some aspects of the trauma
   - Diminished interest or participation in important activities
   - Feelings of detachment or estrangement from others
   - Restricted range of affect
   - Sense of forshortened future (e.g., does not expect to have a career or normal life span)

3. Persistent increased arousal (not present before the trauma), shown by two (or more) of the following:
   - Difficulty falling or staying asleep
   - Irritability or outbursts of anger
   - Difficulty concentrating
   - Hypervigilance
   - Exaggerated startle response

4. Duration of the above symptoms is more than 1 month

5. The disturbance causes clinically significant distress or impairment in social, occupational, or other important areas of functioning

DSM – 5 (APA, 2013) replaced the three-factor model with a four-factor model adding a new component named ‘negative alterations in cognitions and mood’ to the existing three main clusters of symptoms. The new cluster of symptoms is based on a combination of some old DSM-IV ‘Avoidance’ factors and new negative cognitions symptoms:
• persistent negative cognitions about oneself, others and the world
• persistent distorted cognitions about the cause and consequences of the traumatic events
• persistent negative emotional states (fear, horror, anger, shame)
• inability to recall important aspect of the traumatic event
• markedly diminished interest in significant activities
• persistent inability to experience positive emotions
• feelings of detachment or estrangement from others

In addition, the distinction between acute and chronic PTSD has been removed form DSM – 5 (APA, 2013).

1.2.1. Aetiology of Post-traumatic Stress Disorder

In the process of making a clinical diagnosis of PTSD based either on ICD and DSM diagnostic criteria, both classification systems affirm that there must be evidence of the individual experiencing a stressful traumatic event (WHO, 1992; APA, 2013). ICD 10 defines this experience as ‘event or situation (either short- or long-lasting) of an exceptionally threatening or catastrophic nature, which is likely to cause pervasive distress in almost anyone’ (WHO, 1992, p. 147). DSM-5’s definition of trauma under its Criterion A includes ‘exposure to actual or threatened death, serious injury or sexual violence’ (APA, 2013, p.271).

According to DSM-5, these can happen through direct experiencing, witnessing or learning of such incidents. Several examples of traumatic occurrences have been listed: natural or man-made disaster, combat trauma, being a victim of torture, terrorism, rape and witnessing the violent death of others. Although associations between traumatic experience and subsequent PTSD symptoms (reliving the event, hyperarousal and avoidance) have been established, it is less clear how the psychopathological process of PTSD evolves and why some people who have been through similar traumatic experiences develop PTSD but others do not.
Research evidence from a twin study with war veterans including over 4000 twin pairs (2,224 MZ and 1,818 DZ) suggested that heritability rate in PTSD patients was around 30% (Goldberg et al., 1990). This rate remained the same even after controlling for combat exposure which would suggest that genetic factors might affect an individual’s reaction towards environmental stressors and make them more likely to develop PTSD symptoms. Premorbid environmental factors were not found to increase susceptibility to PTSD. Twin studies with the civilian population suggest that genetic factors account for the development of PTSD symptoms following exposure to assaultive traumatic events whilst environmental influences were more influential in non-assaultive trauma, thus suggesting that individuals’ reaction is different according to type of trauma (Stein et al., 2002). Some research evidence also suggests that genetic factors in PTSD overlap with other mental health disorders (depression, anxiety and panic disorder) suggesting considerable amount of the genetic variance between these conditions so genes that affect the risk of these disorders will also impact on the risk of PTSD (Koenen et al., 2008). Although twin studies provide a progress in our understanding of the aetiology of a condition, they are frequently criticized for the lack of comparative studies with healthy trauma survivors.

Recent advances in molecular biology have indicated that several genes maybe potential markers for PTSD vulnerability. Out of eleven candidate genes, six have been linked to dopamine system genes supported by findings of higher levels of dopamine (DA) in the blood and urine of patients with PTSD symptoms. Although some of the initial results sounded encouraging, these investigations are at early stages and would need to be replicated before any conclusions are reached (Koenen et al., 2008).
The activation of the Hypothalamic – Pituitary – Adrenal (HPA) axis at times when animals and humans are exposed to stress has been extensively researched and long known to be associated with increased levels of corticosteroids in the blood. It has been hypothesized that the impaired sensitivity of the HPA axis to this negative feedback is implicated in anxiety and depressive disorder (Southwick et al., 2010). Whilst hypercorticolism was observed in depressed individuals which is consistent with this well-known acute stress cascade, the opposite was found in PTSD patients were most studies reported hypocorticolism (Yehuda, 1998). To explain low cortisol levels in PTSD patients, Yehuda et al. (1991) proposed a model of enhanced negative feedback sensitivity. According to this hypothesis, chronic PTSD patients experience prolonged stress, which results in increased secretion of CRF. Over time, pituitary sensitivity decreases resulting in blunted ACTH response to CRF, which in turn leads to hypocorticolism. As a result, an increased glucocorticoid receptor sensitivity develops leading to an increased negative feedback inhibition (Yehuda, 2001). This is in contrast to the weakened negative feedback loop in depressed individuals that leads to hypercorticolism inhibition (Wingenfeld et al., 2015; Yehuda, 2001). However, these findings are not consistent across all studies and a meta-analysis of cortisol levels in patients suffering from current PTSD, suggested no systematic difference in basal plasma cortisol levels when compared to healthy adults without mental illness (Meewisse et al., 2007). Some findings suggest that the raised CSF cortisol levels reported in PTSD patients have more implications in the development of PTSD psychopathology (Steckler & Risbrough, 2012).

In animal studies, elevated levels of corticosteroids in prolonged stress situations were associated with atrophy of hippocampal regions. Findings from a meta-analysis of studies using structural magnetic resonance imaging (MRI) in PTSD patients indicated that the average reduction in the left hippocampal volume was around 6.9% and in the right
hippocampal volume around 6.6% (Smith, 2005) although it was not clear whether this was
the consequence of the trauma or a pre-existing phenomenon that made these individuals
more susceptible. Karl et al. (2006) conducted a meta-analysis of brain volumetric studies in
PTSD patients with two types of control groups: healthy non-trauma exposed controls and
trauma-exposed non-PTSD group. When compared to healthy non-trauma exposed controls,
PTSD patients and trauma-exposed non-PTSD controls were found to have significantly
smaller bilateral hippocampal volumes. Comparison of PTSD patients vs. trauma-exposed
non-PTSD controls showed significantly smaller bilateral hippocampal volume only in people
with a severe form of PTSD. These volumetric findings were not restricted to the
hippocampus, as significantly smaller bilateral amygdala volumes were found in PTSD
patients when compared to trauma-exposed non-PTSD controls and healthy non-exposed
controls. However, effect sizes were small (Karl et al., 2006).

Research evidence from a MZ twin study suggested that trauma-exposed twins with severe
unremitting PTSD and their unexposed twin had significantly smaller hippocampi (around
10% smaller) than non-PTSD twin pairs even when controlling for age, combat severity and
number of non-combat traumatic events. These results would suggest that smaller
hippocampal volume in these PTSD patients represented pre-trauma vulnerability factor
rather than being the consequence of hypothesized corticosteroid-related neurotoxicity
(Gilbertson et al., 2002). These suggest a further evidence of heredity being an important
factor in predisposition to increased vulnerability to developing PTSD in susceptible
individuals.

Influenced by the reported abnormalities from neuroimaging studies in PTSD patients, a large
amount of research refocused on the involvement of the corticolimbic circuit in the
Lasting personality pathology after trauma

development of PTSD pathology. A comprehensive review by Steckler and Risbrough (2012) provides a detailed account of the most recent developments in the neuropharmacology of PTSD and describes the complexity of the underlying neurochemical processes. It has been proposed that insufficient top-down control from prefrontal cortex (PFC) to amygdala and hippocampus results in poor control of fear-related memories (impaired extinction and lack of control over fear-related recollections of traumatic events). A number of neurochemical mediators have been implicated including glutamate (excitatory neurotransmitter), gamma-aminobutyric acid (GABA, inhibitory neurotransmitter), CRF and noradrenaline. It has been proposed that increased glutamate transmission across multiple systems: prefrontal cortex, amygdala, hippocampus and locus coeruleus could lead to the hyperarousal observed in PTSD sufferers and increased encoding of trauma-related events. Furthermore, it has been suggested that insufficient top-down control from PFC of HPA system leads to enhanced CRF release and increased glucocorticoid production. Combined with augmented noradrenergic processing in the locus coeruleus, these have been implicated in enhanced encoding of aversive traumatic memories.

In summary, experience of a traumatic event is the crucial occurrence preceding development of PTSD symptomatology. Research evidence suggests that the aetiology of PTSD is complex and is based on gene-environment interplay arising from an individual’s premorbid vulnerability. This vulnerability is potentiated by specific neurochemical systems that mediate stress responses which under influence of traumatic environmental factors, could lead to PTSD pathology. However, a precise aetiological role of each of them remains unclear.
1.2.2. Prevalence of Post-traumatic Stress Disorder

The National Comorbidity Survey in a sample of 5877 persons aged 15-54, indicated the lifetime prevalence of PTSD in the general population was around 8% (Kessler et al., 1995). Women were twice as likely as men to experience lifetime PTSD (10.4% vs 5%). There was no consistent association between age and PTSD after controlling for confounders. The lifetime PTSD was more prevalent in separated, divorced and widowed than married individuals. The most frequently reported type of trauma in both men and women was witnessing someone being killed or badly injured (36% of men and 15% of women). Other types of trauma reported by men were being threatened by a weapon (19.0%), experience of physical attacks (11.1%), combat exposure (6.4%) or being kidnapped. In comparison to men, women reported significantly higher rates of sexual molestation (12.3%), rape (9.2%) and adverse childhood events (physical abuse and neglect). More than 70% of both men and women diagnosed with PTSD experienced two or more traumatic events (Kessler et al., 1995).

PTSD is a relatively frequent disorder in primary care settings. Lifetime prevalence of PTSD in general practice was found to be 14% whilst current PTSD rate was around 9% (Gomez-Beneyto et al., 2006). Prevalence of PTSD reported in epidemiological studies involving psychiatric population varied greatly between different population groups (war veterans, civilian population, inpatients, outpatients), type of trauma and time since traumatic exposure. Results from a major USA epidemiological study, The National Vietnam Veterans Readjustments study (Kulka et al., 1990) estimated that 31% of 3.1 million veterans had lifetime PTSD. Fifteen percent had PTSD symptoms 15 year after combat exposure. Younger men (born 1940-1949) had twice as high PTSD rates than older veterans (10% vs 5% respectively) suggesting that exposure to combat trauma at a younger age increased the
likelihood of PTSD (Kulka et al., 1990). This pattern was not observed in female veterans (potentially due to the fact that women involved in Vietnam War were mostly nurses, not actively involved in combat and possibly joined the army at a more mature age). Kulka et al. (1990) also found that veterans suffering from current PTSD were exposed to higher levels of war-zone stress in contrast to their combat fellows who did not have current PTSD symptoms indicating that the consequence of more severe trauma was longer lasting psychopathology.

The prevalence of PTSD also varies depending on whether studies assessed current, lifetime or chronic PTSD. Lower levels of current PTSD were found in studies which measured PTSD symptoms more than 15-20 years following trauma which ranged from 15% to 29% (Barrett et al., 1996; Engdahl et al., 1991; Kulka et al., 1990) indicating that a considerable proportion of PTSD sufferers do get better over a period of many years. Lifetime PTSD rates generally reported in war veterans ranged between 40% - 60% (Ford & Kidd, 1998; Ford, 1999; Funari et al., 1991; Jongedijk et al., 1996). Similar rates of lifetime PTSD were reported among German political prisoners (Ehlers et al., 2000) and refugees (Hunt & Gakenyi, 2005).

When different types of traumatic experience were compared, considerably higher levels of PTSD symptoms were reported in victims of interpersonal and prolonged trauma. Eighty-three percent of torture victims reported PTSD symptoms more than five years after the trauma (Daud et al., 2008). Ninety-five percent of treatment-receiving participants with a history of exposure to the ‘Troubles’ in Northern Ireland met criteria for PTSD (Dorahy et al., 2009). In the Oklahoma City bombing in 1995, 34% of survivors reported symptoms of PTSD (North et al., 1999) with a higher prevalence in women than men (55% vs. 34%). Onset of symptoms was very fast with the two thirds of survivors experiencing first PTSD symptoms on the day of the bombing.
Disaster is generally defined as an incident on a large scale causing disruption to a considerable number of people with significant consequences on people’s life. In the systematic review on PTSD following disaster (Neria et al., 2007), the authors divided disasters into three separate categories: natural disaster, human-made disaster and technological disasters. In their narrative synthesis of 284 studies, they reported a wide variation in prevalence of PTSD among studies in all the three disaster subcategories. They reported the lowest prevalence in survivors of natural disasters (3.7% to 60%) with a generally rapid decline over relatively a short time period. When compared to human-made and technological disasters, rates of PTSD after natural disaster are usually considerably lower. Similarly, a wide variation in prevalence was observed following technological disasters (15% to 75%). The prevalence of PTSD following human-made disasters varied largely and showed more gradual decrease over the time. Findings also indicated that PTSD was more frequent among survivors directly involved in the incident and first responders. For example, around 22.5% of first responders following the terrorist attack on 11 September 2001 suffered from PTSD two weeks after the incident and around 20% of them reported PTSD symptoms 10-15 months later (Neria et al., 2007). Most of the studies were cross-sectional not providing information about course of PTSD. However, a few studies that examined the long-term course of PTSD report a decrease in PTSD symptoms (Garakani et al., 2004) with the rates of PTSD being at the highest level immediately post disaster event. Twenty five percent of the survivors of Buffalo Creek dam collapse were found to have current PTSD 14 years later in comparison to a much higher levels of lifetime PTSD (60%) reported among 193 participants (Green et al., 1992).
1.2.3. Comorbidity and the impact of PTSD

Kessler et al. (1995) reported the average duration of PTSD symptoms was shorter in patients who received treatment than those who did not (36 months vs. 63 months). A third of patients failed to improve even after several years following the traumatic experience. Comorbidity with other mental health disorders was high in patients diagnosed with PTSD. At least one comorbid mental health disorder was reported in 88% of men and 79% of women with lifetime PTSD. The most common comorbid diagnosis reported by National Comorbidity Survey (Kessler et al., 1995) in men with PTSD was alcohol abuse/dependence (52%) whilst in trauma-exposed women it was major depressive disorder (48.5%). Men with PTSD were 4-7 times more likely to report comorbid symptoms of depression and anxiety whilst women were 2-4 time more likely to be diagnosed with anxiety and affective disorders than non-PTSD controls. Approximately 59% of trauma-exposed men and 44% of women with PTSD were diagnosed with more than three comorbid disorders. However, the cross-sectional nature of the study made it impossible to clearly establish what percentage of PTSD was a primary disorder. So, it was estimated that between 30-50% of men and 40-60% of women had PTSD a primary diagnosis.

Comorbid substance misuse was found to be high in both men and women with PTSD. Findings from the National Comorbidity Survey (Kessler et al., 1995) suggested that 52% of men and 27% of women with PTSD had comorbid alcohol misuse which was significantly higher than in non-PTSD controls (M-34% and F-7.6% respectively). Similarly, drug misuse was twice as high in trauma-exposed men than in non-PTSD controls (34% vs. 15%) and three times higher in female trauma victims than in female non-PTSD controls (27% vs. 7.6%). PTSD patients were two times more likely to be diagnosed with certain chronic physical illness such as stomach ulcer and arthritis (Kessler & Greenberg, 2002). Veterans
with chronic PTSD suffered more frequently from various physical illnesses (cardiovascular, pulmonary and metabolic disease) more than 15 years after combat exposure (Britvic et al., 2015).

Findings from a meta-analysis including 63 studies suggested that both current and lifetime PTSD have been strongly associated with increased suicidality (ranged from suicidal thoughts to more severe suicide attempts) independent of sex and age (Panagioti et al., 2012). They did not find a significant association between successful suicide and PTSD (based on a subgroup analysis of only four studies that met inclusion criteria). Results from the Epidemiologic Catchment Area Survey suggested that PTSD patients were 15 times more likely to attempt suicide than non-PTSD patients (Davidson et al., 1991). These findings remained significant after controlling for comorbid depression suggesting that PTSD patients were still eight times more likely to attempt suicide than non-PTSD patients.

### 1.2.4. Risk factors for development of PTSD

Two meta-analyses investigated psychosocial risk factors for PTSD (Brewin et al., 2000; Ozer et al., 2003). The effects of five demographic predictors (age, gender, race, socioeconomic status and educational attainment) were found to be small with weighted average effect sizes \((r)\) from 0.05 to 0.14 and deemed to add little to our understanding of the development of PTSD (Brewin et al., 2000). Nine other predictors were reported by Brewin et al. (2000) relating to a person’s characteristics (past psychiatric history, childhood abuse, other childhood adverse events, previous experience of trauma and family psychiatric history), trauma severity and social support (lack of social support and life stress following trauma). These all yielded low to moderate effect sizes \((0.11 – 0.40)\). The lack of social support and additional post-trauma life stressors were found to be the best predictors of PTSD (Effect size}
(ES) = 0.40 and ES = 0.32 respectively) followed by trauma severity (ES = 0.23). Interestingly, predictors relating to the person’s pre-trauma characteristics had relatively low ES ranging from 0.11 - 0.19.

Similar findings were reported in the subsequent meta-analysis by Ozer and her colleagues (2003) suggesting that trauma severity (weighted r = 0.26), peri-traumatic emotional response (weighted r = 0.26) and particularly peri-traumatic dissociation (weighted r = 0.35) were strongest predictors of PTSD. Lack of social support in this study was associated with a weighted ES of 0.28, which was considerably smaller than the weighted ES of 0.40 reported by Brewin et al. (2000). Family psychiatric history, an individual’s pre-trauma psychological problems and history of prior trauma were the smallest predictors (weighted r = 0.17), suggesting that psychological peri-traumatic experiences were the strongest predictors for the development of PTSD pathology. Some research evidence suggests that risk factors associated with maintenance of PTSD are related to appraisal of the traumatic event and its consequences suggesting the importance of peri-traumatic emotional and cognitive interpretation and validation (Vogt et al., 2011).

A systematic review of prospective longitudinal studies of PTSD suggested that pre-trauma risk factors might also be important although due to considerable methodological and clinical heterogeneity among the included studies and the lack of meta-analytic estimates, no clear conclusions could be drawn on the importance of more specific pre-trauma factors in predicting PTSD (Di Gangi et al., 2013).

In summary, the extant research evidence suggests that trauma severity, peri-traumatic emotional response and lack of social support play important roles in the development and
course of PTSD, although the precise predictive power of each of them remains unclear. Our understanding of the importance of pre-trauma risk factors as aetiological antecedents of PTSD is still very limited and requires more high quality evidence base before any firm conclusions can be drawn.

1.2.5. Prognosis of PTSD

Kessler et al. (1995) reported that the average duration of PTSD symptoms was shorter in patients who received treatment than those who did not (36 months years vs. 63 months). A third of patients failed to improve even after several years following the traumatic experience.

Findings from a multidimensional meta-analysis of psychotherapy for PTSD patients (Bradley et al. 2005) suggested that 56% (95% CI 50.01 to 61.30) of those who entered treatment (based on intention-to-treat analysis) did not meet criteria for PTSD following the treatment. This figure rose to 67% (95% CI 61.63 to 73.20) for the treatment completers. Further analysis of the 10 studies that included follow-up data indicated that 62% patients did not meet diagnostic criteria for PTSD at 6 months post-treatment. Only two studies measured outcomes at 12 months, which the authors concluded was not sufficient to assess whether there were any further improvements in PTSD symptoms. These results suggested that a considerable proportion of patients post-psychotherapy (44% immediately post-therapy and 38% at ≥6 months) continue to experience some residual symptoms following the treatment. No specific psychotherapy was found to be more efficacious than others. The type of trauma reported varied from childhood abuse, adult sexual assault, motor vehicle accidents to traumatic combat experience. Consistent with the previous reviews, Bradley et al., (2005) also reported lowest effect size for studies with war veterans.
Morina et al., (2014) conducted a systematic review on spontaneous long-term remission rates (improvement without treatment) following diagnosis of PTSD. The findings suggested that remission rates varied widely from 8% to 89%, with an average of 44% of remitting adults no longer meeting diagnostic criteria for post-traumatic stress disorder after a mean observation period of 3.3 years. The highest remission rates (60%) were observed in the PTSD survivors of natural disasters whilst the lowest remission rates of PTSD were reported following physical illness (31%). The review excluded combat-related PTSD studies, thus generalizability of these findings is limited due to the exclusion of more complex and severe interpersonal trauma.

**1.2.6. Treatment for PTSD**

As with personality disorders, both pharmacotherapy and psychological interventions have been used in clinical practice for treatment of patients with PTSD. However, the NICE guideline on treatment for PTSD (2005) recommended caution in prescribing medication emphasising that drug treatment should not be used as a routine first-line treatment option. This conclusion was reached on basis on the overall small effect sizes of the relevant trials, which failed to reach the target effect size of 0.5, a widely accepted level of clinical significance. Instead, watchful waiting is recommended for individuals with mild to moderate PTSD symptoms in the first four weeks following the trauma. For moderate to severe cases of PTSD, paroxetine and mirtazapine were recommended as first choice antidepressants based on the more robust effect size and higher tolerability. Olanzapine was recommended as an adjunctive drug for those patients who did not respond to initial drug treatment (NICE, 2005).

However, a Cochrane review and meta-analysis of pharmacological treatment in PTSD (Stein et al., 2006) found that when compared to placebo, medication was superior in reducing the
severity of all three PTSD symptom clusters (reliving, hyperarousal and avoidance) as well as associated mental health comorbidity. This review included 35 short-term (up to 14 weeks) RCTs with 31 trials comparing medication to placebo, and the remainder comparing two or more different psychotropic medications. Response to medication occurred in 60% of patients whilst the response to placebo was 38%. Results showed overall superiority of medication to placebo (RR=1.49, 95% CI 1.28 to 1.73, NNT=4.85, 95% CI 3.85 to 6.25). Results from this review did not show superior efficacy of one antidepressant over the others, although evidence for treatment efficacy was most convincing for the SSRIs (paroxetine and sertraline). Olanzapine and lamotrigine were not found to be an effective treatment for patients with PTSD, although this could be due to methodological problems related to small sample size and short duration of the trials. Interestingly, the findings also suggested that war veterans were more resistant to pharmacotherapy than other patients groups (Stein et al., 2006). A more recent systematic review and meta-analysis (Hoskins et al., 2015), did not find statistically significant evidence for the efficacy of sertraline over placebo in the pharmacological treatment of PTSD. They found fluoxetine, paroxetine and venlafaxine to be statistically superior to placebo in reduction of PTSD symptoms, but no evidence for olanzapine, topiramate and sertraline. Apart from considerable methodological flaws in the studies included in the review, the authors conclude that for most psychotropic medications, there is inadequate evidence of their efficacy in the treatment of PTSD symptoms (Hoskins et al., 2015).

In the light of PTSD being associated with exposure to traumatic experience, psychotherapy has been widely used in treatment and management of PTSD. The research evidence has not supported routine use of single-session debriefing after psychological trauma (Van Emmerick et al., 2002). The NICE guideline on treatment for PTSD (2005) recommended use of either
trauma-focused CBT or eye movement desensitisation and reprocessing (EMDR) treatment for the individuals who experienced moderate to severe PTSD whilst watchful waiting is recommended for the individuals with mild PTSD symptoms in the first four weeks following the trauma.

Bisson et al., (2007) in their meta-analysis of 38 RCTs using psychological interventions, found that chronic PTSD patients (PTSD symptoms > 3 months) treated with trauma-focused CBT showed a significant improvement on all PTSD measures when compared to treatment as usual (TAU) or waiting lists. They also showed improvement on both anxiety and depression symptom scales. The evidence base for EMDR intervention was also supportive when compared to TAU or waiting lists, although it was not as strong as for trauma-focused CBT. There was also some limited evidence for the effectiveness of stress management and group CBT, whilst other forms of psychotherapy (psychodynamic, supportive/non-directive therapy and hypnosis) did not show any clinically important improvements in PTSD symptoms or associated comorbid conditions (depression and anxiety). Interestingly, the findings of this review also suggested less evidence of effectiveness of either EMDR and trauma-focused CBT over waiting list in Vietnam war veterans on reducing PTSD symptoms, anxiety and depression. However, the number of veteran studies meeting inclusion criteria and analysed in this review was small (two studies only) and sample sizes were also small (24 and 25 participants), thus raising the possibility that some methodological problems may have influenced the reported results (Bisson et al., 2007).

A systematic review of psychosocial interventions in war veterans presenting with common, mental health conditions provided some evidence for psychological therapy in chronic combat-related PTSD. Findings from a meta-analysis (Kitchiner et al., 2012) of four studies
provided some support for trauma-focused psychotherapy in war veterans when compared to routine clinical care or being on a waiting list (SMD= -0.59, 95% CI -1.09 to -0.10). The studies sample size ranged from 20 to 60 participants. Two studies employed EMDR, one implosive flooding technique and one trial used cognitive processing therapy. None of the trials used group therapy.

Most evidence of psychotherapy approaches in combat PTSD patients stems from small sample studies and individual therapy, mostly without an appropriate control group. Very few studies used group-based approaches. In a long-term study that used group psychodynamic therapy over a period of five years, war veterans showed improvement in PTSD symptoms, but little improvement in anxiety and depression symptoms. Most noticeable improvements were observed in the ‘reliving’ and ‘hyperarousal’ clusters of PTSD symptoms (p<0.001), whilst little or no change was reported in relation to ‘avoidance’ symptoms (Britvic at al., 2006). Almost a third of patients (29%) dropped out from the treatment with the highest rate during the fourth year (18%). No demographic differences were found between those who completed and those left treatment early except that more participants with less combat exposure dropped out from the treatment.

A Cochrane review examining the evidence for combined pharmacotherapy and psychological interventions for PTSD (Hetrick et al., 2010) concluded that there was not enough evidence to either support or oppose the effectiveness of combined drug treatment with psychological therapy when compared to either treatment alone in patients with PTSD. These results were based on four RCTs with relatively small sample sizes (from 10 to 65 participants) and one of them involved children and adolescents. Three trials prescribed sertraline and one study used paroxetine in the pharmacotherapy arm of the trial. In terms of
psychotherapy, one trial compared trauma-focused CBT, two trials used prolonged exposure interventions and one trial employed a culture-specific CBT (all participants were Cambodian female refugees). Only one trial used group therapy and all trials offered between 10 and 12 sessions. The time since the traumatic event varied from just under two years to 25 years in three studies (not clear in one study). Although the results of the previous reviews suggested that, in a more chronic course of PTSD, a combination of both pharmacotherapy and psychotherapy would be a preferred treatment option, based on this Cochrane review it seems that there is not enough evidence at present to either support or refute this. These findings clearly underline the need for further large randomised controlled trials.

1.3. Personality change and disorder following trauma in adults

1.3.1. Background

As discussed in the Chapter 1.1.1., the effects of adverse and traumatic childhood experiences have been extensively researched and persistently linked with the development of maladaptive personality traits and personality disorders across all three clusters. In contrast, much less is known about personality related problems that arise in adulthood. In the late 1960s and early 1970s, during several wars in South-East Asia, veterans were exposed to severe traumatic events that subsequently resulted in a substantial psychopathology observed among them. For several decades since, most research related to trauma in adults has focused on short- to medium-term mental health problems, mainly post-traumatic stress disorder. However, it has been argued that PTSD does not capture some of the enduring problems experienced by adults following the exposure to major trauma (Herman, 1992; Van der Kolk et al., 1996). This led to inclusion of a new diagnostic category named Enduring Personality
Change after Catastrophic Experience (EPCACE, F62.0) in ICD-10 (World Health Organization, 1992).

1.3.2. Enduring Personality Change After Catastrophic Experience (EPCACE)

EPCACE is defined as a change of at least four years duration in a person's pattern of perceiving, relating to, or thinking about the environment and self following exposure to catastrophic stress. The main features are stated to be a permanent hostile and/or distrustful attitude towards the world, social withdrawal, a constant feeling of emptiness and/or hopelessness, enduring feeling of ‘being on edge’ or being threatened and a permanent feeling of being changed without pre-existing history of personality disorder (WHO, 1992). Examples of severe traumatic events include concentration camp experience, torture, hostage taking, disasters and prolonged exposure to life-threatening circumstances. It excludes psychological dysfunction following a short-term exposure to a life-threatening experience such as car accident as this is most likely to cause acute stress reaction/PTSD symptoms and is potentially related to pre-existing psychological vulnerability (WHO, 1992). The main diagnostic features and criteria that need to be met to receive a diagnosis of Enduring personality change after catastrophic experience are listed below (Box 1):
Although the inclusion of this new nosological entity in the ICD-10 was seen as a positive step in helping clinicians and researchers in unifying trauma-related phenomena in adults, not previously addressed by either of the two disease classification systems, it also attracted
further criticisms. An international survey of expert opinions in the field of trauma, showed that 85% of the experts endorsed the view that people can suffer lasting personality pathology following exposure to catastrophic stress, but less than 16% used this diagnosis in clinical practice (Beltran & Silove, 1999). One of the reasons given was that the diagnostic criteria of this novel category in the ICD-10 were rather non-specific and not fully capturing the symptomatology that patients exposed to severe trauma present with. For instance, a high level of emotional dysregulation and impulsivity, changed perception of self, propensity to considerable somatisation, feelings of blame and reduced capacity to comply with the social norms were frequently observed in a clinical setting but not included in the current ICD-10 diagnostic criteria. Self-harm and sexual dysfunction were additional symptoms that emerged from a qualitative study based on in-depth focused interviews with clinicians working in the area of extreme trauma (Beltran et al., 2008). Thus some experts, particularly from the countries using DSM-IV diagnostic classification, used borderline personality disorder as they believed this diagnosis better captured the high level of emotional distress and impulsive behaviours seen in these patients. On the other hand, the experts endorsed the severity of traumatic experience being an important factor and rated types of trauma they thought were more frequently associated with personality change (torture 91%, concentration camp experience 90%, war exposure 72%, sexual assault 66%, hostage taking 57%). They also endorsed the view that trauma had to be repeated or sustained, undermine the individual’s sense of integrity and be of a life-threatening nature (Beltran & Silove, 1999). Among the five symptoms (Criterion B), the experts ranked a hostile and/or mistrustful attitude as being the most prominent one (Beltran & Silove, 1999; Beltran et al., 2008). This core symptom was followed by feelings of emptiness and hopelessness, chronic feelings of being on edge and threatened with social isolation being the least frequent one (Beltran & Silove, 1999).
Lasting personality pathology after trauma

In addition to the above described concerns, there are also some discrepancies between the ICD-10 Clinical Descriptions and Diagnostic Guideline (CDDG) and the ICD-10 Diagnostic Criteria for Research (DCR) in defining EPCACE. ICD-10 DCR seems to be more precise and provides specific criteria on which to base this clinical diagnosis. On the other hand, ICD-10 CDDG appears to be more descriptive and provides more detailed information regarding types of catastrophic stress that might cause the illness, but lacks clarity in defining the necessary symptoms to fulfill the diagnostic criteria. However, the crucial difference between the two relates to the relationship between the diagnosis of Enduring personality change after catastrophic experience and PTSD. The ICD-10 CDDG classification excludes diagnosis of PTSD and clearly states that personality changes should be present for at least 2 years. However, ICD-10 DCR acknowledges that the personality change is often preceded by PTSD and also that their symptoms often overlap. For this reason, ICD-10 DCR specifies that, in cases of preexisting PTSD of 2 years, there should be a further period of no less than 2 years (in total 4 years) during which symptoms meeting the criteria for personality change should be present. Clearly, this discrepancy could cause confusion in diagnosing patients correctly in both the clinical and research field and has been raised previously (Beltran et al., 2009).

1.3.3. Disorder of Extreme Stress Not Otherwise Specified (DESNOS)

Similarly researchers and clinicians working with people who experienced severe sexual trauma have long argued that the current diagnostic criteria for PTSD do not capture symptoms experienced by these patients. Herman (1992) proposed the introduction of a diagnostic category ‘complex PTSD’. This subsequently led to the introduction of another term ‘Disorder of Extreme Stress not otherwise specified’ (DESNOS) to capture psychological disturbance in victims of childhood sexual abuse and interpersonal violence.
including combat veterans, (Van der Kolk et al., 1996; Van der Kolk et al., 2005; Van der Kolk et al., 2007). DESNOS symptoms have been grouped in seven main categories (Box 2): alteration in regulation of affect and impulses, alteration of self-perception, alteration in relations to others, alteration in systems of meaning, alteration in attention and consciousness, somatisation and alteration in the perception of the perpetrator (Van der Kolk et al., 1996; Van der Kolk et al., 2005). The latter was subsequently dropped as not endorsed by research evidence (Pelcovitz et al., 1997).
BOX 2: Clinical criteria for diagnosis of Disorder of Extreme Stress not otherwise specified (DESNOS) (Pelcovitz et al., 1997):

A) Alterations in regulation of affect and impulses
   - Affect regulation
   - Modulation of anger
   - Self-destructive
   - Suicidal preoccupation
   - Difficulty modulating sexual involvement
   - Excessive risk taking

B) Alterations in attention or consciousness
   - Amnesia
   - Transient dissociative episodes and depersonalisation

C) Alterations in self-perception
   - Ineffectiveness
   - Permanent damage
   - Guilt and responsibility
   - Shame
   - Nobody can understand
   - minimizing

D) Alterations in relations with others
   - Inability to trust
   - Revictimisation
   - Victimizing others

E) Somatization
   - Digestive system
   - Chronic pain
   - Cardiopulmonary symptoms
   - Conversion symptoms
   - Sexual symptoms

F) Alterations in systems of meaning
   - Despair and hopelessness
   - Loss of previously sustained beliefs
Although enduring personality change after catastrophic experience along with some other proposed diagnostic entities such as ‘complex PTSD’ and ‘Disorder of Extreme Stress Not Otherwise Specified’ (DESNOS) (Herman, 1992) was considered for inclusion in DSM IV (American Psychiatric Association, 1994), this proposal was rejected (Shea, 1996).

This was possibly due to considerable methodological limitations of the research evidence available at the time and little information about pre-existing personality pathology which was one of the major criticisms of the existing studies. Instead, to address some of the issues raised by the experts and researchers in the area of interpersonal trauma and PTSD, DSM-IV added ‘associated descriptive features’. These features included impaired affect regulation, feelings of ineffectiveness, shame, despair, hopelessness, self-destructive and impulsive behaviour, dissociative symptoms, somatic complaints, feeling permanently damaged and being threatened by others, a loss of previously sustained beliefs, hostility and poor interpersonal relationships (APA, 1994). However, this approach requires that patients fulfil criteria for PTSD first and would exclude patients who have ‘associated descriptive features’ but not meeting current PTSD criteria. Additionally, it assumes that a person has an anxiety disorder rather than long-term personality change (as stated in ICD-10), which might be a prognostically different entity and much more difficult to treat. Furthermore, it is not clear whether it is sufficient to have just one or more ‘associated symptoms’ to fulfil criteria of more complex symptomatology rather than a simpler form of PTSD. DSM-IV recognised 3 forms of PTSD (acute, chronic and delayed) but this was not based on the severity of symptoms but rather on the length and time of experiencing symptoms. In other words, one can receive a diagnosis of chronic PTSD if suffering from reliving, hyperarousal and avoidance without any associated symptoms as someone who had most of associated symptoms listed in DSM-IV. Also, it is not clear what diagnosis patients should receive when
they no longer meet criteria for 3 main PTSD symptom clusters but continue to experience several ‘associated symptoms’.

Further attempts to include symptoms of personality pathology by stealth in the existing PTSD constellation of symptoms are evident in DSM – 5 (APA, 2013) when a fourth factor named ‘negative alterations in cognitions and mood’ was added. This new cluster of symptoms was based on the existing ‘Avoidance’ symptoms to which some other symptoms were added such as feeling of being permanently changed (estrangement) and persistent negative cognitions about oneself, others and the world. One could argue that these symptoms were more likely to describe someone’s personality pathology than symptoms of an anxiety disorder.

1.4. Development of lasting personality pathology following exposure to catastrophic trauma in adults: a systematic review

Inconsistencies between ICD and DSM classifications described above (Chapter 1.3.3) reflect genuine uncertainties about whether long-standing personality problems can result from exposure to trauma in adults. I have therefore set out to review the existing literature to find out if severe trauma in adulthood can lead to enduring personality change in individuals who had no pre-existing personality pathology.

The aim of the systematic review was to address the following questions:

1. Is there evidence of long-term personality pathology in adults after exposure to severe trauma?
2. If so, what is the proportion of people who develop personality pathology after such experiences?

3. What are the observed personality changes and are they consistent with symptoms of enduring personality change (F62.0) as defined in ICD-10?

4. Finally, what is the relationship between personality change and PTSD?

1.4.1. Methods

I used the Preferred Reporting Items for Systematic Reviews and Meta-Analysis (PRISMA) guidelines which were followed for summarizing research evidence in this review (Liberati et al., 2009).

Search strategy

Relevant studies were identified by searching three bibliographic databases (MEDLINE, PsychINFO and EMBASE) from inception until November 2011. The combinations of terms used were related to personality (‘personality disorders’ or ‘personality change’ or ‘F62’ or ‘Enduring Personality Change after Catastrophic Experience’ or ‘EPCACE’ or ‘Disorder of extreme stress not otherwise specified’ or ‘DESNOS’ and extreme stress (‘war’ or ‘veterans’ or ‘refugee’ or ‘catastrophic experience’ or ‘concentration camp’ or ‘hostage’ or ‘torture/torture survivor’ or ‘trauma’ or ‘natural disaster’). Further papers were found by hand-searching the references of retrieved articles.

Inclusion and Exclusion Criteria

Apart from one journal article, all papers included in this literature review were written in English (one paper was only available in Croatian language spoken by one of the reviewers). All types of epidemiological studies were included but individual case studies and small scale
case series (below 10 cases) were excluded. Only studies that used either semi-structured/structured interviews or standardized self-report questionnaires for diagnosis of personality disorder/change were included. Research evidence suggests that the use of unstructured clinical interviews is less accurate and markedly under-recognized both Axis I and Axis II comorbidity (Tenney, Schotte, Denys, van Megen, & Westenberg, 2003; Zimmerman & Mattia, 1999; Zimmerman, Chelminski, & Young, 2008). Studies that only examined changes in personality lasting less than 4 years or focused solely on other forms of psychopathology such as depression, anxiety or acute PTSD were excluded. I used the cut-off point of 4 years as recommended duration of symptoms of enduring personality change (F62.0) in ICD-10 Diagnostic Criteria for Research (WHO, 1992) in view that most participants included in studies also had diagnosis of PTSD. Studies that did not state time between trauma and assessment of symptoms or where it was impossible to estimate length of the post-traumatic period were also excluded. Finally, studies that included childhood trauma, experienced below the age of 18, were excluded (in one included study it was possible to extract results for the adult trauma group alone).

**Data extraction and quality assessment**

The assessment of eligibility and data extraction were completed independently by two reviewers (JM and VL). Any disagreements were resolved by discussion with a third reviewer (MC). Authors were contacted for missing information (i.e. trauma recency) to determine the eligibility of several studies. We used the Strengthening of the Reporting of Observational Studies in Epidemiology (STROBE) guideline to assess and code the quality of the included studies (Von Elm et al., 2007). In addition to the aforementioned recommendations, a study was considered to be of higher quality if the design was prospective, cases definition for personality changes was based on the last two editions of DSM and ICD, studies that had pre-
trauma personality characteristics assessed at baseline (recruitment), recruitment was
consecutive or some other recognized method was used to avoid selection bias. Information
extracted included sample characteristics (inpatients/outpatients, age, gender, ethnic
background), type of traumatic event (interpersonal trauma vs natural disaster; combat related
trauma vs refugees vs experience of torture during forced imprisonment), trauma recency,
evidence of childhood trauma, measurement of personality disorder/change, diagnostic
criteria, design of study and outcome data. Based on the reported information available,
quality ratings for each study were assigned as low, medium or high quality. The outcomes of
interest for this review were prevalence and characteristics of personality disorder/changes
following exposure to severe trauma.

**Data synthesis**

Marked clinical and methodological heterogeneity among included studies meant that meta-
analysis was not an appropriate method for synthesizing study data (Higgins & Green, 2008).
When the level of heterogeneity in systematic reviews is high, statistically pooling findings
from individual studies can generate inaccurate estimates of association (Egger, Davey Smith
& Schneider, 2007; Ryan, 2013). Although we judged that the two retrospective studies were
sufficiently similar to justify calculating a weighted prevalence estimate for enduring
personality change after catastrophic trauma, we had to use a narrative approach to
synthesizing data from the other studies that were included in the review.

1.4.2. Results

A PRISMA diagram detailing the paper retrieval process is presented in Figure 1. Forty-one
studies, published between 1965 and 2008, met my inclusion criteria and provided data on
11188 participants. The number of participants assessed for personality characteristics in each study ranged from 20 to 2441. Most studies were conducted in out-patient settings (70%). Thirteen studies (32%) assessed more than 200 patients and two studies (5%) had more than 1000 participants. Across the forty-one studies, 16 (39%) used validated semi-structured interviews and the remainder used standardized questionnaires. Twenty nine studies (69%) included participants who were exposed to traumatic experience regardless of their PTSD status, whilst thirteen (31%) included only patients who had been previously diagnosed with PTSD.
New cases of personality change in adults after catastrophic experience

No prospective studies were found that investigated personality change four or more years following exposure to severe trauma in adults. We found two retrospective studies that reported on new cases of personality change (Kozaric-Kovacic & Kocijan-Hercigonja, 2001; Marcinko et al., 2006) and one study that reported on new cases of adult-onset antisocial behaviour (Barrett et al., 1996). All three studies assessed pre-trauma personality pathology.
Two studies (Table 2) reported incidence of 2.6% and 6% (weighted prevalence of 4.6%, 95% CI 3.4% to 6.3%) of enduring personality change in adults (EPCACE) following exposure to catastrophic trauma (Kozaric-Kovacic & Kocijan-Hercigonja, 2001; Marcinko et al., 2006). Pre-trauma mental health and social functioning was based on information obtained from a structured clinical interview (Kozaric-Kovacic & Kocijan-Hercigonja, 2001; Marcinko et al., 2006) and collateral history obtained from patients’ social workers (Kozaric-Kovacic & Kocijan-Hercigonja, 2001). In a study with 2441 participants, Barrett et al., (1996) reported that 11% of combat veterans met criteria for antisocial personality disorder (ASPD). However, their findings also suggested that 20% of the veterans with no prior childhood behavioural problems reported four or more adult antisocial behaviours such as violence, illegal activities, marital/relationship instability, traffic offences, vocational difficulties, frequent lying/using alias and vagrancy. The severity of combat exposure was found to be significantly associated with adult antisocial behaviour even when childhood history and PTSD were controlled for. These results suggest that extreme trauma may have an important role in the development of the adult-onset antisocial behaviours.
Table 2  Studies reporting new cases of personality change following catastrophic trauma

<table>
<thead>
<tr>
<th>Authors (year)</th>
<th>Context</th>
<th>Sample size</th>
<th>Time since trauma</th>
<th>Quality</th>
<th>Incident cases</th>
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<tr>
<td>Barrett et al., 1996</td>
<td>American Vietnam Veterans (outpatients)</td>
<td>2441</td>
<td>&gt;20 years</td>
<td>2</td>
<td>20% veterans with no prior childhood behavioral problems had adult-onset antisocial behaviour</td>
</tr>
<tr>
<td>Kozaric-Kovacic &amp; Kocijan-Hercigonja, 2001</td>
<td>Croatian Veterans under examination for PTSD-related claims</td>
<td>502</td>
<td>4 years</td>
<td>2</td>
<td>F62.0 - 6% (95% CI 3.92 – 8.08)</td>
</tr>
<tr>
<td>Marcinko et al., 2006</td>
<td>Croatian Veterans (with history of PTSD)</td>
<td>340</td>
<td>6-10 years</td>
<td>1</td>
<td>F62.0 - 2.6% (95% CI 0.91 – 4.29)</td>
</tr>
</tbody>
</table>

a Assessment of methodological quality: 1=low, 2=medium, 3=high.

Prevalence of personality traits/disorders in trauma vs non-trauma populations

Ten studies compared the prevalence of personality disorders between participants who were exposed to severe trauma (concentration camp, combat trauma and natural disaster) and non-exposed participants (Table 3). Half of these found no statistically significant difference in personality traits/disorders between cases and controls (Archibald & Tuddenham, 1996; Boman, 1986; Dor-Shav, 1978; Leon, Butcher, Kleinman, Goldberg, & Almagor, 1981; Maj et al., 1989).

The remaining five studies found significantly higher levels (p<0.001) of abnormal personality traits in cases (Daud, Afklinterberg & Rydelius, 2008; Richman & Frueh, 1996; Richman & Frueh, 1997; Robert et al., 1985; Sutker, Winstead, Galina, & Allain, 1993) with borderline, avoidant, passive–aggressive and all three Cluster A traits being most common (Richman & Frueh, 1996; Robert et al., 1985). Suspicion, impulsiveness, aggression, detachment, guilt, psychasthenia, feeling emotionally numb, social introversion and loss of
Lasting personality pathology after trauma

interest in usual activities were personality characteristics most frequently observed among cases (Daud, et al., 2008; Richman & Frueh, 1997; Sutker et al., 1993).

<table>
<thead>
<tr>
<th>Authors (year)</th>
<th>Sample</th>
<th>Time since trauma</th>
<th>PD measure</th>
<th>Quality</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Archibald &amp; Tuddenham, 1965</td>
<td>Cases: 53 American WW II and Korean veterans Controls: 100 outpatients</td>
<td>&gt;20 years</td>
<td>Minnesota Multiphasic Personality Inventory (MMPI)</td>
<td>1</td>
<td>No significant difference between groups.</td>
</tr>
<tr>
<td>Boman, 1986</td>
<td>Cases: 50 Australian Vietnam Veterans (inpatients) Controls: 25 current servicemen with no overseas experience (inpatients)</td>
<td>10-15 years</td>
<td>DSM III clinical interview for ASPD only</td>
<td>1</td>
<td>No significant difference between groups.</td>
</tr>
<tr>
<td>Daud et al., 2008</td>
<td>Cases: 36 refugees with history of torture (outpatients) Controls: 31 refugees with no history of trauma (outpatients)</td>
<td>&gt;5 years</td>
<td>Karolinska Scales of Personality (KSP)</td>
<td>2</td>
<td>Higher levels of abnormal personality traits among cases (suspicion, impulsiveness, aggression and detachment), p&lt;0.001</td>
</tr>
<tr>
<td>Dor-Shav, 1978</td>
<td>Cases: 42 WW II concentration camp survivors emigrated to Israel Controls: 20 matched subjects (age, education, occupation, ethnicity)</td>
<td>&gt;30 years</td>
<td>16 Personality Factor Questionnaire (16PF)</td>
<td>1</td>
<td>No significant difference between groups.</td>
</tr>
<tr>
<td>Leon et al., 1981</td>
<td>Cases: 52 WW II concentration camp survivors</td>
<td>33 years</td>
<td>MMPI</td>
<td>2</td>
<td>Four out of 52 comparisons showed small statistically significant difference.</td>
</tr>
<tr>
<td>Study</td>
<td>Cases: Vietnam veterans with history of PTSD</td>
<td>Controls: Historical sample</td>
<td>Method of Assessment</td>
<td>Methodological Quality</td>
<td></td>
</tr>
<tr>
<td>-----------</td>
<td>---------------------------------------------</td>
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<td>-----------------------</td>
<td></td>
</tr>
<tr>
<td>Richman &amp; Frueh, 1997</td>
<td>53 Vietnam War Veterans (outpatients)</td>
<td>462 Historical sample</td>
<td>Cloninger Tridimensional Personality Questionnaire</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Robert et al., 1985</td>
<td>25 Vietnam veterans with history of PTSD (inpatients)</td>
<td>25 Vietnam veterans with history of PTSD (inpatients)</td>
<td>Millon Clinical Multiaxial Inventory (MCMI)</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Sutker et al., 1991</td>
<td>22 Korean POW (outpatients)</td>
<td>22 War veterans who had not been taken captive (outpatients)</td>
<td>MMPI</td>
<td>1</td>
<td></td>
</tr>
</tbody>
</table>

*Similar rates of personality disorders between groups (7.4-8.1%)*

Significantly higher levels of all 3 categories of Cluster A personality traits and borderline traits in cases, p<0.001.

Significantly higher levels of abnormal personality traits among cases (novelty seeking and harm avoidance), p<0.001.

Significantly higher levels of abnormal personality traits among veterans (avoidant, passive-aggressive and borderline traits) p<0.01.

Higher levels of abnormal personality traits among cases (feeling emotionally numb, inability to express feelings, social introversion), p<0.01.

*Assessment of methodological quality: 1=low, 2=medium, 3=high.*
**Prevalence of personality disorders in adults with history of trauma in non-controlled studies**

Seven studies reported prevalence of personality disorders in adults with history of traumatic stress (Table 4). Six of those related to combat veterans (Barrett et al., 1996; Bollinger, Riggs, Blake, & Ruzek, 2000; Dunn et al., 2004; Escobar et al., 1983; Kulka et al., 1990; Southwick, Yehuda, & Giller 1993) and one to a disaster following a dam collapse (Green, Lindy, Grace, & Leonard, 1992). Four studies focused only on antisocial PD (Barrett et al., 1996; Escobar et al., 1983; Green et al., 1992; Kulka et al., 1990). Prevalence of ASPD varied considerably from 0.005% in a disaster sample (Green et al., 1992) to 40% in a study with 20 outpatient combat veterans (Escobar et al., 1983). Results from the National Vietnam readjustment study (Kulka et al., 1990) found that veterans with PTSD were more likely than those without PTSD to have a lifetime diagnosis of ASPD and they were more likely to have experienced high levels of war zone stress. They found that 31% of theatre war veterans had lifetime PTSD and 10% of veterans met criteria for ASPD. Similar rates of ASPD were reported by Barret et al. (1996) who found that 11% of combat veterans met criteria for antisocial personality disorder. They also found that 20% of the veterans reported adult antisocial behaviours with no prior childhood behavioural problems that would indicate pre-trauma pathology.

Studies that assessed a broader range of personality disorders did not suggest ASPD was a prevalent form of PD (Bollinger et al., 2000; Dunn et al., 2004; Southwick et al., 1993). All three studies reported avoidant, paranoid and obsessive-compulsive PD as being most frequent PD categories, followed by borderline and antisocial PDs. Overall, Cluster C appears to be most frequent (43-51%), followed by Cluster A (31-40%) and Cluster B (15-
26%) (Bollinger et al., 2000; Dunn et al., 2004; Southwick et al., 1993). However, the prevalence of each PD varied considerably between studies with inpatient samples (Bollinger et al., 2000; Southwick et al., 1993) having much higher rates than outpatients (Dunn et al., 2004).

Table 4  
Studies with prevalence of personality disorders in adults with history of trauma

<table>
<thead>
<tr>
<th>Authors (year)</th>
<th>Context</th>
<th>Sample size</th>
<th>Trauma recency</th>
<th>PD measure</th>
<th>Quality</th>
<th>PD type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barrett et al., 1996</td>
<td>American Vietnam Veterans (outpatients)</td>
<td>2441</td>
<td>&gt;20 years</td>
<td>Diagnostic Interview Schedule (DIS) - Anti-social subscale only</td>
<td>2</td>
<td>11% diagnosed with ASPD 20% veterans without childhood problems had ASPD (2.2% of the sample)</td>
</tr>
<tr>
<td>Bollinger et al., 2000</td>
<td>American Vietnam veterans with diagnosis of PTSD (inpatients)</td>
<td>107</td>
<td>&gt;20 years</td>
<td>Structured Clinical Interview (SCID-II, DSM III-R)</td>
<td>2</td>
<td>Cluster C - 51.1%; Cluster A-39.9%; Cluster B- 15% Five most frequent PD: Avoidant PD 47.2%; Paranoid PD 46.2%; Obsessive-compulsive 28.3%; Antisocial PD 15.1%; Schizoid PD-8.5%;</td>
</tr>
<tr>
<td>Dunn et al., 2004</td>
<td>American war veterans with PTSD (outpatients)</td>
<td>115</td>
<td>&gt;20 years</td>
<td>SCID-II (DSM IV)</td>
<td>2</td>
<td>Cluster C - 43.2%; Cluster A -30.9%; Cluster B - 25.9% Five most common PD: Paranoid- 17.4% Anankastic – 16.5% Avoidant – 12.7% Borderline – 8.7%; Anti-social PD-7%;</td>
</tr>
<tr>
<td>Escobar et al., 1983</td>
<td>Hispanic war veterans with PTSD (outpatients)</td>
<td>20</td>
<td>&gt; 5 years</td>
<td>National Institute of Mental Health Diagnostic Interview Schedule DSM III (NIMH-DIS-III)</td>
<td>2</td>
<td>40% diagnosed with Antisocial PD</td>
</tr>
<tr>
<td>Green et al., 1992</td>
<td>Survivors of Buffalo Creek dam collapse</td>
<td>193</td>
<td>14 years</td>
<td>SCID II (DSM III) for Antisocial PD only</td>
<td>1</td>
<td>Only 1 person met criteria for ASPD (0.005%)</td>
</tr>
</tbody>
</table>
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| Kulka et al., 1990 | American Vietnam war veterans | 440 | 10-15 years | Diagnostic Interview Schedule (DIS- DSM-III) for Antisocial PD only | 2 | 10% of combat veterans had lifetime ASPD. Veterans with PTSD were more likely than those without PTSD to have lifetime diagnosis of ASPD |
| Southwick et al., 1993 | American Vietnam veterans (inpatients and outpatients) | 34 | >15 years | Personality Disorder Examination DSM III-R (PDE, DSM III-R) | 1 | Five most frequent PD: Borderline PD 76%, Anankastic PD 44%, Avoidant 41%, Paranoid 38%, Passive-aggressive 35% |

*Assessment of methodological quality: 1=low, 2=medium, 3=high.*

Characteristics of the observed personality pathology in adults with a history of exposure to catastrophic trauma

Twenty-three reported the types of personality problems experienced by adults who had been exposed to catastrophic trauma using nine different personality measures (Table 5). Nine studies which assessed personality traits according to DSM III and DSM IV criteria (Funari, Piekarski, & Sherwood 1991; Hyer, Woods, Boudewyns, Bruno, & O’Leary, 1988; Hyer, McCraine, Boudewyns, & Sperr, 1996; Piekarski, Sherwood, & Funari, 1993; Richman & Frueh, 1996; Robert et al., 1985; Shea, Zlotnick, & Weisberg 1999; Sherwood, Funari, & Piekarski, 1990; Taylor, Asmundson, & Carleton., 2006) found the most frequent to be avoidant (7/9), borderline (6/9), passive-aggressive (6/9) and schizoid traits (5/9). Three studies assessing for Disorder of Extreme Stress Not Otherwise Specified (DESNOS) reported that the most frequent personality difficulties were related to affect and impulse regulation (problems with regulating anger, self-destructive behaviour, suicidal preoccupation and excessive risk taking), altered systems of meaning (hopelessness and despair) and altered self-perception (permanent damage, guilt, shame) (Ford, 1999; Jongedijk, Carlier, Schreuder, & Gersons, 1996; Morina & Ford, 2008). These symptoms were more prominent in treatment...
seeking war veterans (inpatients and outpatients) (Ford, 1999; Jongedijk et al., 1996) than civilian war victims (Morina & Ford, 2008). Five studies reported increased scores on hypochondriacs/somatization scale (Daud et al., 2008; Engdahl, Speed, Eberly, & Schwartz, 1991; Ford et al., 2001; Glenn et al., 2002; Morina & Ford, 2008). Guilt, suspicion, distrust, impulsiveness, aggression, avoidance, detachment, psychasthenia, mental defeat, feelings of emotional numbness and alienation, inability to express emotions and loss of interest in usual activities present a range of personality characteristics observed by the rest of the studies presented in Table 4 (Daud et al., 2008; Ehlers, Maercker, & Boos, 2000; Forbes et al., 2003; Foy, Sipprelle, Rueger, & Carroll, 1984; Hunt & Gakenyi 2005; Richman & Frueh, 1997; Yager, Laufer, & Gallops, 1984).

Table 5   Studies describing characteristics of the observed personality pathology in adults following trauma

<table>
<thead>
<tr>
<th>Authors (year)</th>
<th>Context</th>
<th>Sample size</th>
<th>Time since trauma</th>
<th>PD measure</th>
<th>Quality</th>
<th>PD characteristics/ types</th>
</tr>
</thead>
<tbody>
<tr>
<td>Daud et al., 2008</td>
<td>Iraqi refugees with history of torture (outpatients)</td>
<td>36</td>
<td>&gt;5 years</td>
<td>Karolinska Scales of Personality (KSP)</td>
<td>2</td>
<td>Significantly higher scores on: guilt, suspicion, somatic anxiety, psychasthenia impulsiveness, aggression and detachment (p&lt;0.001).</td>
</tr>
<tr>
<td>Ehlers et al., 2000</td>
<td>Political prisoners (East Germany) who responded to adverts or invitation letters</td>
<td>81</td>
<td>20-28 years</td>
<td>Semi-structured clinical interview (ADIS-R)</td>
<td>2</td>
<td>Perceived permanent change, mental defeat and feeling of alienation most frequently reported characteristics.</td>
</tr>
<tr>
<td>Engdahl et al., 1991</td>
<td>American WWII POWs invited by a letter to participate</td>
<td>62</td>
<td>40 years</td>
<td>Minnesota Multiphasic Personality Inventory (MMPI)</td>
<td>1</td>
<td>POW scored higher on: hypochondriacs, depressive and psychasthenia scales.</td>
</tr>
<tr>
<td>Forbes et al., 2003</td>
<td>Australian Vietnam War Veterans</td>
<td>158</td>
<td>&gt;20 years</td>
<td>MMPI-2</td>
<td>2</td>
<td>Veterans scored highly on externalization, alienation and had propensity to act out.</td>
</tr>
<tr>
<td>Study</td>
<td>Description</td>
<td>Sample Size</td>
<td>Follow-up</td>
<td>Measure</td>
<td>Domain of Interest</td>
<td>Findings</td>
</tr>
<tr>
<td>-------</td>
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</tr>
<tr>
<td>Ford, 1999</td>
<td>American Vietnam veterans (inpatients)</td>
<td>84</td>
<td>&gt;10 years</td>
<td>Structured interview for Disorder of Extreme Stress (SIDES)</td>
<td>Altered regulation of affect and impulses 94%  Altered self-perception (alienation, guilt and shame) 79%  Altered systems of meaning (despair and hopelessness) 66%  Altered relationships 60%  Altered consciousness and attention 46%</td>
<td></td>
</tr>
<tr>
<td>Ford et al., 2001</td>
<td>Gulf War Veterans</td>
<td>237</td>
<td>5-7 years</td>
<td>MMPI (Hy and Hs)</td>
<td>Altered regulation of affect and impulses 94%  Altered self-perception (alienation, guilt and shame) 79%  Altered systems of meaning (despair and hopelessness) 66%  Altered relationships 60%  Altered consciousness and attention 46%</td>
<td></td>
</tr>
<tr>
<td>Foy et al., 1984</td>
<td>American Vietnam veterans with history of PTSD (outpatients)</td>
<td>21</td>
<td>&gt;5 years</td>
<td>Minnesota Multiphasic Personality Inventory (MMPI)</td>
<td>PTSD participants scored higher on:  Paranoia, p&lt;0.01  Psychasthenia, p&lt;0.01  Schizophrenia, p&lt;0.01  Depression, p&lt;0.01</td>
<td></td>
</tr>
<tr>
<td>Funari et al., 1991</td>
<td>American Vietnam War Veterans (inpatients)</td>
<td>36</td>
<td>&gt;15 years</td>
<td>Millon Clinical Multiaxial Inventory (MCMI)</td>
<td>Highest scores on:  Passive-aggressive  Avoidant  Schizoid  Borderline  Antisocial</td>
<td></td>
</tr>
<tr>
<td>Glenn et al., 2002</td>
<td>American Vietnam and Gulf War veterans (outpatients)</td>
<td>172</td>
<td>&gt;9 years</td>
<td>MMPI-2</td>
<td>Most frequently occurring scores among Vietnam veterans were:  Schizophrenia 29.1%  Depression 26.9%  Paranoia 12.7%  Psychasthenia 10.5%  Gulf war veterans:  Schizophrenia 39.5%  Hypochondrias 18.4%  Depression 15.8%  Hystera 13.2%</td>
<td></td>
</tr>
<tr>
<td>Hunt &amp; Gakenyi, 2005</td>
<td>Bosnian refugees in the UK and displaced in Bosnia</td>
<td>190</td>
<td>5-8 years</td>
<td>Cloninger Tridimensional Personality Questionnaire (TPQ)</td>
<td>Positive relationship between PTSD symptoms and Harm Avoidance (worry, fear, shyness, fatigability)</td>
<td></td>
</tr>
<tr>
<td>Hyer et al., 1988</td>
<td>American Vietnam War veterans (inpatients)</td>
<td>60</td>
<td>&gt;10 years</td>
<td>MCMI</td>
<td>Primary personality styles were passive-aggressive and avoidant with schizoid and borderline influence</td>
<td></td>
</tr>
<tr>
<td>Hyer et al., 1996</td>
<td>American Vietnam War veterans with history of PTSD</td>
<td>110</td>
<td>&gt;10 years</td>
<td>MCMI</td>
<td>Dominant passive-aggressive and avoidant personality styles</td>
<td></td>
</tr>
<tr>
<td>Study</td>
<td>Group Description</td>
<td>Participants</td>
<td>Methodology</td>
<td>Key Findings</td>
<td></td>
<td></td>
</tr>
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<td>------------------------------</td>
<td>------------------------------------------------------------------------------------</td>
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<td></td>
</tr>
<tr>
<td>Jongedijk et al., 1996</td>
<td>Dutch WW II and Dutch East Indies veterans (outpatients)</td>
<td>21</td>
<td>&gt;42 years Structured interview for Disorder of Extreme Stress (SIDES)</td>
<td>Highest scores on regulation of affect and impulses (62%) and self-perception (81%) scales.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Morina &amp; Ford, 2008</td>
<td>Civilian war victims from Kosovo</td>
<td>102</td>
<td>6 years SIDES</td>
<td>Somatisation 42.2% Altered relationships 34.3% Altered sustained beliefs (despair/hopelessness) 23.5% Altered self-perception 14.7% Dissociation 9.8% Affect dysregulation 9.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Piekarski et al., 1993</td>
<td>American Vietnam War veterans (inpatients)</td>
<td>245</td>
<td>&gt;10 years MCMI</td>
<td>Four personality profiles: 1. Aggressive stress 58% (avoidant and passive-aggressive) 2. Dependent stress 13% (high level of avoidance) 3. Subclinical Stress 13% (lowest levels of avoidant, passive-aggressive, dysthmic and anxiety levels among 1-3) 4. Non-stress aggressive 16% (non-PTSD) reflective of antisocial profile</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Richman &amp; Frueh, 1996</td>
<td>American Vietnam War Veterans with history of PTSD (outpatients)</td>
<td>42</td>
<td>&gt;20 years Structured Clinical Interview (SCID DSM III-R)</td>
<td>Most frequent personality traits in PTSD group: Borderline 26% Schizotypal 17% Paranoid 16% Schizoid 15%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Richman &amp; Frueh, 1997</td>
<td>American Vietnam War Veterans with history of PTSD (outpatients)</td>
<td>53</td>
<td>20 years Cloninger Tridimensional Personality Questionnaire</td>
<td>Significantly higher levels of abnormal personality traits: novelty seeking and harm avoidance.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Robert et al., 1985</td>
<td>American Vietnam war veterans with history of PTSD (inpatients)</td>
<td>25</td>
<td>&gt;15 years MCMI</td>
<td>Veterans scored significantly higher on avoidant, passive-aggressive and borderline p&lt;.001.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Shea et al., 1999</td>
<td>American Vietnam War Veterans with history of PTSD (inpatients and</td>
<td>92</td>
<td>&gt;20 years Personality Diagnostic Questionnaire-Revised (PDQ)</td>
<td>Five most frequent traits: Paranoid 89% Borderline 83% Obsessive-compulsive 68% Schizotypal 66% Schizoid 59%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
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<table>
<thead>
<tr>
<th>Study (date)</th>
<th>Population/Methods</th>
<th>Duration</th>
<th>Measure</th>
<th>Methodological Quality</th>
<th>Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sherwood et al., 1990</td>
<td>American Vietnam war veterans admitted between 1985 and 1989 (inpatients)</td>
<td>&gt;11 years</td>
<td>MCMI</td>
<td>2</td>
<td>Five most frequent traits: Passive-aggressive 75.7%, Avoidant 69.6%, Schizoid 45.9%, Antisocial 34.5%, Dependent 19.6%</td>
</tr>
<tr>
<td>Sutker et al., 1991</td>
<td>Korean POW (outpatients)</td>
<td>&gt;35 years</td>
<td>MMPI</td>
<td>1</td>
<td>POW scored significantly higher on feeling emotionally numb, inability to express feelings, loss of interest in usual activities and difficulties in concentrating</td>
</tr>
<tr>
<td>Yager et al., 1984</td>
<td>American men who were of draft-eligible age during Vietnam war</td>
<td>6-15 years</td>
<td>Psychiatric Epidemiology Research Interview (PERI)</td>
<td>2</td>
<td>Veterans who participated in abusive combat violence scored significantly higher for distrust</td>
</tr>
<tr>
<td>Taylor et al., 2006</td>
<td>Treatment seeking outpatients with DSM-IV diagnosis of PTSD (outpatients)</td>
<td>8 years</td>
<td>The Personality Diagnostic Questionnaire for DSM-IV (PDQ-4)</td>
<td>2</td>
<td>Five most frequent personality traits in Complex PTSD patients: borderline, paranoid, schizotypal, dependant and avoidant (p&lt;.0001)</td>
</tr>
</tbody>
</table>

*Assessment of methodological quality: 1=low, 2=medium, 3=high.*

Relationship between PTSD and personality pathology after catastrophic experience

No prospective studies were found that examined the relationship between PTSD and long term personality pathology in adults. In the two studies that reported prevalence of enduring personality change (Table 2), four or more years after exposure to catastrophic stress (Kozaric-Kovacic & Kocijan-Hercigonja, 2001; Marcinko et al., 2006), 47% and 75% of people had PTSD, though the proportion who had enduring personality change was small (2.6% and 6% respectively). Although there was a considerable diversity in reporting PTSD symptomatology (current, lifetime, chronic, complex PTSD) in the included studies (Table 6), most studies that involved people with and without PTSD reported higher levels of personality pathology in people with PTSD whatever the cause (Barrett et al., 1996; Daud et
al., 2008; Ehlers, et al., 2000; Engdahl et al., 1991; Funari et al., 1991; Hunt & Gakenyi 2005; Resnick, Foy, Donahoe, & Miller, 1989; Sherwood et al., 1990; Skodol et al., 1996; Sutker et al., 1993; Taylor et al., 2006.). Skodol et al. (1996) reported that personality disorders occurred more frequently in men reporting of PTSD (OR=3.0, 95% CI 1.7-5.2). Barrett et al. (1996) assessed only ASPD and reported that veterans with PTSD were two times more likely to have ASPD than those without PTSD. The proportion of people with war related PTSD who had clinically significant personality pathology varied considerably across the studies. Studies that assessed DESNOS, found that proportion of people with PTSD who also had DESNOS varied from 10% to 43% (Ford, 1999; Ford & Kidd 1998; Jongedijk et al., 1996; Morina & Ford, 2008; Nemcic-Moro et al., 2011). However, only 2% of PTSD participants met criteria for DESNOS (in a study that included PTSD and non-PTSD participants) when much stricter criteria of meeting all six main symptoms were applied (Hyer et al., 1988). Two studies reported no significant difference in antisocial behaviour and pre-army functioning between PTSD and non-PTSD participants (Resnick et al., 1989; Bowman, 1980) whilst combat exposure was significantly associated with PTSD symptoms (Resnick et al., 1989). A study involving a disaster sample found relatively high rates of lifetime and current PTSD but very low rate of ASPD (0.005%) (Green et al., 1992).
Table 6  Studies describing personality pathology in PTSD population

<table>
<thead>
<tr>
<th>AUTHORS (YEAR)</th>
<th>CONTEXT</th>
<th>SAMPLE SIZE</th>
<th>TIME SINCE TRAUMA</th>
<th>PD MEASURE</th>
<th>QUALITY A</th>
<th>RESULTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Barrett et al., (1996)</td>
<td>Vietnam War Veterans (outpatients)</td>
<td>2441</td>
<td>&gt;20 years</td>
<td>Diagnostic Interview Schedule (DIS) - Anti-social subscale only</td>
<td>2</td>
<td>15% of the sample met criteria for PTSD. 11% of the sample diagnosed with ASPD. 20% veterans without childhood problems had ASPD in addition to PTSD</td>
</tr>
<tr>
<td>Boman, (1986)</td>
<td>Cases: Australian Vietnam Veterans (inpatients) Controls: current servicemen with no overseas experience (inpatients)</td>
<td>75</td>
<td>10-15 years</td>
<td>DSM III interview for ASPD only</td>
<td>1</td>
<td>No significant difference in antisocial behaviour between PTSD and non-PTSD participants; no significant difference in pre-army functioning between PTSD and non-PTSD participants</td>
</tr>
<tr>
<td>Daud et al., (2008)</td>
<td>Iraqi refugees with history of torture (outpatients)</td>
<td>36</td>
<td>&gt;5 years</td>
<td>Karolinska Scales of Personality (KSP)</td>
<td>2</td>
<td>83% refugees diagnosed with PTSD. Torture victims scored significantly higher on: guilt, suspicion, somatic anxiety, psychasthenia impotssiveness, aggression and detachment (p&lt;0.001).</td>
</tr>
<tr>
<td>Ehlers et al., (2000)</td>
<td>German political prisoners who responded to adverts or invitation letters</td>
<td>81</td>
<td>21-28 years</td>
<td>Semi-structured clinical interview (ADIS-R)</td>
<td>2</td>
<td>39.5% had chronic PTSD; 64% lifetime PTSD. Participants with chronic PTSD were more likely to report perceived permanent change and have experienced mental defeat and feeling of alienation than those without PTSD.</td>
</tr>
<tr>
<td>Engdahl et al., (1991)</td>
<td>WWII POWs invited by letter to participate</td>
<td>62</td>
<td>40 years</td>
<td>Minnesota Multiphasic Personality Inventory (MMPI)</td>
<td>1</td>
<td>50% POWs had PTSD in the first year of repatriation. 29% of POWs had chronic PTSD 40 years later. Patients with PTSD scored higher on MMPI.</td>
</tr>
<tr>
<td>Ford &amp; Kidd</td>
<td>American</td>
<td>74</td>
<td>&gt;10</td>
<td>Structured</td>
<td>2</td>
<td>60% had current PTSD</td>
</tr>
</tbody>
</table>
### 1.4.3. Discussion of results of the systematic review

Results of this systematic review suggest that a minority of people who are exposed to severe trauma in adulthood go on to develop long-term personality pathology (Barrett et al., 1996; Kozaric-Kovacic & Kocijan-Hercigonja, 2001; Marcinko et al., 2006). Although only two studies reported the new instances of enduring personality change (F62.0) and found 2.6% and 6.0% experience this (Kozaric-Kovacic & Kocijan-Hercigonja, 2001; Marcinko et al., 2006), findings from the cross-sectional studies that report that the prevalence of personality...
disorders is twice as high among those exposed to severe trauma (Bollinger et al., 2000; Dunn et al., 2004) add extra weight to the existence of this phenomenon. Results from these studies suggest that Cluster C and Cluster A are the most common with avoidant, paranoid and obsessive-compulsive PD being among those most frequently reported (Bollinger et al., 2000; Dunn et al., 2004).

Personality characteristics reported were multifarious with guilt, distrust, impulsiveness, aggression, avoidance, obsessional behaviour, emotional numbness, loss of interest in usual activities, hopelessness and altered self-perception being most frequently reported (Daud et al., 2008; Ehlers, et al., 2000; Forbes et al., 2003; Foy et al., 1984; Hunt & Gakenyi 2005; Ford, 1999; Jongedijk et al., 1996; Morina & Ford, 2008; Richman & Frueh, 1997; Ford, 1999; Yager et al., 1984). Some studies reported increased levels of somatization symptoms (Daud et al., 2008; Engdahl et al., 1991; Ford et al., 2001; Glenn et al., 2002; Morina & Ford, 2008). Although some of the observed characteristics are similar to the current diagnostic criteria for enduring personality change after traumatic experience, some other symptoms such as impulsiveness, aggression, guilt, obsessional behaviour, mental defeat and somatisation are not currently included. Both personality change in adults and PTSD have been linked to traumatic experience and also have some diagnostic criteria that overlap such as feelings of ‘being on edge’, feelings of detachment or estrangement, irritability and avoidance. Despite the similarities between the two conditions, most studies that involved PTSD and non-PTSD participants reported higher levels of personality pathology in those with PTSD regardless whether cases were torture victims, refugees, war veterans or prisoners of war (Barrett et al., 1996; Daud et al., 2008; Ehlers, et al., Engdahl et al., 1991; Funari et al., 1991; Hunt & Gakenyi 2005; Sherwood et al., 1990; Skodol et al., 1996; Sutker et al., 1993; Taylor et al., 2006). Although relatively few studies examined the effects of different types of
trauma on personality change, it was interesting to note that interpersonal trauma is more likely to be related to long-term personality pathology (Barrett et al., 1996; Daud et al., 2008; Ehlers, et al., 2000; Engdahl et al., 1991; Funari et al., 1991; Hunt & Gakenyi 2005; Kozaric-Kovacic & Kocijan-Hercigonja, 2001; Marcinko et al., 2006; Richman & Frueh, 1996; Richman & Frueh, 1997; Robert et al., 1985; Sherwood et al., 1990; Skodol et al., 1996; Sutker et al., 1993; Taylor et al., 2006) whilst evidence for association between natural disasters and long-term personality changes appears to be less convincing (Maj et al., 1989; Green et al., 1992).

Although this review found a considerable number of relevant studies, a high level of clinical and methodological heterogeneity between the studies was found as the studies differed in sample selection, clinical settings, methodologies, personality assessment measures and research foci including inconsistencies between lifetime and concurrent comorbidity reported by studies. Observational studies included in the review are susceptible to several biases and it is possible that findings from some studies are amplified due to the population studied (treatment-seeking participants), the treatment setting (inpatient vs. outpatient) and the diagnostic tools used (self-report measures vs. semi-structured interviews). The use of eighteen different personality assessment measures rendered comparability and interpretability of the findings related to personality characteristics even more difficult.

**Strengths and limitations**

There are several strengths of this review. It is the first ever systematic review on personality change following trauma in adulthood and involved combining a high quality comprehensive search strategy with clearly defined search terms that uncovered a large number of published studies. However, there are also a number of limitations. Firstly, publication bias may have
influenced our results as non-significant findings may be less likely to be published and are potentially missed as we did not search grey literature. Secondly, language restrictions may have also affected our findings as we only included studies published in English and Croatian due to lack of resources and facilities for translations. Thirdly, the range of populations included in the selected studies, while excellent in terms of geographic and cultural variations, was primarily limited to war veterans (30 studies, 73%) and secondarily to studies of civilian victims of war or political violence (9 studies, 23%) and two studies of disaster survivors (5%) which limits generalisability of our findings. Finally, the quality of the observational studies included in the review may also limit generalisability of the results as they were generally rated low to moderate. Marked heterogeneity of the included studies meant that more sophisticated meta-analysis was not appropriate, thus justifying our narrative approach to synthesising findings.

**Implications for future research and clinical practice**

Although the results of this review suggest that a small proportion of previously healthy adults develop long-term personality changes following exposure to catastrophic trauma, the number of studies investigating this problem was small. Additionally, very few studies investigated pre-morbid personality characteristics and in the absence of this important information it is difficult to conclude that posttraumatic personality changes were truly the result of catastrophic traumatic exposure rather than pre-existing undiagnosed personality disorder. Hence, well-designed, high-quality prospective studies with appropriate controls are required. These studies should assess evidence of childhood behavioural problems to address a fundamental question related to pre-trauma personality pathology. Equally, a better understanding of comorbidity between PTSD and personality disorders/change following trauma should be established to see whether pre-existing PTSD and/or type of traumatic
experience are necessary risk factors. While studies have not examined personality change following exposure to natural disasters, low levels of personality disorders among people who experience trauma that is not ‘man-made’ raise the possibility that personality change is the consequence of interpersonal trauma rather than exposure to life-threatening circumstances. Further research is also needed to examine other potential risk and preventative factors following the exposure to catastrophic stress. In recent years services for people with personality disorder have become better established and more widely available in a number of countries (Crawford et al., 2008; Lieb, Zanarini, Schmahl, Linehan & Bohus, 2004). While such services have generally been directed towards those with borderline and other specific personality disorders, the results of this review highlight the need for treatment for people who have significant personality-related problems that develop after childhood and adolescence. This review attempted to examine extant literature on the development of personality pathology in adults following exposure to catastrophic trauma in order to increase our understanding of this phenomenon. The results clearly highlight a great need for high-quality research to inform the best practice.

1.5. Summary

The main focus of my thesis is to investigate an association between exposure to catastrophic trauma in adults and the subsequent development of personality pathology.

As described in previous chapters (1.1. and 1.2.) traumatic experience has been linked with the development of personality disorder and post-traumatic stress syndrome. In terms of personality disorders, extant research evidence suggests that the aetiology of personality disorders is both complex and multifactorial, bringing together hereditary influence (20-40%) and heterogeneous adverse environmental factors (abuse and neglect) affecting personality
formation in young individuals. Similarly, research evidence suggests that the aetiology of PTSD is complex and is based on a gene-environment interplay arising from an individual’s premorbid vulnerability (30%), and potentiated by specific neurochemical systems that mediate stress responses that may result in the development of PTSD pathology under influence of traumatic environmental factors. However, the precise aetiological role of each of them remains unclear in both personality disorders and PTSD.

In terms of the onset of PD, the two current diagnostic classification systems specify that deeply engrained behavioural patterns have to appear in childhood or adolescence and continue into adult life (WHO, 1992; APA, 2013). In contrast, there is no time/age restriction for development of PTSD. However, there must be evidence of the affected individual experiencing a significant trauma (short- or long-lasting) of exceptionally threatening nature that one would expect to cause distress in almost every healthy individual (WHO, 1992; APA, 2013).

Over the years there has been a controversy surrounding the nature of the relationship between BPD and post-traumatic stress disorder (PTSD). Some authors argue it would be less stigmatising for patients who experienced childhood trauma to be diagnosed with PTSD rather than BPD (Lewis et al., 2009). This issue is further complicated by the DSM-IV current diagnostic criteria for PTSD not capturing symptoms that are characteristics of BPD such as unstable relationships and self-mutilating behaviour. Supporters of this view argue that introduction of complex PTSD, which is not currently formally diagnosed as a distinct disorder would be a more appropriate solution (Lewis et al., 2009).
In chapters 1.3 and 1.4, I described some of the dilemmas related to personality related problems that arise in adulthood. For many years experts in the trauma field argued that PTSD does not capture some of the enduring psychological problems experienced by adults following the exposure to major trauma (Herman, 1992; Van der Kolk et al., 1996). In 1992, a new diagnostic category of Enduring Personality Change after Catastrophic Experience (EPCACE, F62.0) was included in ICD-10 (World Health Organization, 1992). However, less than 16% of experts reported using this diagnostic category in their clinical practice due to the diagnostic criteria being rather non-specific and not fully capturing the symptomatology that patients exposed to severe trauma present with (Beltran & Silove, 1999). In terms of research evidence for Enduring Personality Change after Catastrophic Experience (EPCACE, F62.0), results of a systematic review (Munjiza et al., 2014) suggest that a minority of people who are exposed to severe trauma in adulthood go on to develop long-term personality pathology (weighted prevalence 4.6%, 95% CI 3.4% to 6.3%). The observed personality disturbance is multifarious and more extensive than the prototype described in ICD 10. However, only two studies reported the new instances of enduring personality change. Additionally, a high level of clinical and methodological heterogeneity in the assessment of post-trauma personality pathology as well as the fact that a very few studies investigated premorbid personality pathology are considerable limitations affecting generalisability of the above findings.

The aim of this thesis was to investigate whether traumatic war experience can lead to long-term personality pathology in adults. Furthermore, the study aims to investigate personality pathology in subjects who developed adult-onset personality problems and compare these with the ICD-10 diagnostic criteria for the EPCACE. It will also attempt to explore any
potential risk factors that might make some people more vulnerable to developing lasting personality pathology following catastrophic traumatic experience.

The results of this study together with its strengths and limitations will be presented and important findings discussed with emphasis on implications for research, diagnostic classification and clinical practice.
2. STUDY AIMS

The aim of this study was to investigate whether traumatic war experience can lead to long-term personality pathology in adults. Furthermore, the study aimed to investigate personality pathology in subjects who developed adult-onset personality problems and compare these with the ICD-10 diagnostic criteria for the EPCACE. This was a case-control study in which cases were selected on the basis of their having a clinical diagnosis of personality disorder or personality change, whilst controls had no such diagnosis.

2.1. Primary Hypothesis

People who have clinically significant personality difficulties according to the International Personality Disorder Examination (IPDE) screening questionnaire (cases) will be more likely to have been exposed to war-related trauma (primary exposure) than those who do not have significant personality difficulties (controls).

2.2. Secondary Hypotheses

1. People who have clinically significant personality disorder (IPDE positive) will have poorer mental health and social functioning than those who are not IPDE positive.

2. Among cases (IPDE positive), those who have a history of exposure to catastrophic trauma but no evidence of PD are more likely to score higher on EPCACE (enduring personality change after catastrophic experience) variables (based on ICD-10 criteria) than those with PD.
3. People who have personality pathology following catastrophic trauma (EPCACE group) will experience more PTSD symptoms than those with PD only.

4. Levels of social dysfunction among people who developed personality pathology following catastrophic trauma (EPCACE group) are as great as they are among people with PD.

5. Levels of childhood trauma and behavioural problems during adolescence will be no higher among EPCACE group than they are among controls.
3. METHODS

3.1. Study design

3.1.1. Case-control study

A case-control study is an observational retrospective study which compares the characteristics of a group of participants with a particular disease outcome (cases) to the group without a disease outcome (controls) to investigate whether any past exposures occurred more or less frequently in cases than controls (Altman, 1991). This kind of research design can be useful for studying exposures that cannot be controlled by the investigators (war exposure, natural disaster) and rare outcomes (cancer), but does not provide information about the prevalence or incidence of the condition.

There are many advantages of the case-control studies compared to other study designs. Some of them being of practical nature (lower cost, no loss to follow-up, less time consuming) which are described in more detail in the next section (3.1.2). However, the main limitations relate to possible biases such as recall bias and in the selection of controls, which potentially limit the internal validity of this study design and place the case-control studies on a lower position on the hierarchy of the quality of research evidence (Howick et al., 2011).

Despite these limitations, I chose this design as it seemed most appropriate research design among observational studies to test my main hypotheses. Based on the existing research evidence, I assumed that the development of lasting personality pathology in adults following catastrophic trauma would be a relatively rare condition and conducting a cohort study would involve a very large number of participants in order to obtain a sufficient number of cases. Additionally, the war in Croatia happened 15 years ago and conducting a prospective study at
this stage would have not answered the aims of this study as personality pathology would have already developed at this stage. Even had it been possible to conduct a prospective study after study subjects had been exposed to war-related trauma, a minimum follow up period of several years would have been required with all the attendant cost and potential for loss to follow-up that this would entail. When compared to a cross-sectional study where both exposure and outcome are assessed at a specific time point, and thus temporal sequence can be difficult to ascertain, a case-control design would be preferable as information from the past might be more relevant aetiologically than information obtained from a ‘snapshot’ (cross-sectional) sample (Grimes & Schulz, 2002). This is particularly true in situations of infrequent exposures where temporal sequence might be a crucial factor in ascertaining a relationship between outcome and exposure.

3.1.2. Strengths and weaknesses of case-control studies
There are several advantages to case-control studies. The major strength of the case-control design compared to other types of epidemiological studies is related to its informative nature as it involves a large number of participants with a condition of interest, thus allowing investigations of a wide range of contributing factors; there is no loss to follow up, no waiting time to see who falls ill and who does not (Breslow et al., 1980). This design is more appropriate for studying rare outcomes where it can be highly valuable as there is no need to have a large number of participants to get a sufficient number of cases. Another important aspect of case control studies relates to their efficiency as they can be executed relatively quickly and are less costly than some other observational studies. However, the main limitations of case-control studies relate to biases which can influence study findings. Bias undermines the ability of the study to measure what they set out to. In another words, it undermines the internal validity of research (Grimes & Schulz, 2002).
In 1979 Sackett listed 35 different biases that can arise in sampling and measurement procedures employed in observational studies of which those most commonly found in case-control design will be discussed here.

Selection of cases

The selection of cases is based on them having the condition being investigated. It is important to define the source of population from which the cases are selected to reduce any potential biases related to the selection process itself. For example, it is important to know whether cases were recruited from one or more clinics, hospital or community settings or the general population. Cases should be selected to ensure that all those with the condition being studied have an equal chance of taking part in the study. It is important to have a clear understanding of the characteristics of the sample in relation to the source population to help ensure that appropriate controls are selected.

Selection of controls

Selection of appropriate controls presents one of the main challenges when planning case-control study. Controls should be as similar as possible to the cases with the exception of their not having the condition (primary outcome) that is being investigated. They should be representative of the population at risk of the outcome and be selected independently of the exposure of interest (Grimes & Schulz, 2005). However, finding appropriate controls can be a difficult task. Generally, it is thought that controls should come from a healthy sample of the general population. This could be problematic if all cases come from secondary care settings (inpatient and outpatient) for example, as they might be different to healthy controls in other ways rather than just in having or not having the condition of interest. Therefore, when cases are selected from those in contact with healthcare services it is recommended that controls
should also be selected from those in contact with healthcare services (Grimes & Schulz, 2005). Some authors suggest that the use of two control groups would be more appropriate to reduce the possibility of making Type I error (Sackett, 1979). The rationale for this is that when cases are compared to both comparison groups independently, similar findings should be achieved with both control groups. In other words, significant results obtained with only one control group would raise doubts of true difference between cases and controls. However, having two control groups may increase both the cost and time needed to conduct the study by 50% and may not be always feasible (Breslow & Day, 1980). Considering the length of time that each participant in general medical settings would have to allocate for participation in this study (approximately two hours) and considerable time restrictions associated with the recruitment of participants abroad, having two control groups was not feasible in this study.

**Recall bias**

Recall bias, a form of information bias, presents an important threat to the validity of findings from case-control studies. The reason for this is that, at the time when information about exposure status is obtained, study participants are already aware whether they have the health-related problem being examined. This can have a major impact on the obtained results. This is because cases and controls may differ in the amount and accuracy of information they remember about their exposure to risk factors that may be related to the onset of their health problems. More specifically, recall bias can result in over-reporting of exposures in cases and under-reporting in controls which can produce spurious results. An example would be the alleged association between induced abortion and risk of breast cancer initially reported by some case-control studies, which was subsequently found to be untrue (Bartholomew & Grimes, 1998). Recall bias can be minimised if exposure status between cases and controls was assessed in a sufficiently similar way, for example, by using a structured clinical
interview or standardised self-report measures in cases and controls to ensure that the exposure of interest is equally assessed in both groups (Sackett, 1979). For example, when conducting a structured clinical interview, the researcher should aim to be as consistent as possible when asking questions in both groups, avoiding using additional prompts in some participants but not in others. Similarly, when using a standardised self-report measure, and if asked for clarifications of some questions, the researcher should explain the question without additional prompts that would enhance recall of specific past events in some participants, but not in others thus resulting in a different recall rate and overreporting in one group and underreporting in the other group.

Observer bias

Observer bias is another type of the information bias where the researcher’s awareness of participants’ case or control status influences assessment of the measured outcomes and exposure of interest. Ideally, the investigator should be ‘masked’ to the condition status of participants (Lee et al., 2007).

Diagnostic suspicion bias

Diagnostic suspicion bias in case-control studies can affect the selection of cases if there is a putative causal factor that has been widely publicised (Sackett, 1979). This can influence clinicians who might be approaching patients they perceive to be more suitable for the study, thus introducing a bias.

Confounding

Confounding is another important factor that can undermine the internal validity of a study. Confounding happens when a researcher makes a spurious claim about an association
between the exposure and the outcome of interest when in fact the relationship is the result of a third factor (called a ‘confounder’). Although some sort of confounding is unavoidable in observational studies, this can be controlled for, providing that the researcher is aware of the potential confounders. One way of reducing confounding is to use matching to make cases and controls more comparable. Matching is a method used in recruitment of participants when random sampling is not possible and distribution of potential confounders is different between cases and controls (Wacholder et al., 1992a). The matching can be done on a ‘one to one’ basis so that each case has a matching control on variables such as age, gender, education or employment status. Matching should only be done on variables that could potentially influence both the exposure and the outcome investigated (Altman, 1999). Matching also has several disadvantages as it is less cost-effective, more time consuming and also can result in the exclusion of cases when a matching control cannot be found. All three of them could considerably reduce a study’s efficiency. Another potentially negative effect is ‘overmatching’, a term used when matching on an intermediate variable restricts the comparisons between exposure and outcome of interest (Wacholder et al., 1992a).

Another way of controlling for confounding which can cause a potential overestimate or underestimate of the true association between exposure and disease is through multivariate statistical analysis (Hennekens & Buring, 1987). In this study, associations with a binary disease outcome (positive or negative for personality pathology) will be expressed as odds ratios and analysed using logistic regression and controlled for the effects of certain variables such as demographic characteristics.
3.1.3. Inclusion and Exclusion Criteria - Cases

**Inclusion Criteria:**
To take part in the study potential participants had to have clinically significant personality pathology (this included a diagnosis of personality disorder (F60.0-F60.9) and a diagnosis of personality change after traumatic experience (F62.0). In addition, people were eligible to participate in the study if clinicians suspected they had personality related problems but had not been formally diagnosed yet (i.e. patients who had a brief overnight admission following deliberate self-harm). Each case had to meet criteria for PD when assessed by the IPDE questionnaire. Patients who were attending psychiatric outpatient clinics or patients being hospitalised on psychiatric wards were included. They had to reside in Croatia during the civil war between 1990 and 1995 as war-trauma was the main exposure of interest in this study. Only participants who provided written informed consent were included in the study. Participants aged 20 and above were eligible to take part in the study (cut-off point of ‘20 years of age’ was set as participants had to be at least 5 year old in 1995 to memorise war related trauma).

**Exclusion Criteria:**
Patients who refused to sign informed consent or were younger than 20 years were excluded. Patients suffering from an acute psychotic episode, chronic psychotic illness or who received a diagnosis of F62.1 (Enduring personality change after psychiatric illness) or had personality change due to organic brain damage, disease and dysfunction (F07) were not eligible to participate in the study. Participants who did not live in Croatia between 1991-95 (during the time of civil war) were also excluded.
3.1.4. Inclusion and Exclusion Criteria – Controls

The same exclusion and inclusion criteria were applied to potential controls with the exception that participants in the control group should not meet criteria for PD on the IPDE questionnaire (scoring positive on one or more PD subcategories). Recruited participants were aged 20 or over, were living in Croatia between 1990 and 1995, attending general medical outpatient clinics or were hospitalised on similar medical wards (endocrinology, rheumatology, cardiology, dermatology). Only participants who provided written informed consent were included in the study.

3.1.5. Control of confounders

Although I aimed to have approximately equal numbers of male and female participants of similar ages across both groups, I did not use matching to recruit participants in my study. This is mainly due to the disadvantages associated with this recruitment method. It is less cost-effective, more time consuming and also can result in the exclusion of cases when a matching control cannot be found. As data collection in this study was done abroad, matching would have considerably reduced the study’s efficiency and most likely would have led to the exclusion of some male cases and prolonged recruitment of controls to achieve matching on gender. Matching itself can introduce a bias and be counterproductive, referred to as ‘overmatching’, which could restrict the comparisons between exposure and outcome of interest (Wacholder et al., 1992b). Instead, to avoid undesirable effects of the potential confounders in this study, multivariate statistical analysis will be used. Associations with the disease outcome (binary variable defined as positive or negative for personality pathology) will be expressed as odds ratios and analysed using logistic regression and controlled for the effects of certain variables such as demographic characteristics.
3.2. Setting of the study

3.2.1. Rationale for deciding the study setting

Croatia is a state located in the southeast part of Europe (also known as the Western Balkans). During recent years, the country has achieved a degree of stability and, as such, joined European Union in 2013 (Fig 2). One of the reasons why Croatia was chosen as the study setting was that I had the benefit of speaking the native language. In addition, I have spoken to colleagues locally who felt that even fifteen years after the war the local mental health services were still overwhelmed with patients whose mental health has been affected by the civil war (1991-95) following the disintegration of the former Yugoslavia. In four years of warfare in different parts of former Yugoslavia (1991-1995), it has been estimated that several hundred thousand people were killed and over three millions were displaced from their homes which resulted in the largest number of refugees in Europe since World War II (Young, 2001; Wilkinson, 2005).

Recruiting participants from a war affected region, rather than selecting a sample from the refugee population in the UK, allowed me to recruit a larger number of participants who were exposed to war trauma which was the main exposure of interest in this study. Recruiting cases and controls from the same war-affected region helped to avoid biases and confounding factors that could have been introduced had I conducted this study in a refugee population in the UK. These could have been related to post-immigration stressors, adjustment to a new society, struggles related to cultural differences and language barriers.
3.2.2. Historical background

The history of the Western Balkans region had been a turbulent one. This is the region where the great empires of the continental Europe used to meet (Peroche, 2008). The principal powers were the Austro-Hungarian Empire and the Ottoman Empire. In the background was the Russian Empire. These three empires represent the key political influences, but also the key cultural and religious influences: the Austrian Empire promoted the Roman Catholic faith and associated ideological influences; in a similar way the Russian empire encouraged the Orthodox Christianity; whilst the Ottoman Empire, on the other hand, backed the spread of Islam (Fig 3).
The roots of these religious and cultural divisions can be traced back to the arrival of Slavic tribes into what had been territory occupied by the Roman Empire, mostly inhabited by Greek people. During the time of the Roman Empire, parts of the Balkans (especially area inhabited by Greeks) were advanced centres of culture and civilization with organised cities, economy, theatres and literature. The arrival of the Slavs first resulted in economic collapse: the Greek cities were destroyed, literacy abolished, the economy collapsed (Peroche, 2008).

Nevertheless, Orthodox Greek missionaries managed to create an alphabet for the Slavs (Cyrillic alphabet) and also to bring cultural influence through the spread of Christianity. However, this did not pacify the warring Slavic tribes and very soon, the “Balkanisation” of the region started; first with a tectonic split into Orthodox and Catholic tribes. It is worth
mentioning that the introduction of Christianity was not accompanied with the building of social and cultural institutions - due to illiteracy, Christianity was introduced (one could say installed) among the tribes on ideological grounds in a sense that people would “declare” themselves to belong to one group or the other. It has been argued that most of the tribes did not convert to Christianity in a biblical sense but opportunistically adopted it as tribal identity that would give them some socio-economic advantage (Peroche, 2008). With the demise of the Byzantine Empire, the Western Balkans were pressurised to adopt Catholic religious faith. As a result, the society remained backward with illiteracy rates approaching almost 100% (Peroche, 2008).

With the arrival of Islam in 14th century, the fragmentation of the region was accelerated to the extent that some Slavic tribes declared themselves Muslims as soon as the Turks arrived. In combination with mountainous terrain without any roads and covered in deep snow for most of the winter, this created a leopard skin like distribution of warring communities speaking the same language and being geographically close to each other, yet living in complete isolation from each other.

In this situation, the three empires acted as a stabilising force and mostly managed to keep the region in relative peace, with a more or less stable border lasting centuries, Fig 3.

This peace was disturbed in the second half of the 19th century with the rise of nationalism and pan Slavism soon resulting in the idea of Yugoslavia. The concept of Yugoslavia was to parallel the similar movements for unification of Italy and Germany. The movement was led by Serbia and supported by both Western powers and Russia. The result were the Balkan Wars, which were mostly aimed at destroying the Ottoman Empire. Soon after, the First
World War started with the assassination of Archduke Franz Ferdinand of Austria in Sarajevo. The war dragged in Western powers and Russia and resulted in the collapse of both the Austrian Empire and what was left of the Ottoman Empire (Glenny, 2000).

In the aftermath of the First World War, most of the so called south Slavic ethnic groups voluntarily united into one state first called the State of Serbs, Croats and Slovenians. Both Croats and Slovenians played a key role in creating the new state and were very enthusiastic about it. The name was later changed to Yugoslavia. Yugoslavia was a parliamentary monarchy modeled on Western style democracy, with a perpetual monarch from the royal family of Serbia.

The enthusiasm for the new state was so great that in all parts of Yugoslavia the Serbian army was greeted as liberating force generally received with joy. However, only a few years later Croatsians wanted to leave this union. This resulted in the creation of the Croatian fascist movement supported by both Mussolini and Hitler. At the same time there was a significant communist movement supported by Russia. This resulted in political fragmentation of the country along ethnic lines, thus seriously impeding the functioning of democracy. Yugoslavia was close to being ungovernable by the time of Hitler’s invasion in 1941. Following German invasion, Yugoslavia rapidly disintegrated into a patchwork of warring regions with a myriad of local militia fighting each other. Especially notorious were atrocities committed against Jews, Gypsies, Orthodox, liberals and communists (Glenny, 2000).

In order to protect themselves, peasants joined Tito’s Partisans in large numbers. Consequently, Partisans emerged as a liberating force. Tito proceeded with introducing a
Yugoslavia-specific type of socialism based on atheism and “brotherhood” between different ethnic groups.

The new regime managed to transform the region from peasant land with 95% illiteracy to a relatively highly skilled and well-educated workforce. As such, the country very soon became the envy of Eastern Europe and was by far the most free of all the socialist countries of the time. It also gained international prominence as one of the founding members of the nonaligned movement.

![Map of Yugoslavia during the civil war](image)

**Figure 4. A map depicting geographical areas of warring factions during the Yugoslav civil war (1991-1995)**

With Tito dead, the communist party split along the ethnic lines. As a result, the economy collapsed and centuries old tectonic faults started appearing again; this included the religious awakening of people who paradoxically were atheists. What followed was the bloodiest war in Europe for the last 70 years and one could argue one of the bloodiest modern day civil wars
with its concentration camps, ethnic cleansing and forceful expulsions of ethnic minorities by
the newly created states (Silber & Little, 1996).

3.2.3. General demographic information

Croatia has a population of 4.3 million. The Croatian economy is based mostly on service
industries, with a very limited industrial sector and declining agriculture.

This study was conducted in Split, which is the main regional centre in southern Croatia (also
called Dalmatia). Participants were recruited at the University Hospital in Split (Klinicki
Bolnicki Centar Split), which provides secondary health care (outpatient and inpatient
services) to a population of over one million people, which is just under a quarter of the
entire population of Croatia (Fig. 4).

‘Klinicki Bolnicki Centar Split’ comprises both inpatient and outpatient units (policlinics)
which are based at two different locations that are ten minutes walking distance from each
other (Krizine and Firule). Participants recruited for this study were either attending
outpatient clinics or were hospitalised at one of the two hospital units (Krizine and Firule).
Cases were recruited from psychiatric outpatient and inpatient services. Controls were
recruited from patients attending outpatient clinics (internal medicine) and inpatient wards
(cardiology, dermatology, endocrinology, haematology) at the same clinical settings in Split
(the University Hospital Split). A variety of general medical inpatients and outpatients were
used to obtain a range of clinical diagnoses with the aim of diluting the potential for bias that
having all controls with only one or two general medical diagnoses might have introduced.
3.3. Assessment of exposure and outcomes

3.3.1. Demographics
I collected data on demographic factors: age, sex, ethnicity, marital status, educational attainment, employment status and whether recruited participants were inpatients or outpatients using a proforma specifically developed for the study.

3.3.2. Primary outcome
The primary outcome measure was the presence of personality disorder assessed with the 77-item International Personality Disorder Examination (IPDE) screening questionnaire. The IPDE was derived from the original version of Personality Disorder Examination (PDE) developed by Loranger et al. (1985) which was a highly structured interview that required considerable training in its use. Since then this inventory has undergone considerable adaptations and was modified further for international use and compatibility with ICD-10 (Loranger et al., 1994). The current version has proven to be a user-friendly and clinically meaningful tool for clinicians throughout the international psychiatric community. It has demonstrated inter-rater reliability (0.71-0.91) and intertemporal reliability (0.55-0.84) that is roughly similar to instruments used to diagnose psychoses, mood, anxiety, and substance use disorders (Loranger et al., 1994).

Current IPDE versions frequently used in research include the semi-structured interview (a DSM-IV module containing 99 sets of questions and an ICD-10 module with 67 sets of questions) and the IPDE screening inventory (IPDE-77 for DSM-IV and IPDE-59 for the ICD-10 version). The IPDE screening versions were initially used to reduce the interview time by identifying personality domains unlikely to be present before conducting semi-structured interviews (Loranger, 1999).
The IPDE-77 Screening Questionnaire used in this study is a self-reported tool containing 77 items that measure personality disorders according to the DSM-IV. The questionnaire requires dichotomous ‘true/false’ responses. It is written at a 9-years of age reading level and can be completed in 15 minutes.

The IPDE-77 (DSM-IV version) includes ten personality disorders classified in three clusters A (Paranoid, Schizoid, Schizotypal), cluster B (Antisocial, Borderline, Histrionic and Narcissistic) and cluster C (Avoidant, Dependent, Obsessive Compulsive). The 77 questions are not presented in a list form of consecutive items for each PD subtype. Instead, they are interspersed between different PD subcategories with some items reversed. In this way participants who are guessing and choosing desirable answers or just ticking ‘yes’ or ‘no’ without fully reading the statements can be detected and such behaviour would result in their responses being invalidated. The participants are asked to choose either ‘True’ or ‘False’ answer for each item. If fewer than three items related to a particular personality disorder are circled, the participant is ‘negative’ for that disorder. If four or more items are circled for a single disorder, the participant will be considered as ‘definite or positive’ for that personality disorder subgroup, whilst a score of three items is viewed as ‘probable’. In this study, I have used a more conservative approach so a score of three and below meant ‘negative’ for a PD category and a score of four and above meant ‘positive’ for that personality subgroup.

One of the frequently raised limitations of screening questionnaires is that they have a potential for overreporting bias of personality dysfunction (Zimmerman, 1994; Loranger, 1999). Loranger et al. (1997) also emphasized that IPDE screening instruments and semi-structured interviews should not be used interchangeably and particularly that IPDE screening measures should not be employed to make a psychiatric diagnosis. However, some
researchers have reported that the brevity, accuracy and consistency of screening scales makes them attractive tools for assessing the mental health of general populations and they have been used on a number of occasions to estimate the prevalence of personality disorders (Coid et al., 2006; Huang et al., 2009; Fok et al., 2014; Jackson & Burgess, 2000; Mollica et al., 2004). Being standardized and adapted culturally and linguistically, they often have better psychometric properties than lengthy and complex clinical interviews (Mollica et al., 2004). For example, the WHO World Mental health survey (Huang et al., 2009), found the IPDE screening measure useful in estimating personality disorder prevalence rates across 13 different countries which were quite consistent being between 6.1% and 7.9%. The Australian National Survey of Mental Health and Wellbeing which also used IPDE questionnaire (ICD-10 version, 59 items) and found similar prevalence of 6.5% in the adult population. The National Comorbidity Survey Replication for DSM IV PD (Lezenweger et al., 2007) reported prevalence estimates based on the IPDE screening which were only slightly lower than the direct estimates obtained in the clinical reappraisal sample (9.1% and 11.9% respectively). Furthermore, the IPDE screening measure has a very high specificity (>90%) and people scoring negative are unlikely to have personality disorder (Loranger, 1999). As described above, over the past 10-15 years the IPDE screening measure has been widely used in many international studies for estimating personality disorder prevalence, and reportedly provided consistent and reliable results (Loranger et al., 1994; Jackson & Burgess, 2000; Lenzenweger et al., 2007; Huang et al., 2009).

While the IPDE screen has been used to assess personality disorder in a number of international studies, its psychometric properties have not been fully examined. However, several studies reported on its reliability (internal consistency) in clinical and non-clincal populations (Loranger et al., 1991; Lenzenweger et al., 1997; Lenzenweger et al., 2007). One
study reported satisfactory reliability in a sample of psychiatric patients which yielded the following $\alpha$ values: 0.88 for cluster A, 0.93 for cluster B and 0.88 for cluster C (Loranger et al., 1991). Lenzenweger et al. (1997) subsequently reported reliability for the IPDE screen in non-clinical population and found the values for $\alpha$ coefficient as follows: 0.84 for cluster A, 0.91 for cluster B and 0.84 for cluster C. The screen had high sensitivity and detected all individuals who subsequently received a definite diagnosis on the clinical interview, whilst specificity was 61%. Similar findings were reported in another study which found the IPDE screen to be a significant predictor of clinical diagnoses (Lenzenweger et al., 2007).

I have chosen the IPDE-77 screening measure as a tool for the assessment of personality pathology because it has been widely used and extensively tested in many international studies (Loranger et al., 1994; Lenzenweger et al., 2007; Huang et al., 2009; Jackson & Burgess, 2000). Also, in my study most of the cases recruited already had a clinical diagnosis of personality disorder (F60.0 – F60.9) or personality change (F62.0), so the instrument was not used as a diagnostic tool. The above reported specificity and sensitivity were considered to be satisfactory for the purpose of this study and high specificity meant that people recruited in general medical settings who scored negative on IPDE were unlikely to have personality pathology.

The IPDE was available in the English language only. The WHO recommendations for translating instruments were used as a guide whilst translating the IPDE into Croatian language (WHO, 2010). A modified approach was used which included forward translation, discussion with a bilingual expert and pre-testing the instrument on a small sample of the target population. According to the WHO guide, the translator doing forward translation should be someone who is fluent in English and knowledgeable of the English speaking
culture but his/her mother tongue is the primary language of the target population i.e. Croatian language. The aim of the forward translation is to produce the conceptual equivalent of words and phrases using simple, clear language that would be easily understood by the target audience. I conducted forward translation of the IPDE as Croatian language is my primary language and am also fluent in English. The translated IPDE version was subsequently reviewed by a local expert (DB, a psychiatrist who is an expert in mental health, had prior experience in instrument translations and is fluent in English) who checked it for accuracy and clarity as well as any discrepancies between the forward translation and the original version. The only disagreement was related to the IPDE question number 44 ‘I have a reputation for being a flirt’ where the Croatian psychiatrist recommended translating the word ‘flirt’ into ‘flert’ which she believed would be easily understood by Croatian people regardless of their educational attainment. This change was agreed and a complete translated version of the IPDE was produced and tested on a small sample of Croatian nationals before the translated version was used on patients. The individuals involved in pre-testing were deemed to be representative of those who would be administered the questionnaire and included Croatian females and males (18 years of age and older) of varied educational background (university students, vocational education and a person who had no qualifications/completed eight years of primary school education). They were asked to complete a copy of the translated version of the IPDE and whether there were any words or any expressions they found confusing or unacceptable. I also checked the length of time it would take to complete the instrument. No concerns were raised about the clarity of any of the 77 IPDE statements and it took between 10-20 minutes to complete the whole questionnaire.
Findings from the IPDE screening tool will be presented as a dichotomized variable with those scoring 4 and above being classified as IPDE positive (cases) and those scoring 3 and below as IPDE negative (controls).

### 3.3.3. Secondary outcomes

**Assessing PTSD**

Traumatic war-related experience and symptoms of post-traumatic stress were assessed by using the Harvard Trauma Questionnaire (HTQ), a self-report measure (Mollica et al., 1992). Initially developed more than 25 years ago, this instrument has been modified, widely translated and used in traumatized refugees and civilian population throughout the world. This screening tool was first developed for clinical settings in western countries to help clinicians in assessing the mental health of refugees and traumatized civilian populations in primary care settings and mental health services (Mollica et al., 1992). However, over the past 15-20 years the HTQ has been widely used in epidemiological research in countries directly affected by civil war or civil arrest such as Cambodia, Thailand and former Yugoslavia (Mollica et al., 1998; Mollica et al., 1999; Mollica et al., 2001, Silove et al., 2007). It has also been frequently used in research on war veterans and victims of torture (Shea et al., 1999; Daud et al., 2008).

Studies examining HTQ’s psychometric properties in Southeast Asian refugees, reported excellent reliability and internal consistency (Hollifield et al., 2002). However, test-retest reliability for individual items ranged from poor to excellent meaning that some items were more likely to be answered consistently than others when tested on two separate occasions (Hollifield, 2002). Silove et al., (2007) compared the psychometric properties of the HTQ’s and the Hopkins Symptom Checklist (self-reported measure assessing anxiety and
depression) with the Structured Clinical Interview for DSM-IV (SCID) among ethnic Cambodians in Thailand, a community spared of prolonged massive violence (unlike their counterparts in Cambodia proper). The main finding was that both screening measures showed greater agreement with the SCID in finding non-cases (negative prediction) than cases (positive prediction), suggesting that the HTQ tended to overestimate the number of cases compared to the clinicians. However, when the cut-off point on the HTQ score was raised to 2.5 (instead of 2.0), the same number of cases was identified with HTQ and the SCID. The authors suggested that clinicians might be more accurate in identifying cases than non-cases in highly symptomatic population, whilst the opposite may be the case in a low prevalence community population (Silove et al., 2007).

Although there is an ongoing debate whether the use of semi-structured interviews is more appropriate than self-reported questionnaires, Mollica et al. (2004) report that there are a number of advantages in using a screening instrument over clinical interview. The primary advantages are that these instruments are simple, brief and less expensive to administer. Being standardized and adapted culturally and linguistically, they often have better psychometric properties than lengthy and complex clinical interviews (Mollica et al., 2004). However, these screening instruments have been frequently criticized as they did not readily provide a psychiatric diagnosis. The authors therefore used specific algorithms based on DSM-IV and developed a cut-off value for ‘checklist positive cases’. All of the participants who were above the cut-off point specifically estimated for a certain community were classified as symptomatic for a particular clinical diagnosis (Mollica et al., 2004). Silove et al. (2007) reported a cut-off score of 2.5 being more consistent with the SCID clinical assessment then 2.0 in a Cambodian sample. The observed variation in threshold scores raise the possibility that population characteristics might influence the performance of the HTQ, which further
emphasizes the importance of cultural adaptations of screening tools. Nevertheless, screening instruments seem to be valuable tools in assessing the distribution and range of symptoms in both the general population and a clinical setting. They are also considered to be useful in exploring the relationship between the elicited symptoms and relevant risk and protective factors. Additionally, continuous scores obtainable from screening instruments would be more robust than categorical assignment when investigating the association between risk factors and outcomes (Mollica et al., 2004).

I selected the HTQ for the trauma and PTSD outcome assessment because it had been translated in Croatian language, culturally adapted and extensively used, tested and validated in the communities of former Yugoslavia, particularly Croatia and Bosnia (Mollica et al., 1999; Mollica et al., 2001).

The Harvard Trauma Questionnaire consists of four distinctive parts. Part I includes 47 questions related to specific traumatic events. Part II gives participants an option to describe traumatic events in their own words. Part III is a brief 6-item tool assessing the presence of head injury. Part IV is a 40-item screening measure assessing symptoms of PTSD and self-perception of functioning. Parts I, II and III were not primarily designed to derive numerical scores, but rather to examine the underlying factorial structure of traumatic dimensions and have been found useful in research studies (Mollica et al., 1999).

Part IV of the Harvard Trauma Questionnaire includes 40 questions of which the first 16 items were derived from the Diagnostic and Statistical Manual of Mental Disorders, Third Edition revised (DSM-III-R) and later DSM, Fourth Edition (DSM-IV) criteria for PTSD based on three sub-domains: re-experiencing traumatic events, avoidance and numbing, and
increased arousal. Box 3 provides information on the categories of questions included in the HTQ (Mollica et al., 1999).

**Box 3: Harvard Trauma Questionnaire Category (original version)**

<table>
<thead>
<tr>
<th>4 re-experiencing items</th>
<th>7 avoidance items</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Recurrent thoughts/memories</td>
<td>4. Withdrawn from people</td>
</tr>
<tr>
<td>2. Feeling event happening again</td>
<td>5. Can’t feel emotions</td>
</tr>
<tr>
<td>3. Recurrent nightmares</td>
<td>11. Avoid activities</td>
</tr>
<tr>
<td>16. Sudden emotional physical reaction</td>
<td>12. Can’t remember parts of events</td>
</tr>
<tr>
<td>13. Less interest in daily routine</td>
<td></td>
</tr>
<tr>
<td>14. Don’t have a future</td>
<td></td>
</tr>
<tr>
<td>15. Avoid hurtful thoughts</td>
<td></td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>5 arousal items</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. Jumpy/easily startled</td>
</tr>
<tr>
<td>7. Hard to concentrate</td>
</tr>
<tr>
<td>8. Trouble sleeping</td>
</tr>
<tr>
<td>9. Feeling on guard</td>
</tr>
<tr>
<td>10. Outbursts of anger</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>24 “refugee” items on self-perception of functioning</th>
<th>2 of these include dissociation items</th>
</tr>
</thead>
<tbody>
<tr>
<td>17. Less skills than before</td>
<td>29. Can’t remember what you did</td>
</tr>
<tr>
<td>18. Difficulty dealing with new situations</td>
<td>30. Split into two people</td>
</tr>
<tr>
<td>19. Feeling exhausted</td>
<td></td>
</tr>
<tr>
<td>20. Bodily pain</td>
<td></td>
</tr>
<tr>
<td>21. Troubled with physical problems</td>
<td></td>
</tr>
<tr>
<td>22. Poor memory</td>
<td></td>
</tr>
<tr>
<td>23. Difficulty paying attention</td>
<td></td>
</tr>
<tr>
<td>24. Difficulty dealing with daily tasks</td>
<td></td>
</tr>
<tr>
<td>25. Blaming yourself</td>
<td></td>
</tr>
<tr>
<td>26. Feeling guilty for having survived</td>
<td></td>
</tr>
<tr>
<td>27. Hopelessness</td>
<td></td>
</tr>
<tr>
<td>28. Ashamed of terrible events</td>
<td></td>
</tr>
<tr>
<td>29. No one understands what happened to me</td>
<td></td>
</tr>
<tr>
<td>30. Feel others are hostile</td>
<td></td>
</tr>
<tr>
<td>31. No one to rely on</td>
<td></td>
</tr>
<tr>
<td>32. Betrayed by trusted one</td>
<td></td>
</tr>
<tr>
<td>33. Feeling humiliated</td>
<td></td>
</tr>
<tr>
<td>34. No trust in others</td>
<td></td>
</tr>
<tr>
<td>35. Feeling powerless to help others</td>
<td></td>
</tr>
<tr>
<td>36. Why me?</td>
<td></td>
</tr>
<tr>
<td>37. You are only one who suffered</td>
<td></td>
</tr>
<tr>
<td>38. Feeling a need for revenge</td>
<td></td>
</tr>
</tbody>
</table>
The remaining 24 scores (items 17 to 40) were added to assess personal perception of psychosocial functioning and gauge participants overall capacity to meet the challenges of everyday life. The 24 items are categorized in the six underlying domains of social functioning and are listed in Box 4.

**Box 4: Self-perception of Functioning**
*Expansion of refugee/culture-specific symptoms*

<table>
<thead>
<tr>
<th>Category</th>
<th>Item Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skills and Talents</td>
<td>Feeling that you have less skills that you had before</td>
</tr>
<tr>
<td>Physical Impairments</td>
<td>Feeling exhausted</td>
</tr>
<tr>
<td>Intellectual Functioning</td>
<td>Difficulty paying attention</td>
</tr>
<tr>
<td>Emotional Functioning</td>
<td>Blaming yourself for things that have happened</td>
</tr>
<tr>
<td>Social Relationships</td>
<td>Feeling that you have no one to rely upon</td>
</tr>
<tr>
<td>Spiritual/Existential Concerns</td>
<td>Spending time thinking why these events happened to you</td>
</tr>
</tbody>
</table>

Participants were asked to give one of the following responses for each item of the Part IV and the answers were scored accordingly: 1= ‘not at all’, 2=’a little’, 3=’quite a bit’, 4=’extremely’.

The PTSD score is obtained by adding up the scores from questions 1 to 16 and dividing them by 16. Adding up the items from 17 - 40 and dividing them by 24 results in the Self-Perception of Functioning score. Total score is generated by adding up PTSD score and the Self-Perception of Functioning score with the total divided by 40. A cut off score of ≥ 2.5, which was initially derived from Indochinese population, was generally considered to be “checklist positive” for PTSD. Subsequent studies conducted in former Yugoslavia indicated this cut-off point was too high and recommended a cut-off of ≥ 2. 0 (sensitivity = 1.0; specificity = 0.84) (Mollica et al., 1999). However, in this study a more conservative cut off
point will be used, so the mean PTSD score of 2.5 or more would be classified as PTSD ‘positive’ to reduce the likelihood of making a false positive PTSD diagnosis and to make the findings from this study comparable to wider international communities.

**Assessing anxiety and depression**

Symptoms of depression and anxiety were assessed using the Hopkins Symptom Checklist-25 (HSCL-25). The HSCL a widely used self-report inventory which was first used for measuring change in the clinical status of psychotherapy patients (Murphy, 1989). Since then, the HSCL has undergone continuing refinement and has been translated and culturally adapted to different populations across the world. The HSCL-25 version that will be used in this study, has been translated and culturally adapted for Croatian, Bosnian and Kosovar communities who were affected by the civil war (Mollica et al., 1999). It has been extensively validated in numerous studies on refugees, has high test-retest reliability and good validity in predicting depression and anxiety (Hollifield et al., 2002; Mollica et al., 1999; Mollica et al., 2001; Silove et al., 2007).

The HSCL -25 consists of 25 self-report items which are divided into a 10-point anxiety scale and 15-item scale of depressive symptoms that have been experienced in the week prior to the assessment. The ten anxiety symptoms included in the HSCL-25 are consistent with the DSM diagnosis of generalized anxiety disorder, whilst the 15 depression items are applicable to the DSM diagnosis of major depression. Thematic categorization for both anxiety and depression symptoms are presented in the Box 6.
Participants were asked to score the presence of each symptom (item) on the following scale: 1= ‘not at all’, 2=’a little’, 3=’quite a bit’, 4=’extremely’. The anxiety score is obtained by adding up the scores of the first 10 items and dividing it by 10. The depression score is generated by adding the items 11-25 and dividing the total by 15. Following extensive validation of the psychometric properties of HSCL-25 inventory in culturally diverse populations and settings, the Harvard Program in Refugee Trauma (HPRT) recommended a cut-off point of ≥ 1.75 for a diagnosis of depression (Mollica et al., 2004). Results in a sample of Bosnian refugees in primary health care settings indicated a cut-off point of 1.86 for the HSCL-25 diagnosis of major depression (sensitivity=1.00, specificity=0.99) (Mollica et al., 2004).

I selected the HSCL-25 for the depression and anxiety outcome assessment because it had been translated in Croatian language, culturally adapted and extensively used, tested and

<table>
<thead>
<tr>
<th>10 anxiety items</th>
<th>15 Depression items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scared for no reason</td>
<td>Low energy/slowed down</td>
</tr>
<tr>
<td>Feeling fearful</td>
<td>Blaming yourself</td>
</tr>
<tr>
<td>Faint/dizzy/weak</td>
<td>Crying easily</td>
</tr>
<tr>
<td>Nervous/shaky inside</td>
<td>Loss of sex interest</td>
</tr>
<tr>
<td>Heart pounding/racing</td>
<td>Poor appetite</td>
</tr>
<tr>
<td>Trembling</td>
<td>Difficulty sleeping</td>
</tr>
<tr>
<td>Feel tense &amp; keyed up</td>
<td>Hopeless about future</td>
</tr>
<tr>
<td>Headaches</td>
<td>Feeling blue</td>
</tr>
<tr>
<td>Spells of terror/panic</td>
<td>Feeling lonely</td>
</tr>
<tr>
<td>Feeling restless</td>
<td>Suicidal thoughts</td>
</tr>
<tr>
<td></td>
<td>Feel trapped/caught</td>
</tr>
<tr>
<td></td>
<td>Worrying too much</td>
</tr>
<tr>
<td></td>
<td>No interest in things</td>
</tr>
<tr>
<td></td>
<td>Everything an effort</td>
</tr>
<tr>
<td></td>
<td>Feeling worthless</td>
</tr>
</tbody>
</table>
validated in the communities of former Yugoslavia (Mollica et al., 2004). In my study, I used the recommended cut-off point of $\geq 1.75$ for the HSCL-25 diagnosis of depression and anxiety.

**Assessing social functioning**

In this study, I used the Social Functioning Questionnaire (SFQ) to assess participants’ levels of social dysfunction. This is an eight-item self-report measure that was developed from the Social Functioning Schedule (Tyrer, 1990). This shorter version was developed following the need for a quick assessment of perceived social functioning in a wide range of clinical and non-clinical settings. This short and robust instrument has been used in a variety of studies and was found to have good test-retest and inter-rater reliability as well as construct validity (Tyrer et al., 2005). Similar findings were also found in studies involving ethnic minorities’ community populations (Weich et al., 2004). A critical survey of self-report measures found the SFQ to have good and robust psychometric properties and the measure has received positive comments from lay people, patients and mental health professionals (Blount et al., 2002).

The Social Functioning Questionnaire consists of eight questions, each scored on a four point scale (0-3), with higher scores indicating more dysfunction (maximum score 24). Problems with the essential aspects of social functioning are explored including difficulties with keeping close relationships, struggles surrounding the completion of tasks at work and home, financial struggles, feelings of loneliness, isolation and lack of enjoyment in spare time activities. Statements related to each aspect of impaired social functioning are presented in **Box 7**.
### ‘R’ indicates a reverse-scored item

The SFQ mean score in a community sample of 4,164 people was reported to be 4.6 and a score of 10 or more indicated poor social functioning (Tyrer et al., 2005). A positive association has been found between social functioning scores and personality pathology with the mean SFQ scores of ≥10 in participants with diagnosis of personality disorder, giving support to the validity of the scale (Tyrer et al., 2005).

The social functioning score is generated by adding up the scores on the items 1-8. The total SFQ score ranges between 0-24. SFQ results in this study will be presented as mean scores (SD) and compared between different groups using appropriate parametric statistics. Some of

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**Box 7: Social functioning questionnaire**

<table>
<thead>
<tr>
<th>Aspects of social functioning</th>
<th>Item Example</th>
</tr>
</thead>
</table>
| Family and close relationship difficulties | I have difficulties in getting and keeping close relationships.  
I get on well with my family and other relatives. (R)  
I have problems with my sex life. |
| Difficulties related to completing tasks at work or home | I complete my tasks at work and home satisfactorily. (R)  
I find my tasks at work and home very stressful. |
| Feelings of loneliness, isolation and lack of enjoyment | I feel lonely and isolated from other people.  
I enjoy my spare time. (R) |
| Financial difficulties | I have no money problems. (R) |
the findings will also be presented as a dichotomized variable where those who scored less than 10 would be classified as having no social dysfunction and those with a score of 10 or more would be classified as having poor social functioning.

Assessing childhood trauma and childhood behavioural difficulties

Exposure to early childhood maltreatment was measured by using the Childhood Trauma Questionnaire (CTQ), which is a 28-item self-report inventory that provides a brief, reliable and widely used screening tool for histories of abuse and neglect (Bernstain et al., 1994). The CTQ was first developed as a 70-item questionnaire which was found to have good evidence of reliability and validity and excellent test-retest reliability with the Childhood Trauma Interview (Fink et al., 1995). The authors subsequently developed a shorter 28-item version which retained similar levels of reliability and content validity as well as good evidence of external validity across diverse populations (Bernstein et al., 1997; Bernstein & Stein, 1998).

The CTQ provides a quantitative measure of childhood trauma and its items reflect definitions of three areas of child abuse (emotional, physical and sexual abuse) and two areas of neglect (emotional and physical). Each clinical area of abuse/neglect has five items which are rated on a 5-point Likert-type scale indicating childhood maltreatment and three items of the Minimization/Denial Scale (reflects the tendency of the respondent to give exaggerated, desirable responses and potentially giving false-negative reports). Participants are asked to score each item on the following scale: 1 - ‘never true’, 2 - ‘rarely true’, 3 - ‘sometimes true’, 4 - ‘often true’ and 5 - ‘very often true’. For each of the five clinical scales, scores could range from 5 to 25 indicating severity of maltreatment. Scores of 5-8 indicate ‘no or minimal’ abuse, whilst scores above 13 indicate ‘severe’ childhood maltreatment with exceptions for Emotional Abuse where the total score needs to be ≥ 16 and Emotional Neglect where the
total score needs to 18 or higher to meet the criteria for severe level of maltreatment. Results from individuals who scored high on the Minimization/Denial Scale should be taken with caution due to potential false-negative tendency (Bernstain et al., 1994). Box 8 provides the guidelines for classifications of CTQ scores.

<table>
<thead>
<tr>
<th>Scales</th>
<th>Classification</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>None (or minimal)</td>
</tr>
<tr>
<td>Emotional Abuse</td>
<td>5-8</td>
</tr>
<tr>
<td>Physical Abuse</td>
<td>5-7</td>
</tr>
<tr>
<td>Sexual Abuse</td>
<td>5</td>
</tr>
<tr>
<td>Emotional Neglect</td>
<td>5-9</td>
</tr>
<tr>
<td>Physical Neglect</td>
<td>5-7</td>
</tr>
</tbody>
</table>

In addition to CTQ which measures childhood abuse and neglect, I also measured behavioural difficulties during adolescence (symptoms suggestive of conduct disorder). According to ICD 10, Conduct disorder (CD) is defined as ‘a repetitive and persistent pattern of behaviour in which either the basic rights of others or major age-appropriate societal norms or rules are violated, lasting at least 6 months during which some of the characteristic symptoms are present’ (WHO, 1992). Some studies indicated that approximately 40-50% of children who have conduct disorder develop antisocial personality disorder as adults (Rutter & Giller, 1983). In order to assess potential symptoms indicating conduct disturbance during adolescence, I have devised a 10-item brief screening tool based on ICD-10 diagnostic criteria for CD (WHO, 1992) and these questions were interspersed with CTQ items as both of them relate to childhood experiences. Box 9 shows relevant questions attributed to separate categories defining symptoms of CD. Participants are asked to score each item on the
following scale: 1-‘never true’, 2- ‘rarely true’, 3- ‘sometimes true’, 4- ‘often true’ and 5- ‘very often true’. The total score could range from 10 to 50. In a similar fashion to the CTQ scoring system, scores from 10-20 indicate ‘low’ level of behavioural problems, 21-30 medium and above 30 severe childhood behavioural difficulties.

<table>
<thead>
<tr>
<th>Box 9: Conduct disorder screening</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ICD 10 criteria</strong></td>
</tr>
<tr>
<td>Aggression to people and animals</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
</tr>
<tr>
<td>Destruction of property</td>
</tr>
<tr>
<td>Deceitfulness or theft</td>
</tr>
<tr>
<td>Disobedience and resistance to authority</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
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<tr>
<td>Violation of rules</td>
</tr>
<tr>
<td></td>
</tr>
</tbody>
</table>

**Assessing alcohol and drugs misuse**

Alcohol and drug misuse were screened by two questions asking participants whether they currently use alcohol and drugs, to be answered as ‘yes’ or ‘no’. If the answer was positive to either question, participants were also asked about the type of alcoholic drinks and weekly amount they consumed. Similarly, they were asked about the type of drugs and weekly amount they used.
3.3.4. Exposure variables

Assessing exposure to war trauma

War trauma was assessed by Harvard Trauma Questionnaire Part I which includes 47 questions relating to specific trauma events (Mollica et al., 1999).

The list of trauma events in Part I emerged from a systematic qualitative approach compiled from various sources that were subsequently subjected to extensive statistical analysis to achieve the eight main dimensions. They are presented in the Box 10.

<table>
<thead>
<tr>
<th>Categories</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Material Deprivation</td>
<td>Lack of shelter</td>
</tr>
<tr>
<td>War-like Conditions</td>
<td>Lack of food or water</td>
</tr>
<tr>
<td>Bodily Injury</td>
<td>Exposure to sniper fire</td>
</tr>
<tr>
<td></td>
<td>Used as a human shield</td>
</tr>
<tr>
<td>Forced Confinement and Coercion</td>
<td>Beating to the body</td>
</tr>
<tr>
<td></td>
<td>Knifing or axing</td>
</tr>
<tr>
<td>Forced to Harm Others</td>
<td>Forced to find and bury bodies</td>
</tr>
<tr>
<td></td>
<td>Forced to physically harm family member or friend</td>
</tr>
<tr>
<td>Disappearance, Death, or Injury of Loved Ones</td>
<td>Forced to destroy someone else’s property</td>
</tr>
<tr>
<td></td>
<td>Disappearance or kidnapping of spouse</td>
</tr>
<tr>
<td>Witnessing Violence to Others</td>
<td>Murder, or death due to violence, of son or daughter</td>
</tr>
<tr>
<td></td>
<td>Witness torture</td>
</tr>
<tr>
<td>Head Injury</td>
<td>Witness rape or sexual abuse</td>
</tr>
<tr>
<td></td>
<td>Beatings to the head</td>
</tr>
<tr>
<td></td>
<td>Suffocation or strangulation</td>
</tr>
</tbody>
</table>

Assessing exposure to catastrophic trauma

Although the HTQ includes 47 war-related traumatic events (listed in the Part I), not all of them would satisfy the ICD-10 criteria for being of catastrophic nature. Based on the ICD-10
description of catastrophic stress (WHO, 1992) and a survey of experts’ opinion (Beltran & Silove, 1999) it was assumed that catastrophic trauma would involve prolonged exposure to life-threatening circumstances with imminent possibility of being killed (for example exposure to war trauma, concentration camp experience, being tortured, hostage situations and sexual assault). I and another experienced clinician (MC) independently assessed 47-items of HTQ trauma events (Part I) and selected those that we thought would meet the criteria for catastrophic stress. Any disagreements were resolved by further discussions. We both agreed that 17 items (36%) out of 47 war-related traumatic events listed in the Harvard Trauma Questionnaire, were of the severity that could be described as catastrophic traumatic experience and are listed in the Box 11.

**Box 11: 17 items from Harvard Trauma Questionnaire related to catastrophic trauma**

1. Being under sniper fire
2. Witnessed burned or disfigured bodies
3. Murder or death due to violence of other family members (not spouse or a child) or friends
4. Ran into an ambush
5. Witnessed torture
6. Witness killing or murder
7. Serious physical injury from combat or landmine
8. Other types of sexual abuse or sexual humiliation (excluding rape)
9. Torture
10. Forced to find and bury bodies of the dead
11. Solitary confinement
12. Forced to harm others
13. Murder or death due to violence of son or daughter
14. Rape
15. Kidnapped
16. Murder or death due to violence of spouse
17. Witnessed rape or sexual abuse
Findings relating to the selected 17 items on the HTQ trauma events (Part I) will be presented as a dichotomized variable with those scoring ‘yes’ on any of 17 catastrophic trauma events being classified as ‘catastrophic trauma positive’ and those who did not have any ‘yes’ responses to the 17 selected items as ‘catastrophic trauma negative’.

3.3.5. Onset of personality related problems

On completion of the self-report questionnaires, each participant had a clinical interview to assess when the personality difficulties reported on the IPDE started. This was done to further clarify whether these happened during a participant’s late childhood and/or adolescence or if these difficulties started later in their adult life. Before the interview, I briefly checked each participant’s responses on the IPDE scale, and then asked them when they first became aware of the personality difficulties that they endorsed on the IPDE. For example, I asked the question: “When did you first become aware that you were feeling empty inside?” I would ask three to four similar questions related directly to the participant’s answers on the IPDE scale. This was followed by a more detailed examination of the participant’s experience of childhood and adolescence to elicit the presence of personality-related problems and interpersonal difficulties. The information obtained included problems in school (being bullied, receiving cautions, being expelled) and at home (running away, in trouble with the police, relationship with parents). I also enquired about their history of close relationships and employment, and abuse of substances before the war. These questions also allowed to check if any personality-related difficulties continued into their adult life. Additionally, each participant was asked if they had been treated by mental health services before the war. Based on this information, I categorized each participant as having pre-existing personality pathology (suggestive of personality disorder) or personality pathology with onset in
adulthood. Findings on personality status prior to the civil war, based on the clinical interview, were used to dichotomise people who were IPDE positive as either:

- Having personality pathology in childhood and adolescence which continued into their adult life (in other words, having personality disorder)
- Having personality pathology with onset in adulthood

In addition to the aforementioned criteria based on the clinical interview, I also used findings from the IPDE scores and self-reported exposure to catastrophic trauma events on the HTQ to further dichotomise people who were IPDE positive. By combining the findings from all three variables i.e. whether participants have met the required criteria (being positive) or not (being negative) on each variable, all participants were categorized into separate subgroups. For example, cases (IPDE positive) were initially divided into two groups based on whether they experienced or did not experience catastrophic trauma events. These two groups were further divided into separate subgroups based on the presence or absence of pre-trauma personality pathology. The same was applied to the controls, who were negative for personality pathology, and therefore there were no participants in the PD positive subcategories. The proposed allocation of study participants according to the above described combinations of the three variables is presented in Fig 5. A group of patients that were IPDE positive and exposed to catastrophic trauma, but had no evidence of pre-trauma personality pathology, were considered to have developed personality problems following exposure to catastrophic war-related trauma as adults and would therefore be considered to have EPCACE (F62.0).
**Figure 5.** Flowchart of the proposed participants’ subgroups based on the IPDE scoring, exposure to catastrophic trauma and presence of pre-trauma personality pathology

**IPDE positive** (International Personality Disorder Examination Questionnaire) - participants scoring positive on IPDE; **IPDE negative** - participants scoring negative on IPDE

**Catastrophic event** (positive or negative) based on the Harvard Trauma Questionnaire

**PD positive** – pre-trauma personality pathology present; **PD negative** – pre-trauma personality pathology absent

### 3.3.6. Features of EPCACE derived from IPDE items

Based on the ICD-10 diagnostic criteria for EPCACE (WHO, 1992), I and another experienced clinician (MC) independently assessed 77-items on the IPDE scale and selected those that described personality characteristics that closely related to current diagnostic criteria for EPCACE (described in 1.3). Any disagreements were resolved by further discussions. We both agreed on 20 items out of 77 personality statements listed on the IPDE scale, which would delineate personality features related to EPCACE. These are presented in the Box 12. This was done before any data analysis took place.
Box 12: 20 items from the International Personality Disorder Examination scale (IPDE) that relate to ICD-10 diagnostic criteria for EPCACE

1. I usually get fun and enjoyment out of life (R)
2. I trust people I know (R)
3. I let others make my big decisions for me
4. People think I am cold and detached
5. I feel awkward or out of place in social situations
6. I usually feel uncomfortable or helpless when I am alone
7. I am careful about what I tell others about myself
8. I often feel “empty” inside
9. I worry about being left alone and having to care for myself
10. I prefer activities that I can do by myself
11. I lose my temper and get into physical fights
12. I often seek advice or reassurance about everyday decisions
13. Everyone needs a friend or two to be happy (R)
14. I discover hidden threats in what some people tell me
15. When I am under stress things around me do not seem real
16. I have been the victim of unfair attacks on my character or reputation
17. I do not show much emotion
18. I feel at ease in social situations (R)
19. I find it hard to disagree with people I depend on a lot
20. I have close friends (R)

R indicates a reverse-scored item

Each of the items in Box 12 corresponds to one diagnostic criteria for Enduring Personality Change After Catastrophic Experience described in the section B (WHO, 1992). Some EPCACE diagnostic criteria have more than one IPDE item that could potentially elicit relevant symptoms. Five of the 20 items are reversed-scored and responding ‘no’ results in receiving a positive score for the EPCACE symptoms.

3.4. Study procedures

At the start of the study I presented the background and proposed methods for the project to the local clinicians during an academic meeting in July 2010. This meeting was attended by psychiatrists from both hospital sites (hospital and outpatients clinics in Firule and Krizine). I
subsequently attended several academic meetings during each visit to encourage referral of patients to help the recruitment process. I explained the inclusion and exclusion criteria to the local clinicians. It was emphasised that all patients who had personality problems, regardless whether they had diagnosis of personality disorder (F60.1 - F60.9) or personality change after catastrophic experience (F62.0), were eligible for participation. Also, some clinicians referred a few patients who they suspected had personality related pathology but had not received a formal diagnosis at the time of the referral (for example an overnight admission following an overdose and other forms of deliberate self harm). I did not have access to the participants’ clinical records and I did not collect data on the ICD-10 diagnostic codes each patient received from their clinicians. Each patient was initially approached by his/her clinician for participation in the study. Following patients’ agreement either I or a trained senior nurse provided information about the study and obtained informed consent. Participants initially completed a set of questionnaires that took on average 45-55 minutes. Subsequently, I conducted a clinical interview with each participant lasting approximately 50-60 minutes. If any of the patients recruited from general medical settings scored positive on IPDE and were found to have personality related pathology during the clinical interview, they would be categorised as cases. It was expected that the number of people having personality problems among potential controls would be higher than in the general population where prevalence is estimated to be around 4%-7% (Jackson & Burgess, 2000; Coid et al., 2006; Huang et al., 2009).

Controls were recruited from patients who attended medical outpatient clinics and patients who were hospitalised on medical wards (endocrinology, rheumatology, cardiology, dermatology). They were initially approached by their treating clinician and only those who provided written informed consent were subsequently recruited into the study.
Participants in both groups were advised before they started to answer questions in the self-reported measures to seek clarification from a researcher if they failed to understand any questions listed. If patients had any queries, they were clarified during the clinical interview.

Study recruitment took place over a one year period beginning in October 2010. It was done in seven separate visits to Croatia lasting one to two weeks at approximately at 2-3 monthly intervals until September 2011, by which time a total of 268 participants was recruited. Participation was completely voluntary and participants did not receive any financial incentives to take part in this study.

### 3.5. Methods used to avoid bias

Several strategies were employed to try to reduce potential biases related to case-control design used in this study.

#### 3.5.1. Recall bias

Recall bias can be minimised if exposure status between cases and controls is assessed in a sufficiently similar way. For example, to ensure that exposure of interest (war-related trauma) was equally assessed in both groups, I used the HTQ, a self-report measures which lists 47 war-related traumatic events asking each participant to choose ‘yes’ or ‘no’. This was completed independently, without any additional prompting by the researcher.

#### 3.5.2. Observer bias

In order to minimise observer bias, I did not have access to patients’ clinical records and was not aware whether the cases had received a diagnosis of personality disorder (F60.1-9) or personality change following catastrophic experience (F62.0). In other words, I was ‘masked’
to clinicians’ clinical diagnosis defining personality pathology status among cases. This information was not collected after the interview. Before the clinical interview, I only checked patients’ scores on the IPDE measure. I did not check any other parts of the self-report measures before the clinical interview with participants. In this way, I was not aware of participants’ scores on the Childhood Trauma Questionnaire or childhood behavioural problems scale prior to the interview, which potentially might have influenced my decision whether there was evidence of pre-existing personality pathology or not. I subsequently explored if participants had any childhood and adolescent behavioural difficulties, and any interpersonal struggles that continued into adulthood that happened before the war. This was an indirect approach in trying to assess pre-trauma personality pathology which if positive would have excluded a diagnosis of EPCACE. I also tried to keep each interview as consistent as possible between participants. However, as this was an unstructured clinical interview, there was a possibility that some questions were not explored at equal level with each participant.

### 3.5.3. Diagnostic suspicion bias

If clinicians assumed that this study was focussed on the effects of war trauma (primary exposure) they could have referred patients who they perceived to be more affected by the war. In order to minimise this bias clinicians were not aware of the study’s primary hypothesis. They were given detailed information about the exclusion and inclusion criteria and advised to refer participants with clinically significant personality pathology.

### 3.5.4. Selection bias in cases

Based on the assumption that most patients with a personality disorder diagnosis would not be hospitalised, the expectation was that most cases in this study would be recruited from
outpatients settings. Only a small number of cases were recruited from inpatient settings and then a similar proportion of controls were recruited from general medical hospital to make both groups more comparable in terms of the proportion of community patients and inpatients taking part in the study. Clinicians in mental health settings were asked to refer all patients with any clinically significant personality pathology. Clinicians were not aware of the primary study hypothesis.

### 3.5.5. Selection bias in controls

To avoid introducing additional biases that might arise between cases with personality pathology and controls and to obtain a representative comparison group, I decided to recruit control participants from secondary care services in general medical settings. A broad range of outpatient and inpatient medical settings were included (endocrinology, cardiology, dermatology, rheumatology, haematology) to avoid potential biases that might arise due to a particular medical condition. This was important for two reasons. Recruiting controls from a variety of outpatients clinics and inpatient wards with many diagnostic categories helped to avoid introducing bias that might be related to a particular diagnostic group of patients (i.e. increased levels of anxiety or depression in patients suffering from a myocardial infarction). I also chose not to recruit participants from surgical wards and outpatient surgical departments as I expected that a higher number of patients attending these units would be suffering from physical injuries related to war and psychological trauma thus introducing bias and confounding into the control group.

Another reason why the general medical settings were chosen for recruitment of controls, was that by recruiting cases and controls from secondary care services, patients in both groups came from a much wider geographical area as secondary care outpatient and inpatient units
were serving a population of approximately one million people. Had I chosen controls from the local primary care services, there would be a much higher possibility of introducing a selection bias as controls would have come only from the urban area whilst cases would include patients from much wider geographical area (rural and urban).

3.6. Statistical power and sample size calculation

The power of a statistical test is the probability that the test will reject the null hypothesis when the alternative hypothesis is correct. In other words, we talk about the power of a test to detect an effect if the effect actually exist (Altman, 1991). Two possible errors that can be made when interpreting findings from a study are named Type I and Type II errors. Type I error happens when we accept the results as significant when the null hypothesis is true (also called ‘false positive’ results). On the other hand, Type II error occurs when non-significant findings are accepted as true when in fact the null hypothesis is not true, referred to as a ‘false negative’ finding. The probabilities of making Type I and Type II errors are known as alpha (\(\alpha\)) and beta (\(\beta\)) values (Hennekens & Buring, 1987; Altman, 1991). \(\alpha\) is determined in advance and most studies use 0.05 level although it could be set at a lower level (for example \(p=0.001\)). The probability of making a Type II error depends on the size of the sample and the size of the effect in which one is interested. This is often referred to as the power of the study and defines the probability to reject the null hypothesis when the null hypothesis is false. The power is equal to 1-\(\beta\). This means that we can calculate the size of the necessary sample to have a high probability of finding the difference between the two groups if it really exist (Altman, 1991).

The power calculation was done using the Power and Sample Size Program, a statistical programme available through the internet. I planned to compare cases (having personality
pathology – IPDE positive) with controls (IPDE negative) on several outcome measures. I calculated sample size and expected that it would be relatively difficult to recruit controls, so in this case-control study of independent cases I planned to have 0.5 controls per case. It was estimated that the probability of exposure among controls is 0.2. If the true odds ratio for disease in exposed participants relative to unexposed participants is 2.5 I will need to recruit 144 cases and 72 controls to be able to reject the null hypothesis that this odds ratio is equal to 1 (no difference) with probability (power) of 0.80 with a 5% level of statistical significance. Based on the above sample size calculation, I aimed to recruit 140 cases who had clinically significant personality pathology, and a sample of 70 controls - people who did not meet IPDE criteria for personality disorder. This sample size would provide 80% power to detect a true difference between the groups equivalent to an Odds Ratio of 2.5, with a 5% level of statistical significance.

### 3.7. Analysis Plan

I conducted statistical analysis using the Statistical Package for Social Science (SPSS) version 21, (Norusis, 2013).

Characteristics of the study sample were examined using univariate descriptive statistics, which were presented as frequency distributions of variables using tables with proportions, means, and medians. The relationship between categorical explanatory and outcome variables was examined using contingency tables. Differences in proportions were calculated with 95% confidence intervals (CI 95%). The statistical significance of differences was calculated using Chi square ($X^2$) tests. Fisher exact test was used if any one cell had an expected frequency of <5.
A Chi-square test for independence was used to examine the relationship between the exposure to traumatic stress (primary exposure) in cases (IPDE positive) and controls (IPDE negative).

Clinically significant personality problems (primary outcome) was assessed as a dichotomous variable (cases/IPDE positive or controls/IPDE negative). Frequencies of specific personality characteristics (based on ten DSM-IV personality subtypes) were calculated within cases and their proportions were subsequently compared between the PD and EPCACE group. Differences in proportions were calculated with 95% confidence intervals (CI 95%).

Mental health (anxiety, depression and PTSD) and social functioning were assessed as continuous variables expressing the severity of the condition. Anxiety, depression and PTSD were further analysed by reclassifying each as dichotomous variables based on the cut-off score i.e whether participants met or did not meet criteria for a specific mental health condition. Odds ratios with accompanying 95% confidence intervals were calculated.

Mann-Whitney test for non-parametric data was used for variables found to have a skewed distribution, such as childhood maltreatment (CTQ) and childhood behavioural problems to explore the difference between cases and controls and between PD and EPCACE groups. These were further analysed according to different types of childhood maltreatment (abuse and neglect) and levels of severity between different abuse/neglect subgroups (mild, moderate and severe). Differences in proportions were calculated with 95% confidence intervals (CI 95%). The statistical significance of differences was calculated using Chi square (X²) tests.
Standard binary logistic regression was used to examine the relationship between exposure to catastrophic experiences among cases and controls, controlled for potential confounding effects of other variables (demographic factors). Odds ratios with accompanying 95% confidence intervals were calculated. Binary logistic regression does not make assumptions about the distribution of the independent variables. In another words, they do not have to be normally distributed, linearly related or of equal variance within each group. Caseness (IPDE positive vs IPDE negative) was used as the dependent variable and predictor variables (after being checked for multicollinearity) were entered into a logistic regression model using standard (enter) method.

Binary logistic regression was used to further assess the relationship between EPCACE and PD patients. Odds ratios with accompanying 95% confidence intervals was calculated. EPCACE group vs. non EPCACE was used as the dependent variable and predictor variables (PTSD, levels of childhood maltreatment and behavioural dysfunction, social functioning including employment status, depression and anxiety) were entered into a standard logistic regression model (enter method).

Subsequent analyses examined factors associated with being in the EPCACE group rather than in the subgroup of controls that underwent a catastrophic traumatic event but had no clinically significant personality pathology (IPDE negative). This analysis was performed using logistic regression. Due to the small numbers of participants in the subgroup of the control group, only the factors found to significantly vary between groups (and those identified as important) were considered for further analysis. Two models were fitted. The first model considered just those variables found to vary between the two groups. The second model additionally included age as this was noted to be an important factor. Age was divided
into three categories (<40, 40-54, ≥55) to examine whether there were any associations between the age when a person experienced trauma and the development of personality pathology. The logistic regression results were summarized by odds ratios with accompanying 95% confidence intervals.

3.8. Ethical considerations

3.8.1. Ethical Committee Approval
Ethical approval for the study was obtained from the University Hospital in Split Ethics Committee in August 2010. I also obtained ethical approval from the School of Medicine, University of Split in September 2010 as both inpatient and outpatient settings of the psychiatric units and internal medicine were closely linked with the School of Medicine in Split. Data collection only began once the study received the approval from the relevant ethics committees.

3.8.2. Informed Consent
The purpose of the study and what the study would involve were carefully explained to participants in their own language (Croatian) spoken by the researcher (myself). Only people who agreed to provide written informed consent were included in the study. Each patient was provided with a copy of a patient information sheet which gave details of what the study involved. The information sheet also included a contact number for the researcher in case the patients or their families/carers wanted to find out more about the study or had any other concerns related to participation in the study. The information sheet made it clear that the person’s decision to take part in the study or not would not in any way affect the current or future care received from their clinicians. Each participant was also made aware that he/she was free to withdraw from the study at any time should he/she wished to do so.
The number of patients who were approached but refused participation in both settings (mental health and general medicine settings) was also recorded. I recorded their age, gender, ethnic background and education level if this information was available. Basic characteristics of people who refused participation were compared to people who agreed to participate in the study to see whether there were particular differences between these two groups that might influence findings of this study.

3.8.3. Patient confidentiality

Hard copies of the questionnaires and additional information disclosed during the verbal interview were kept securely in a locked cabinet and protected in accordance with the terms of the Data Protection Act (Office of Public Sector Information, 1998). Only the researcher involved in the study had a copy of the file cabinet’s key and was able to access the data. The data collected were entered onto a computer at Imperial College and this record did not include the patient’s name or other information that could identify them. All electronic files used a patient identification number rather than the patient's name to maintain their anonymity. Access to the computer where the data were stored was password protected.

3.8.4. Consideration of potential risks in clinical settings

Due to the nature of screening tools involved, it was possible that the memories of past traumatic experiences could potentially have a negative effect on participants’ current mental state. As the research was carried out at the local clinical base (outpatient and inpatient settings), participants’ psychiatrists and I were on hand to provide additional support when this was required. In general medical settings, I was available to provide additional support to patients if this was necessary. I also liaised with the local mental health team and gave one patient from the general medical setting their contact details when she became distressed.
following the verbal interview. All participants also gave permission to inform their general practitioners of their participation in the study should this be required for further support.
4. RESULTS

4.1. Study sample

In total, 311 patients in mental health and general medical settings were approached for participation in the study of whom 43 (13.8%) individuals refused to take part. Proportions of patients who agreed to take part in the study and those who refused participation in both clinical settings are presented in the flow diagram shown in Figure 6. The proportions of patients who refused to take part were similar in both settings (14.6% vs. 12.3%) with a difference of 2.4% (95% CI = -6.0 to 9.0). No patients were excluded for other reasons.
Figure 6. Flow diagram presenting the total number of patients who were approached and those who refused to take part in the study in both clinical settings (mental health and general medical settings).

I collected data on age, gender, ethnicity and education level for non-participating adults and compared it with the patients who agreed to take part in the study. Their characteristics are presented in Table 7.
Table 7. Characteristics of study participants and patients who refused to take part in the study

<table>
<thead>
<tr>
<th>Variable</th>
<th>Patients who agreed to take part (N=268)</th>
<th>Patients who refused participation (N=43)</th>
<th>Mean or proportion difference (95% CI of the difference)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age - Mean (SD)</td>
<td>45.6 (10.5%)</td>
<td>48.2 (9.4%)</td>
<td>-2.58 (-5.93 to 0.76)</td>
</tr>
<tr>
<td>Gender - Male N (%)</td>
<td>168 (62.7%)</td>
<td>32 (74.4%)</td>
<td>0.12 (-0.04 to 0.24)</td>
</tr>
<tr>
<td>Ethnicity - Croatian N (%)</td>
<td>260 (97.0%)</td>
<td>43 (100%)</td>
<td>0.03 (-0.05 to 0.06)</td>
</tr>
<tr>
<td>Educational level N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No qualifications</td>
<td>30 (11.2%)</td>
<td>2 (4.7%)</td>
<td>0.06 (0.05 to 0.12)</td>
</tr>
<tr>
<td>A level/vocational</td>
<td>184 (68.7%)</td>
<td>39 (90.7%)</td>
<td>0.22 (0.08 to 0.30) *</td>
</tr>
<tr>
<td>University/higher</td>
<td>54 (20.1%)</td>
<td>2 (4.7%)</td>
<td>0.15 (0.04 to 0.22) *</td>
</tr>
<tr>
<td>education</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* p<0.05 X² for difference in proportions with 2 degrees of freedom

The two groups did not differ in age, gender and ethnicity. However, a higher number of participants who refused to take part had A level/vocational level of education (90.7% vs 68.7%) and lower levels of higher education (4.7% vs 20.1%), X² (2, n=311) = 8.99, p<0.01.

Out of 268 participants, 168 individuals were recruited from mental health settings (inpatients and outpatients) with a clinical diagnosis of personality disorder/change and 100 people from general medical inpatient and outpatient settings. Table 8 shows social and demographic characteristics of the two groups based on recruitment setting (mental health vs general medicine).
Table 8. Demographic characteristics of participants recruited from mental health settings and general medicine settings

<table>
<thead>
<tr>
<th>Variable</th>
<th>Patients recruited from mental health settings</th>
<th>Patients recruited in general medical settings</th>
<th>Mean or proportion difference (95% CI of the difference)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N= 168</td>
<td>N= 100</td>
<td></td>
</tr>
<tr>
<td>Age - Mean (SD)</td>
<td>44.76 (9.17)</td>
<td>47.07 (12.37)</td>
<td>-2.32 (-5.10 to 0.30)</td>
</tr>
<tr>
<td>Gender N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>116 (69.0)</td>
<td>52 (52.0)</td>
<td>0.17 (0.05 to 0.29)</td>
</tr>
<tr>
<td>Female</td>
<td>52 (31.0)</td>
<td>48 (48.0)</td>
<td></td>
</tr>
<tr>
<td>Ethnicity N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Croatian</td>
<td>162 (96.4)</td>
<td>98 (98.0)</td>
<td>0.02 (-0.04 to 0.06)</td>
</tr>
<tr>
<td>Bosnian</td>
<td>3 (1.8)</td>
<td>0 (0.0)</td>
<td>0.02 (-0.02 to 0.05)</td>
</tr>
<tr>
<td>Serbian</td>
<td>1 (0.6)</td>
<td>1 (1.0)</td>
<td>0.004 (-0.02 to 0.05)</td>
</tr>
<tr>
<td>Montenegrin</td>
<td>0 (0.0)</td>
<td>1 (1.0)</td>
<td>0.01 (-0.01 to 0.05)</td>
</tr>
<tr>
<td>Macedonian</td>
<td>1 (0.6)</td>
<td>0 (0.0)</td>
<td>0.01 (-0.03 to 0.03)</td>
</tr>
<tr>
<td>Other</td>
<td>1 (0.6)</td>
<td>0 (0.0)</td>
<td>0.01 (-0.03 to 0.03)</td>
</tr>
<tr>
<td>Education N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No qualification</td>
<td>14 (8.3)</td>
<td>16 (16.0)</td>
<td>0.08 (-0.002 to 0.17)</td>
</tr>
<tr>
<td>A levels/vocational</td>
<td>124 (73.8)</td>
<td>60 (60.0)</td>
<td>0.14 (0.02 to 0.25)</td>
</tr>
<tr>
<td>University/higher</td>
<td>30 (17.9)</td>
<td>24 (24.0)</td>
<td>0.06 (-0.04 to 0.17)</td>
</tr>
<tr>
<td>Marital status N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>104 (61.9)</td>
<td>69 (69.0)</td>
<td>0.07 (-0.05 to 0.18)</td>
</tr>
<tr>
<td>Divorced</td>
<td>8 (4.8)</td>
<td>2 (2.0)</td>
<td>0.03 (-0.03 to 0.07)</td>
</tr>
<tr>
<td>Separated</td>
<td>11 (6.5)</td>
<td>2 (2.0)</td>
<td>0.05 (-0.01 to 0.09)</td>
</tr>
<tr>
<td>Single</td>
<td>35 (20.8)</td>
<td>20 (20.0)</td>
<td>0.01 (-0.01 to 0.10)</td>
</tr>
<tr>
<td>Widowed</td>
<td>2 (1.2)</td>
<td>3 (3.0)</td>
<td>0.02 (-0.02 to 0.07)</td>
</tr>
<tr>
<td>Living with partner</td>
<td>8 (4.8)</td>
<td>4 (4.0)</td>
<td>0.01 (-0.05 to 0.06)</td>
</tr>
<tr>
<td>Recruitment area N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outpatient</td>
<td>161 (95.8)</td>
<td>91 (91.0)</td>
<td>0.05 (-0.01 to 0.12)</td>
</tr>
<tr>
<td>Inpatients</td>
<td>7 (4.2)</td>
<td>9 (9.0)</td>
<td></td>
</tr>
</tbody>
</table>

The groups did not differ in age, ethnicity, marital status and whether they were inpatients or outpatients. There were differences with regard to gender and in one of the three educational levels. More male participants were recruited from mental health than general medical settings (69% vs 52%), p<0.05. This mismatch reflected the situation on the ground as more men than women were attending outpatient mental health services thus fewer women referred.
for participation in the study. This gender disparity was not observed in general medical outpatient settings, thus similar proportions of both sexes were referred and subsequently recruited. A higher proportion of patients recruited in mental health settings achieved A levels/vocational training when compared to recruited subjects in general medical setting (73.8% vs 60%, p<0.05).

Assessment of personality disorder using the IPDE scale revealed that 163 (97%) of those with a clinical diagnosis of personality disorder/change and 19 (19%) of those recruited from general medical settings met the threshold for a diagnosis of personality disorder. Demographic characteristics of participants based on IPDE status (cases - IPDE positive vs controls - IPDE negative) are presented in Table 9.
There was no significant difference between cases and controls in terms of their age, ethnicity or marital status.

The results suggested a significant difference between the two groups in terms of their gender and inpatient/outpatient status. There was a higher percentage of males in the cases than the controls, and a higher percentage of patients recruited from inpatient services in the cases compared to the controls.
controls (68% vs. 52%), whilst a lower percentage of subjects were inpatients in the cases group (4% vs. 10%). There was also some evidence to suggest that the level of education varied between the two groups, with the cases having a higher proportion in the middle A-level/vocational group, and a lower percentage in the ‘no qualification’ group. However, the difference between groups was not quite statistically significant.

4.2. Personality characteristics of cases

Proportions of different personality disorder subcategories across three PD Clusters among cases are presented in Figure 7.

Results indicated that among 182 cases, Cluster C was the most frequent (59%), followed by Cluster A (55%) and much less frequent Cluster B (38%).
Figure 7. Personality disorder subtypes in cases based on IPDE scores
The most frequent personality pathology based on IPDE scores were avoidant, borderline and anankastic personality traits whilst antisocial traits were the least frequent personality pathology reported among 182 patients (Table 10).

<table>
<thead>
<tr>
<th>Variable</th>
<th>Personality traits in cases (N)</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paranoid</td>
<td>106</td>
<td>58.2</td>
</tr>
<tr>
<td>Schizoid</td>
<td>95</td>
<td>52.2</td>
</tr>
<tr>
<td>Schizotypal</td>
<td>102</td>
<td>56.0</td>
</tr>
<tr>
<td>Histrionic</td>
<td>50</td>
<td>27.5</td>
</tr>
<tr>
<td>Antisocial</td>
<td>29</td>
<td>15.9</td>
</tr>
<tr>
<td>Narcissistic</td>
<td>54</td>
<td>29.7</td>
</tr>
<tr>
<td>Borderline</td>
<td>142</td>
<td>78.0</td>
</tr>
<tr>
<td>Compulsive</td>
<td>110</td>
<td>60.6</td>
</tr>
<tr>
<td>Dependent</td>
<td>69</td>
<td>37.9</td>
</tr>
<tr>
<td>Avoidant</td>
<td>143</td>
<td>78.6</td>
</tr>
</tbody>
</table>

When compared across different PD clusters, results indicated that 72.5% of cases met diagnostic criteria for personality traits across two or more DSM-IV clusters, whilst 29.1% had personality characteristics across all three PD clusters.

### 4.3. Trauma exposure (Primary Hypothesis)

207 participants of the total sample (268) (77.2%, 95% CI = 0.72 to 0.82) experienced at least one war-related event listed in the Harvard Trauma Questionnaire (Part I: Trauma Events...
The most frequently reported traumatic events in the total sample were lack of support from local authority for emotional and physical problems (50.4%), being exposed to incoming fire (47.4%), lack of shelter (47.4%), feeling neglected by the authorities upon return from war zone (44.8%), participating in combat missions resulting in casualties in own unit (44.8%), witnessing injury of a member of own unit (43.3%) and witnessing death of a member of own unit (41.8%).

169 (92.9%) of people with diagnosis of PD and 38 (44.2%) of those with no PD reported being exposed to at least one type of war related event as described in the Harvard Trauma Questionnaire ($X^2(1, n=268) = 78.69, p<0.001$). Both cases and controls reported lack of support from local authority for emotional and physical problems as the most frequently experienced war related event on HTQ (63.7% vs 16.3%).

Out of 47 war-related traumatic events listed in the Harvard Trauma Questionnaire, 17 items (15%) were considered to be of the severity that could be described as catastrophic traumatic experience. When reclassified as a binary variable (exposed and not exposed to one or more catastrophic events) 72.5% of cases and 24.4% of controls experienced one or more catastrophic traumatic events. A Chi square ($X^2$) test for independence indicated significant association between positive IPDE screening and experience of catastrophic war related trauma, $X^2(1, n=268) = 55.18, p<0.001$ indicating that people with personality problems were more likely to have been exposed to severe war-related trauma than those without personality disorder (OR=8.17, 95% CI 4.53 to 14.74). Frequencies of exposure to catastrophic stress in cases and controls are shown in Figure 8.
Figure 8. Number of individuals exposed to catastrophic stress in cases and controls

Comparisons of different types of catastrophic traumatic events in cases and controls based on 17 selected items from the Harvard Trauma Questionnaire are presented in Table 11. There was a statistically significant difference between the two groups on 10 out of 15 traumatic events. At least one case reported experiencing each of 15 catastrophic events whilst the controls scored positive only on 8 out of 15 events (59%). The most frequently reported event in both groups was being under sniper fire (55.2% vs 12.8%).
Table 11. Comparisons of catastrophic trauma events (based on HTQ) between cases and controls

<table>
<thead>
<tr>
<th>Type of severe traumatic event (based on Harvard Trauma Questionnaire)</th>
<th>Cases (IPDE positive) N= 182</th>
<th>Controls (IPDE negative) N= 86</th>
<th>Proportion difference (95% CI of the difference)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Being under sniper fire N (%)</td>
<td>100 (55.2)</td>
<td>11 (12.8)</td>
<td>0.42 (0.31 to 0.51)**</td>
</tr>
<tr>
<td>Witnessed burned or disfigured bodies N (%)</td>
<td>85 (47.0)</td>
<td>7 (2.6)</td>
<td>0.39 (0.28 to 0.47)**</td>
</tr>
<tr>
<td>Murder or death due to violence of other family members (not spouse or a child) or friends N (%)</td>
<td>58 (32.2)</td>
<td>8 (9.3)</td>
<td>0.23 (0.12 to 0.31)**</td>
</tr>
<tr>
<td>Ran into an ambush N (%)</td>
<td>62 (34.1)</td>
<td>3 (3.5)</td>
<td>0.31(0.22 to 0.38) **</td>
</tr>
<tr>
<td>Witnessed torture N (%)</td>
<td>33 (18.1)</td>
<td>1 (1.2)</td>
<td>0.17 (0.10 to 0.23) **</td>
</tr>
<tr>
<td>Witness killing or murder N (%)</td>
<td>33 (18.3)</td>
<td>0 (0)</td>
<td>0.18 (0.12 to 0.24) **</td>
</tr>
<tr>
<td>Serious physical injury from combat or landmine N (%)</td>
<td>24 (13.3)</td>
<td>1 (1.2)</td>
<td>0.12 (0.05 to 0.18) **</td>
</tr>
<tr>
<td>Other types of sexual abuse or sexual humiliation (excluding rape) N (%)</td>
<td>11 (6.1)</td>
<td>0 (0.0)</td>
<td>0.06 (0.01 to 0.11)*</td>
</tr>
<tr>
<td>Torture N (%)</td>
<td>11 (6.1)</td>
<td>0 (0.0)</td>
<td>0.06 (0.01 to 0.11)*</td>
</tr>
<tr>
<td>Forced to find and bury bodies of the dead N (%)</td>
<td>10 (5.5)</td>
<td>0 (0.0)</td>
<td>0.06 (0.01 to 0.09)*</td>
</tr>
<tr>
<td>Solitary confinement N (%)</td>
<td>9 (4.9)</td>
<td>0 (0.0)</td>
<td>0.05 (0.001 to 0.09)</td>
</tr>
<tr>
<td>Forced to harm others N (%)</td>
<td>9 (4.9)</td>
<td>0 (0.0)</td>
<td>0.05 (0.001 to 0.09)</td>
</tr>
<tr>
<td>Murder or death due to violence of son or daughter N (%)</td>
<td>3 (1.6)</td>
<td>2 (2.3)</td>
<td>0.01 (-0.03 to 0.06)</td>
</tr>
<tr>
<td>Rape N (%)</td>
<td>2 (1.1)</td>
<td>0 (0.0)</td>
<td>0.01 (-0.03 to 0.04)</td>
</tr>
<tr>
<td>Kidnapped N (%)</td>
<td>1 (0.5)</td>
<td>1 (1.2)</td>
<td>0.01 (-0.03 to 0.04)</td>
</tr>
<tr>
<td>Murder or death due to violence of spouse N (%)</td>
<td>2 (1.1)</td>
<td>0 (0.0)</td>
<td>0.01 (-0.02 to 0.06)</td>
</tr>
<tr>
<td>Witnessed rape or sexual abuse N (%)</td>
<td>2 (1.1)</td>
<td>0 (0.0)</td>
<td>0.01 (-0.03 to 0.04)</td>
</tr>
</tbody>
</table>

* p<0.05 X² test for difference in proportions with 1 degree of freedom

** p<0.001 X² test for difference in proportions with 1 degree of freedom
4.3.1. Comparison between demographic factors and exposure to catastrophic trauma (Univariate analysis)

Relationships between demographic factors and exposure to catastrophic trauma are presented in Table 12. Although ethnicity and marital status had six subcategories in the initial comparisons of demographic characteristic between cases and controls, in the subsequent analysis I reduced the number of categories in both variables due to a very small number of participants in certain subcategories. Ethnicity was reduced to two categories (Croatian and other) due to a very low number of patients being from other ethnical background (<4%). Marital status variable was reduced to three subcategories (‘single’, ‘married/living with partner’ and ‘divorced/separated/widowed’) due to low numbers in some ‘marital status’ subgroups. Joining together ‘married’ and ‘living with partner’ participants into one category and collapsing divorced/separated/widowed under one name was based on assumed similarities among these subgroups of participants.

Univariate analysis showed that there was no significant difference between the patients who experienced catastrophic trauma and those who did not in terms age, ethnicity, educational attainment or whether they were inpatients or outpatients. However, a higher number of male participants reported exposure to severe traumatic events \(X^2(1, n=268) = 40.99, p<0.001\). Also, a higher number of married patients (74.5%) reported experience of catastrophic trauma \(X^2(2, n=268) = 5.01, p<0.05\).
### Table 12. A comparison of relationship between demographic factors and exposure to catastrophic trauma

<table>
<thead>
<tr>
<th>Variable</th>
<th>Catastrophic event positive</th>
<th>Catastrophic event negative</th>
<th>Mean or proportion difference (95% CI of the difference)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age - Mean (SD)</td>
<td>46.07 (8.84)</td>
<td>45.03 (12.42)</td>
<td>-1.03 (-3.71 to 1.65)</td>
</tr>
<tr>
<td>Gender N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>121 (79.1)</td>
<td>47 (40.9)</td>
<td>0.38 (0.26 to 0.48)**</td>
</tr>
<tr>
<td>Female</td>
<td>32 (20.9)</td>
<td>68 (59.1)</td>
<td></td>
</tr>
<tr>
<td>Ethnicity N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Croatian</td>
<td>148 (96.7)</td>
<td>112 (97.4)</td>
<td>0.01 (-0.04 to 0.05)</td>
</tr>
<tr>
<td>Other</td>
<td>5 (3.3)</td>
<td>3 (2.6)</td>
<td></td>
</tr>
<tr>
<td>Education (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No qualifications</td>
<td>17 (11.1)</td>
<td>13 (11.3)</td>
<td>0.002 (-0.07 to 0.08)</td>
</tr>
<tr>
<td>A levels/vocational</td>
<td>108 (70.6)</td>
<td>76 (66.1)</td>
<td>0.05 (0.07 to 0.16)</td>
</tr>
<tr>
<td>University</td>
<td>28 (18.3)</td>
<td>26 (22.6)</td>
<td>0.04 (-0.06 to 0.14)</td>
</tr>
<tr>
<td>Marital status N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>26 (17.0)</td>
<td>29 (25.2)</td>
<td>0.08 (-0.02 to 0.18)</td>
</tr>
<tr>
<td>Married/with partner</td>
<td>114 (74.5)</td>
<td>71 (61.7)</td>
<td>0.13 (0.02 to 0.24)*</td>
</tr>
<tr>
<td>Divorced/separated/widow</td>
<td>13 (8.5)</td>
<td>15 (13.0)</td>
<td>0.05 (-0.03 to 0.13)</td>
</tr>
<tr>
<td>Recruitment area N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outpatient</td>
<td>144 (94.1)</td>
<td>108 (93.9)</td>
<td>0.002 (-0.06 to 0.07)</td>
</tr>
<tr>
<td>Inpatients</td>
<td>9 (5.9)</td>
<td>7 (6.1)</td>
<td></td>
</tr>
</tbody>
</table>

* p<0.05  X² test for difference in proportions

** p<0.001  X² test for difference in proportions

### 4.3.2. Multivariate analysis of trauma events in cases and controls adjusted for demographic factors

Subsequently standard binary logistic regression was used to examine the influence of a catastrophic event on case/control status. A summary of the analysis results for the unadjusted and adjusted analyses are given in Table 13. The size of effect of a catastrophic event was given as an odds ratio. This indicates the odds of being a case for subjects undergoing a catastrophic event relative to the odds for those not undergoing such an event. Corresponding confidence intervals for the odds ratios are also given, along with p-values indicating the significance of the results.
Lasting personality pathology after trauma

Table 13. Odds ratios (OR) and 95% confidence intervals (CI) for the association between catastrophic traumatic event and being a case (experiencing personality problems)

<table>
<thead>
<tr>
<th>ADJUSTMENTS</th>
<th>CATASTROPHIC EVENT</th>
<th>P-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ODDS RATIO (95% CI)</td>
<td></td>
</tr>
<tr>
<td>Unadjusted</td>
<td>8.2 (4.5 to 14.7)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Gender, education, inpatient/outpatient status</td>
<td>9.0 (4.7 to 17.6)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Gender and marital status</td>
<td>10.1 (5.1 to 19.0)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>All demographics</td>
<td>10.1 (5.0 to 20.4)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

The results suggested a significant association between a catastrophic event and being a case in both the unadjusted analysis, and also adjusted for demographics that were associated with case/control status. In the unadjusted analyses, the odds of being a case (experiencing personality problems) were over 8 times higher for those exposed to a catastrophic traumatic event than those not undergoing such an event. This rose to 9 times higher after adjusting for the demographics of the subjects found to significantly differ between cases and controls. The effect of a catastrophic event rose further adjusting for gender and marital status and then for all demographics, with the odds of being an 10 times higher for those undergoing a catastrophic event.

4.4. Mental health and social functioning of cases compared to controls (Secondary Hypotheses)

This set of analyses was done to test the first secondary hypothesis presented in the Chapter 2.2 (pp. 106-107) predicting that people who have clinically significant personality disorder (IPDE positive) will have poorer mental health and social functioning than those who are not IPDE positive.
4.4.1. Relationship between mental health, social functioning and substance misuse (univariate analysis)

Univariate analysis showed that patients with personality pathology reported significantly more depression, anxiety and PTSD symptoms (Table 14). Cases (IPDE positive) had more interpersonal dysfunction with mean score of 12.58 (sd=3.90), compared to a mean score of 4.62 (sd= 2.83) among IPDE negative participants, t(254)=16.45, p<0.001, mean difference 7.96 (95% CI=7.11-8.81).

Table 14. Comparisons of psychological and social functioning between cases and controls

<table>
<thead>
<tr>
<th>Variables</th>
<th>Cases (IPDE positive)</th>
<th>Controls (IPDE negative)</th>
<th>Mean or proportion difference (95% CI of the difference)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depressive symptoms¹ (HSCL-25) Mean (SD)</td>
<td>2.59 (0.63)</td>
<td>1.45 (0.38)</td>
<td>1.14 (1.01 to 1.26)*</td>
</tr>
<tr>
<td>Anxiety symptoms¹ (HSCL-25) Mean (SD)</td>
<td>2.53 (0.70)</td>
<td>1.47 (0.44)</td>
<td>1.05 (0.91 to 1.19)*</td>
</tr>
<tr>
<td>PTSD symptoms² (HTQ scale) Mean (SD)</td>
<td>2.61 (0.80)</td>
<td>1.20 (0.43)</td>
<td>1.41 (1.25 to 1.56)*</td>
</tr>
<tr>
<td>Social functioning³ (SFQ) Mean (SD)</td>
<td>12.58 (3.90)</td>
<td>4.62 (2.83)</td>
<td>7.96 (7.11 to 8.81)*</td>
</tr>
<tr>
<td>Unemployment¹ N (%) Employed</td>
<td>44 (24.2)</td>
<td>47 (54.7)</td>
<td>0.30 (0.18 to 0.42)**</td>
</tr>
</tbody>
</table>

* p<0.001 t-test for difference in two means
** p<0.001 X² test for difference in proportions

(Denominators in each of these categories varied according to the completeness of the related scales/records; ¹ Cases =182, controls =86; ² Cases =164, controls =81; ³ Cases =175, controls =81).

Similar proportions of cases and controls reported current use of alcohol (39.8% vs. 37.2%). However, the alcohol consumption of the cases was significantly higher with a mean of 14.24 units per week (sd=11.03) when compared to controls whose mean number of alcohol units was 9.24 (sd=7.25), t (73)= 2.16, p<0.05, mean difference 4.99 (95% CI= 0.39 to 9.60). When the groups were compared on weekly alcohol consumption, significantly higher
number of cases were drinking above 20 units of alcohol per week ($X^2 (1, n=268) = 6.46, p=0.04$), although the proportion of them was relatively low (7.1%). Around 13% of cases failed to disclose the amount of weekly alcohol consumption. Similarly, significantly higher number of cases reported current substance misuse (8.2% vs. 0.0%) $X^2 (1, n=268) = 7.51, p<0.05$).

Alcohol and drugs use were compared between participants who did and did not experience a catastrophic traumatic event. Findings indicated that a higher proportion of participants who experienced catastrophic trauma reported current alcohol use (46.7% vs. 28.7%), $X^2 (1, n=267) = 8.93, p<0.05$). Traumatized participants on average reported consuming 14.6 (sd=10.65) alcohol units per week when compared to those who did not experience catastrophic trauma (mean=7.9, sd=6.86), $t (73)= 2.90, p<0.05$, mean difference 6.71 (95% CI= 2.10 to 11.3). When the groups were compared on weekly alcohol consumption, 10% of participants exposed to catastrophic trauma were drinking above 20 units of alcohol per week ($X^2 (1, n=268) = 9.83, p=0.007$). Significantly higher number of participants exposed to catastrophic trauma reported current substance misuse (9.2% vs. 0.9%) $X^2 (1, n=268) = 8.52, p<0.05$).

### 4.4.2. Multivariate analysis

Standard binary logistic regression was used to assess the association between common mental health conditions and social functioning in cases and controls after controlling for gender and educational attainment. Variables related to mental health and social functioning were reclassified as dichotomous variables (i.e. met criteria for depression vs did not meet criteria for depression) and used in subsequent multivariate analysis. Depression and anxiety were highly correlated (>0.8), therefore only depression was included in further analysis to
minimise risk of multicollinearity. Table 14 displays the crude and adjusted odds ratios with 95% confidence intervals.

Table 15. Comparisons of mental health and social function between cases and controls

<table>
<thead>
<tr>
<th>Variables</th>
<th>Cases</th>
<th>Controls</th>
<th>OR (95% CI)</th>
<th>Adjusted OR (95% CI) (gender)</th>
<th>Adjusted OR (95% CI) (gender and educational level)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depressive symptoms N (%)</td>
<td>165 (90.7)</td>
<td>17 (19.8)</td>
<td>4.37 (1.64 to 11.66) *</td>
<td>4.19 (1.53 to 11.46) *</td>
<td>4.70 (1.67 to 13.24) *</td>
</tr>
<tr>
<td>Suicidal thoughts N (%)</td>
<td>97 (53.3)</td>
<td>1 (1.2)</td>
<td>7.98 (0.90 to 70.76)</td>
<td>7.98 (0.90 to 70.64)</td>
<td>8.09 (0.88 to 73.71)</td>
</tr>
<tr>
<td>PTSD symptoms N (%)</td>
<td>102 (62.2)</td>
<td>2 (2.5)</td>
<td>7.52 (1.42 to 39.85) *</td>
<td>7.88 (1.45 to 42.83) *</td>
<td>7.80 (1.38 to 43.93) *</td>
</tr>
<tr>
<td>Social dysfunction, SFQ &gt;10 N (%)</td>
<td>136 (77.7)</td>
<td>6 (7.4)</td>
<td>10.39 (3.51 to 30.75) **</td>
<td>10.75 (3.56 to 32.47) **</td>
<td>11.75 (3.77 to 36.54) **</td>
</tr>
<tr>
<td>Employment status N (% Unempl oyed)</td>
<td>138 (75.8)</td>
<td>39 (43.3)</td>
<td>0.73 (0.28 to 1.86)</td>
<td>0.84 (0.33 to 2.16)</td>
<td>0.90 (0.34 to 2.40)</td>
</tr>
</tbody>
</table>

* p<0.05  
** p<0.001

A greater proportion of people in the IPDE screen positive group reported depressive, PTSD symptoms and higher levels of social dysfunction. These remained significant following the adjustment for gender and education.
4.5. **Comparisons of adverse childhood events and childhood behavioural difficulties between cases and controls**

Data on childhood maltreatment measured by Childhood Trauma Questionnaire (CTQ) were positively skewed (scores clustered to the left at the low values), so a non-parametric test Mann-Whitney U Test was used. Results showed that cases reported significantly higher levels of childhood adverse events on CTQ scale (Md=1.60, n=178) compared with the controls (Md=1.12, n=84), U=1882.50, p<0.001.

Childhood behavioural difficulties were measured by a 10-item childhood behavioural problems scale (based on conduct disorder symptoms) whose questions were embedded in a random manner between the 28-items of the Childhood Trauma Questionnaire. Data on behavioural problems were also positively skewed, so a non-parametric Mann-Whitney U Test was used. Results indicated that cases reported significantly higher levels of childhood behavioural problems scale (Md=1.70, n=180) compared with the controls (Md=1.20, n=85), U=2892.50, p<0.001.

Childhood maltreatment and behavioural problems data were further analysed according to different type of childhood abuse and neglect (Table 16). Results showed that cases reported higher levels of childhood maltreatment on all five CTQ abuse/neglect levels. Similarly they reported more behavioural disturbance during childhood. However, there was a significant difference on CTQ minimisation/denial scale with the higher proportion of controls scoring positive (54% vs 34%). Scoring positive on CTQ minimisation/denial scale suggests a possible underreporting of maltreatment (false negatives). Under these circumstances, the profile of low trauma scores in cases should be interpreted with some caution.
Table 16. Comparisons of different types of childhood maltreatment and between cases and controls

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>CASES (N=182) N (%)</th>
<th>CONTROL (N=86) N (%)</th>
<th>P-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioural difficulties</td>
<td>66 (37%)</td>
<td>3 (4%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Emotional Abuse</td>
<td>77 (43%)</td>
<td>1 (1%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Physical Abuse</td>
<td>67 (37%)</td>
<td>7 (8%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Sexual Abuse</td>
<td>58 (32%)</td>
<td>2 (2%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Emotional Neglect</td>
<td>114 (63%)</td>
<td>14 (16%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Physical Neglect</td>
<td>104 (57%)</td>
<td>7 (8%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Minimisation/denial</td>
<td>61(34%)</td>
<td>46 (54%)</td>
<td>0.002</td>
</tr>
</tbody>
</table>

Multivariate analyses using binary logistic regression (enter method) with unadjusted and adjusted odds ratios are presented in Table 17. Emotional abuse, sexual abuse and physical neglect all were more common in cases than control group. These remained significant after being controlled for gender, education and inpatient/outpatient status. Although there appeared to be evidence for emotional neglect to be higher in cases, this result was not quite statistically significant. Behavioural problems were also more common in cases, but after the adjustments findings did not remain significant.
Table 17. Logistic Regression of associations between different types of childhood maltreatment between cases and controls

<table>
<thead>
<tr>
<th>Variables</th>
<th>Cases N (%)</th>
<th>Controls N (%)</th>
<th>OR (95% CI) *</th>
<th>P-value</th>
<th>Adjusted OR (95% CI)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioural difficulties</td>
<td>66 (37%)</td>
<td>3 (4%)</td>
<td>5.66 (1.50 to 21.15)</td>
<td>0.01</td>
<td>3.52 (0.90 to 13.82)</td>
<td>0.07</td>
</tr>
<tr>
<td>Emotional Abuse¹</td>
<td>77 (43%)</td>
<td>1 (1%)</td>
<td>18.01 (2.26 to 143.55)</td>
<td>0.006</td>
<td>26.10 (3.13 to 217.10)</td>
<td>0.003</td>
</tr>
<tr>
<td>Physical Abuse²</td>
<td>67 (37%)</td>
<td>7 (8%)</td>
<td>1.17 (0.40 to 3.46)</td>
<td>0.77</td>
<td>1.11 (0.36 to 3.45)</td>
<td>0.86</td>
</tr>
<tr>
<td>Sexual Abuse²</td>
<td>58 (32%)</td>
<td>2 (2%)</td>
<td>7.62 (1.62 to 35.88)</td>
<td>0.01</td>
<td>7.61 (1.56 to 37.06)</td>
<td>0.02</td>
</tr>
<tr>
<td>Emotional Neglect³</td>
<td>114 (63%)</td>
<td>14 (16%)</td>
<td>2.10 (0.93 to 4.67)</td>
<td>0.07</td>
<td>2.16 (0.93 to 5.10)</td>
<td>0.07</td>
</tr>
<tr>
<td>Physical Neglect ³</td>
<td>104 (57%)</td>
<td>7 (8%)</td>
<td>7.00 (2.63 to 18.66)</td>
<td>0.001</td>
<td>6.23 (2.21 to 17.57)</td>
<td>0.001</td>
</tr>
</tbody>
</table>

* Odds ratios presented as odds of outcome in cases relative to odds in control group

(Denominators in each of these categories varied according to the completeness of the CTQ scale; Cases =181, controls =86; Cases =182, controls =85; Cases =182, controls =86).

4.6. Groups based on IPDE scoring, exposure to catastrophic trauma and personality pathology

A flowchart of participants’ groups based on IPDE scoring, exposure to catastrophic trauma and evidence of personality pathology during childhood and adolescence is presented in Figure 9. It shows that out of a total of 182 cases, 132 of them (72.5%, 95% CI 65.6 to 78.5) reported exposure to one or more catastrophic traumatic events listed on the Harvard Trauma Questionnaire (Part 1: trauma events). Among them, 67 had personality pathology evidenced in childhood/adolescence suggesting diagnosis of PD prior to exposure to war-related traumatic events whilst 65 participants reported no personality related problems during late childhood and/or adolescence which suggested development of personality pathology following experience of severe trauma (EPCACE group). Fifty IPDE positive patients did not
report exposure to catastrophic trauma (27.5%). Among these, five did not report personality related problems in childhood and adolescence and were subsequently excluded from further analysis as justification for their inclusion in either PD or EPCACE group was questionable. In total 112 (61.5%, 95% CI= 54.3-68.3) participants met diagnostic criteria for personality disorder of whom more than half (59.8%) reported exposure to one or more catastrophic events.

Among 86 controls that were all IPDE screen negative, 21 (24.4%) patients reported exposure to catastrophic traumatic event.
Figure 9. Flowchart of participants’ groups based on IPDE scoring, exposure to catastrophic trauma and presence of personality disorder

**IPDE positive** (International Personality Disorder Examination Questionnaire) - participants scoring positive on IPDE; **IPDE negative** - participants scoring negative on IPDE

**Catastrophic event** (positive or negative) based on Harvard Trauma Questionnaire

**PD positive** – pre-trauma personality pathology present; **PD negative** – pre-trauma personality pathology absent
4.7. **Comparisons of participants with EPCACE and personality disorder (65 vs. 112)**

The aim of these comparisons was to examine differences between the two subgroups of cases, the PD group and participants who had no pre-trauma personality pathology (EPCACE group). This set of analyses was done to test three secondary hypotheses (number 2, 3 and 4) presented in the Chapter 2.2 (pp. 106-107). It was predicted that among cases (IPDE positive), those who have a history of exposure to catastrophic trauma but no evidence of PD would be more likely to score higher on EPCACE variables (based on ICD-10 criteria) than those with PD. The EPCACE group would report more PTSD symptoms than those with PD only and their level of social dysfunction would be as great as among people with PD. Personality pathology based on IPDE scores was compared between PD and EPCACE groups.

4.7.1. **Demographic characteristics**

Among 182 IPDE positive participants, 112 (61.5%) had a clinical history of personality disorder prior to war trauma. Sixty-five IPDE positive participants (38.5%) had no prior personality disorder (scored negative on the clinical interview). Relationships between demographic factors in patients with EPCACE and personality disorder (PD) are presented in Table 18.

There was no significant difference between the two groups in terms of their age, ethnicity, educational attainment or inpatient/outpatient status.

The results suggested a significant difference between the two groups in terms of their gender and marital status. There was a significantly higher percentage of males in the EPCACE group than in the PD group \( (X^2 (1, n=182) = 13.39, p<0.001) \). The EPCACE group were
more likely to be married or living with a partner (82% vs. 58%, \(X^2\) (2, n=182) =11.96, \(p=0.002\)), and less likely to be divorced/separated/widowed (3.1% vs. 17%).

**Table 18. A comparison of demographic factors in PD patients and EPCACE patients**

<table>
<thead>
<tr>
<th>Variable</th>
<th>PD patients N= 112</th>
<th>EPCACE N= 65</th>
<th>Mean or proportion difference (95% CI of the difference)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age - Mean (SD)</td>
<td>44.18 (10.16)</td>
<td>46.51 (8.37)</td>
<td>2.33 (-0.61 to 5.27)</td>
<td>0.12</td>
</tr>
<tr>
<td>Gender N (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>63 (56.3.)</td>
<td>55 (84.6.)</td>
<td>0.28 (0.15 to 0.40)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Female</td>
<td>49 (43.8)</td>
<td>10 (15.4)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity N (%)*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Croatian</td>
<td>108 (96.4)</td>
<td>63 (96.9)</td>
<td>0.01 (-0.07 to 0.06)</td>
<td>1.00</td>
</tr>
<tr>
<td>Other</td>
<td>4 (3.6)</td>
<td>2 (3.1)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No qualifications</td>
<td>11 (9.8)</td>
<td>4 (6.2)</td>
<td>0.04 (-0.06 to 0.12)</td>
<td>0.43</td>
</tr>
<tr>
<td>A levels/vocational</td>
<td>78 (69.6)</td>
<td>51 (78.5)</td>
<td>0.09 (-0.05 to 0.21)</td>
<td></td>
</tr>
<tr>
<td>University</td>
<td>23 (20.5)</td>
<td>10 (15.4)</td>
<td>0.05 (-0.07 to 0.16)</td>
<td></td>
</tr>
<tr>
<td>Marital status N (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>27 (24.1)</td>
<td>10 (15.4)</td>
<td>0.09 (-0.04 to 0.20)</td>
<td>0.002</td>
</tr>
<tr>
<td>Married/with partner</td>
<td>65 (58.0)</td>
<td>53 (81.5)</td>
<td>0.24 (0.09 to 0.35)</td>
<td></td>
</tr>
<tr>
<td>Divorced/separated/widowed</td>
<td>20 (17.9)</td>
<td>2 (3.1)</td>
<td>0.15 (0.05 to 0.23)</td>
<td></td>
</tr>
<tr>
<td>Recruitment area N (%)*</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outpatient</td>
<td>106 (94.6)</td>
<td>64 (98.5)</td>
<td>0.04 (-0.03 to 0.10)</td>
<td>0.43</td>
</tr>
<tr>
<td>Inpatients</td>
<td>6 (5.4)</td>
<td>1 (1.5)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* Analysis using Fisher’s exact test

### 4.7.2. Personality pathology

Personality pathology based on IPDE scores was compared between PD and EPCACE groups (112 vs 65). Among the EPCACE patients Cluster A was the most frequent (72.3%), followed by Cluster C (58.5%) and much less frequent Cluster B (36.5%). On the other hand, among the PD patients Cluster C was the most frequent (59.7%), followed by Cluster A (47.6%) and Cluster B (39.5%). Proportions of different personality sub-categories in PD and EPCACE groups based on IPDE scores are illustrated in Figure 10.
The analysis of PD subcategories showed that avoidant, borderline, schizoid, schizotypal and paranoid personality disorders were the most prevalent personality traits among the EPCACE patients. In the PD group, the most prevalent were borderline, avoidant and compulsive personality disorders.

The percentage of positive scores on the IPDE screen in each of the two groups with p-values indicating the significance of the results are summarized in Table 19. A significantly higher proportion of the EPCACE patients scored positive on the schizoid (73.8% vs. 41.1%) and schizotypal IPDE subscales (75.4% vs. 47.3%) in comparison to the PD patients, whilst
histrionic traits were less common in the EPCACE group (13.8% vs. 35%). However, there was slight evidence of a difference in the paranoid, dependent and avoidant measures between groups, although these results were not quite statistically significant. Dependent behaviour was less common in the EPCACE group, whilst avoidant and paranoid behaviour was more common in the EPCACE group. The least prevalent personality sub-category in both groups was antisocial PD.

Table 19. A comparison of personality pathology between PD patients and EPCACE patients

<table>
<thead>
<tr>
<th>Variable (personality traits)</th>
<th>PD patients N= 112</th>
<th>EPCACE N= 65</th>
<th>Proportion difference (95% CI of the difference)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Paranoid N (%)</td>
<td>61 (54.5)</td>
<td>44 (67.7)</td>
<td>0.13 (-0.02 to 0.27)</td>
<td>0.08</td>
</tr>
<tr>
<td>Schizoid N (%)</td>
<td>46 (41.1)</td>
<td>48 (73.8)</td>
<td>0.33 (0.18 to 0.45)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Schizotypal N (%)</td>
<td>53 (47.3)</td>
<td>49 (75.4)</td>
<td>0.28 (0.13 to 0.41)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Histrionic N (%)</td>
<td>41 (36.6)</td>
<td>9 (13.8)</td>
<td>0.23 (0.09 to 0.34)</td>
<td>0.001</td>
</tr>
<tr>
<td>Antisocial N (%)</td>
<td>16 (14.3)</td>
<td>13 (20.0)</td>
<td>0.06 (-0.05 to 0.18)</td>
<td>0.32</td>
</tr>
<tr>
<td>Narcisistic N (%)</td>
<td>35 (31.3)</td>
<td>17 (26.2)</td>
<td>0.05 (-0.09 to 0.18)</td>
<td>0.47</td>
</tr>
<tr>
<td>Borderline N (%)</td>
<td>85 (75.9)</td>
<td>56 (86.2)</td>
<td>0.10 (0.02 to 0.21)</td>
<td>0.10</td>
</tr>
<tr>
<td>Compulsive N (%)</td>
<td>69 (61.6)</td>
<td>39 (60.0)</td>
<td>0.02 (-1.13 to 0.16)</td>
<td>0.83</td>
</tr>
<tr>
<td>Dependent N (%)</td>
<td>49 (43.8)</td>
<td>19 (29.2)</td>
<td>0.15 (-0.003 to 0.28)</td>
<td>0.06</td>
</tr>
<tr>
<td>Avoidant N (%)</td>
<td>83 (74.1)</td>
<td>56 (86.2)</td>
<td>0.12 (-0.01 to 0.23)</td>
<td>0.06</td>
</tr>
</tbody>
</table>

I have also examined the relationship between the two groups (PD and EPCACE) according to the number of cases meeting diagnostic criteria of personality traits across the DSM-IV conceptual clusters. Table 20 displays the proportions of participants meeting diagnostic criteria for one, two and all three clusters, including the crude and adjusted odds ratios with
95% confidence intervals. A significantly greater proportion of the EPCACE patients met criteria for personality traits across all three DSM-IV clusters. Adjusting for other variables (gender and marital status) resulted in only a small reduction of the odds ratio which remained statistically significant (p=0.003).

Table 20. Comparison between PD and EPCACE groups based on number of participants meeting diagnostic criteria across one or more DSM-IV clusters

<table>
<thead>
<tr>
<th>Number of DSM-IV Clusters</th>
<th>PD group</th>
<th>EPCACE</th>
<th>OR (95% CI)</th>
<th>P value</th>
<th>Adjusted OR (95% CI)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Meeting criteria of 1 PD cluster N, %</td>
<td>28 (25.0)</td>
<td>8 (12.3)</td>
<td>2.57 (0.28 to 23.45)</td>
<td>0.40</td>
<td>2.29 (0.24 to 21.97)</td>
<td>0.47</td>
</tr>
<tr>
<td>Meeting criteria of 2 or more PD clusters N, %</td>
<td>71 (67.0)</td>
<td>56 (86.2)</td>
<td>4.00 (0.48 to 33.36)</td>
<td>0.17</td>
<td>2.97 (0.34 to 26.31)</td>
<td>0.39</td>
</tr>
<tr>
<td>Meeting criteria of all 3 PD clusters N, %</td>
<td>21 (18.8)</td>
<td>32 (49.2)</td>
<td>3.43 (1.65 to 7.12)</td>
<td><strong>0.001</strong></td>
<td>3.28 (1.51 to 7.13)</td>
<td><strong>0.003</strong></td>
</tr>
</tbody>
</table>

4.7.3. Comparisons of IPDE personality characteristics between PD and EPCACE patients

The next set of comparisons analysed personality pathology reported in PD and EPCACE groups based on the IPDE scores.

Most frequently scored personality characteristics (reported by > 50% participants) based on the 77-item IPDE scale by the EPCACE group are presented in Table 21. More than 80% of the patients with adult onset personality pathology reported having persistent feelings of emptiness, frequent mood changes and having anger regulation problems. Equally high proportion of them reported avoidance of social interactions and preferring doing things by themselves to minimise contacts with others. More than 2/3 reported feeling ‘cold and
detached’ and having difficulties showing emotions. The same proportion of them did not feel they could trust others and more than 80% felt that they have been treated unfairly by others including experiencing attacks on their character and reputation. Impulsiveness and identity problems were reported by more than 60 % of participants in this group. More than half of them reported feeling ‘odd and eccentric’, being rigid and inflexible and sensitive to criticism. They did not score high on the IPDE items corresponding to dependent personality traits (see Appendix 3).

In comparison to PD group, the patients with adult onset personality pathology scored significantly higher on 34% of 35 most frequently reported personality characteristics, although there was a trend towards the EPCACE patients scoring higher than PD group on other 49% of the items listed in Table 18., but not reaching statistical significance. The two most frequently scored IPDE items in the EPCACE group were the statement ‘I prefer activities that I can do myself.’ (96.9%) and statement ‘I often feel ‘empty’ inside.’(92.3%) although the latter did not reach statistical significance between the two groups. In PD group, two most frequently scored IPDE items were the statement ‘I often feel ‘empty’ inside.’(84.7%) and the statement ‘I have tantrums or angry outbursts’ (81.3%).
Table 21. Most frequently scored personality characteristics (>50%) based on 77 IPDE items by the EPCACE group (compared to PD participants)

<table>
<thead>
<tr>
<th>IPDE Questionnaire</th>
<th>EPCACE N (%)</th>
<th>PD N (%)</th>
<th>Proportion difference (95% CI of the difference)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I prefer activities that I can do by myself 1</td>
<td>63 (96.9)</td>
<td>86 (76.8)</td>
<td>0.20 (0.10 to 0.29) **</td>
</tr>
<tr>
<td>2. I often feel “empty” inside 2</td>
<td>60 (92.3)</td>
<td>94 (84.7)</td>
<td>0.08 (-0.03 to 0.16)</td>
</tr>
<tr>
<td>3. To avoid being criticized I prefer to work alone 3</td>
<td>59 (92.2)</td>
<td>84 (75.0)</td>
<td>0.17 (0.06 to 0.27) *</td>
</tr>
<tr>
<td>4. I have tantrums or angry outbursts 1</td>
<td>57 (87.7)</td>
<td>91 (81.3)</td>
<td>0.06 (-0.05 to 0.17)</td>
</tr>
<tr>
<td>5. I (do not) feel at ease in social situations 4 (R)</td>
<td>57 (87.7)</td>
<td>66 (60.6)</td>
<td>0.27 (0.14 to 0.38) **</td>
</tr>
<tr>
<td>6. When I first meet someone I do not say much 5</td>
<td>56 (87.5)</td>
<td>79 (71.2)</td>
<td>0.16 (0.04 to 0.27) *</td>
</tr>
<tr>
<td>7. I usually do not get fun and enjoyment out of life 1 (R)</td>
<td>56 (86.2)</td>
<td>68 (60.7)</td>
<td>0.25 (0.12 to 0.37) **</td>
</tr>
<tr>
<td>8. My feelings are like the weather, they are always changing 3</td>
<td>54 (84.4)</td>
<td>87 (77.7)</td>
<td>0.07 (-0.06 to 0.18)</td>
</tr>
<tr>
<td>9. I have been the victim of unfair attacks on my character or reputation 5</td>
<td>53 (82.8)</td>
<td>75 (67.6)</td>
<td>0.15 (0.02 to 0.27) *</td>
</tr>
<tr>
<td>10. I feel awkward or out of place in social situations 3</td>
<td>51 (79.7)</td>
<td>77 (68.8)</td>
<td>0.11 (-0.03 to 0.23)</td>
</tr>
<tr>
<td>11. I do not show much emotion 1</td>
<td>50 (76.9)</td>
<td>78 (69.1)</td>
<td>0.07 (-0.07 to 0.20)</td>
</tr>
<tr>
<td>12. When I am under stress things around me do not seem real 5</td>
<td>49 (76.6)</td>
<td>64 (57.7)</td>
<td>0.19 (0.04 to 0.32) *</td>
</tr>
<tr>
<td>13. People think I am cold and detached 1</td>
<td>47 (72.3)</td>
<td>50 (44.6)</td>
<td>0.28 (0.13 to 0.41)**</td>
</tr>
<tr>
<td>14. I am careful about what I tell others about myself 1</td>
<td>46 (70.8)</td>
<td>69 (61.6)</td>
<td>0.09 (-0.06 to 0.23)</td>
</tr>
<tr>
<td>15. It’s hard for me to get used to a new way of doing things 6</td>
<td>44 (69.8)</td>
<td>77 (68.8)</td>
<td>0.01 (-0.13 to 0.14)</td>
</tr>
<tr>
<td>16. I do not trust people I know 7 (R)</td>
<td>44 (68.8)</td>
<td>47 (42.7)</td>
<td>0.26 (0.11 to 0.39) **</td>
</tr>
<tr>
<td>17. I’m fussy about little details 2 (R)</td>
<td>44 (67.7)</td>
<td>69 (62.2)</td>
<td>0.06 (-0.09 to 0.19)</td>
</tr>
<tr>
<td>18. I find it very difficult to throw out things 1</td>
<td>44 (67.7)</td>
<td>80 (71.4)</td>
<td>0.04 (-0.01 to 0.18)</td>
</tr>
<tr>
<td>19. I will not get involved with people until I am certain they like me 1</td>
<td>42 (64.6)</td>
<td>59 (52.7)</td>
<td>0.12 (-0.03 to 0.26)</td>
</tr>
<tr>
<td>20. I spend too much time trying to do things perfectly 1</td>
<td>42 (64.6)</td>
<td>78 (69.6)</td>
<td>0.05 (-0.09 to 0.19)</td>
</tr>
<tr>
<td>21. Giving in to some of my urges gets me into trouble 5</td>
<td>41 (64.1)</td>
<td>72 (64.9)</td>
<td>0.01 (0.01 to 0.27)</td>
</tr>
<tr>
<td>22. I am very moody 8</td>
<td>39 (61.9)</td>
<td>64 (58.2)</td>
<td>0.04 (-0.11 to 0.18)</td>
</tr>
<tr>
<td>23. I am afraid to making a fool of myself with people I am close to 1</td>
<td>39 (60.6)</td>
<td>65 (62.5)</td>
<td>0.02 (-0.13 to 0.16)</td>
</tr>
<tr>
<td></td>
<td>Statement</td>
<td>Group A</td>
<td>Group B</td>
</tr>
<tr>
<td>---</td>
<td>---------------------------------------------------------------------------</td>
<td>---------</td>
<td>---------</td>
</tr>
<tr>
<td>24.</td>
<td>People think I am odd or eccentric</td>
<td>38 (59.4)</td>
<td>47 (42.7)</td>
</tr>
<tr>
<td>25.</td>
<td>Most people are dishonest and unfair with me</td>
<td>38 (58.5)</td>
<td>58 (51.8)</td>
</tr>
<tr>
<td>26.</td>
<td>I am not usually able to start projects on my own</td>
<td>38 (58.5)</td>
<td>57 (45.5)</td>
</tr>
<tr>
<td>27.</td>
<td>I can’t decide what kind of person I want to be</td>
<td>36 (57.1)</td>
<td>57 (51.4)</td>
</tr>
<tr>
<td>28.</td>
<td>When I am praised or criticized I do not let others know how I feel</td>
<td>37 (56.9)</td>
<td>43 (38.4)</td>
</tr>
<tr>
<td>29.</td>
<td>I have threatened suicide or injured myself on purpose</td>
<td>37 (56.9)</td>
<td>54 (48.2)</td>
</tr>
<tr>
<td>30.</td>
<td>I have little or no desire to have sex with anyone</td>
<td>36 (55.4)</td>
<td>54 (49.5)</td>
</tr>
<tr>
<td>31.</td>
<td>I often mistake objects or shadows for people</td>
<td>35 (54.7)</td>
<td>25 (22.5)</td>
</tr>
<tr>
<td>32.</td>
<td>I avoid unfamiliar activities so I will not be embarrassed trying to do them</td>
<td>35 (54.7)</td>
<td>67 (60.9)</td>
</tr>
<tr>
<td>33.</td>
<td>I have held grudges against people for years</td>
<td>34 (54.0)</td>
<td>65 (59.1)</td>
</tr>
<tr>
<td>34.</td>
<td>People find it hard to get the point of what I am saying</td>
<td>34 (52.3)</td>
<td>53 (47.1)</td>
</tr>
<tr>
<td>35.</td>
<td>I get annoyed when people will not do what I ask</td>
<td>33 (51.6)</td>
<td>54 (48.2)</td>
</tr>
</tbody>
</table>

* p<0.05 X² test for difference in proportions
** p<0.001 X² test for difference in proportions

R indicates a reverse-scored item - the statement presented in the table was readjusted into a non-reversed statement for easier understanding of scores and proportions

(Denominators in each of these categories varied according to the completeness of records on the IPDE scale;

1 EPCACE =65 vs PD= 112; 2 EPCACE =65 vs PD= 111; 3 EPCACE =64 vs PD= 112; 4 EPCACE =65 vs PD= 109; 5 EPCACE =64 vs PD= 111; 6 EPCACE =63 vs PD= 112; 7 EPCACE =64 vs PD= 110; 8 EPCACE =63 vs PD= 110; 9 EPCACE =63 vs PD= 111)

The two groups were subsequently compared according to the ICD-10 Group B diagnostic symptoms for personality change after catastrophic experience (WHO, 1992) which corresponded with twenty statements on the IPDE scale (the selection process of the 20 IPDE items is described in section 3.3.6 in the Methods section). These were done to test the secondary hypothesis that among cases (IPDE positive), those who have a history of exposure to catastrophic trauma but no evidence of PD would be more likely to score higher on
EPCACE variables (based on ICD-10 criteria) than those with PD (presented in the Chapter 2.2, pp. 106-107).

Proportions of patients experiencing each of the 20 items are presented in Table 22. The EPCACE patients had significantly higher scores on 40% of 20 pre-determined items on the IPDE scale which were most consistent with schizoid, schizotypal and paranoid personality symptoms (marked as significant (*) and shaded in Table 22). PD patients scored significantly higher on 10% of the 20 IPDE items which were consistent dependent traits (presented in Table 22 as significant (*) and not shaded).
Table 22. A comparison between groups according to the Group B diagnostic criteria for EPCACE (ICD-10) reported on the 77-item IPDE scale

<table>
<thead>
<tr>
<th>IPDE Questionnaire</th>
<th>EPCACE N (%)</th>
<th>PD N (%)</th>
<th>Proportion difference (95% CI of the difference)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I usually do not get fun and enjoyment out of life(^1) (R)</td>
<td>56 (86.2)</td>
<td>68 (60.7)</td>
<td>0.25 (0.12 to 0.37) **</td>
</tr>
<tr>
<td>2. I do not trust people I know (^2) (R)</td>
<td>44 (68.8)</td>
<td>47 (42.7)</td>
<td>0.26 (0.11 to 0.39) **</td>
</tr>
<tr>
<td>3. I let others make my big decisions for me (^1)</td>
<td>19 (29.2)</td>
<td>35 (31.3)</td>
<td>0.02 (-0.12 to 0.15)</td>
</tr>
<tr>
<td>4. People think I am cold and detached (^3)</td>
<td>47 (72.3)</td>
<td>50 (44.6)</td>
<td>0.28 (0.13 to 0.41)**</td>
</tr>
<tr>
<td>5. I feel awkward or out of place in social situations (^3)</td>
<td>51 (79.7)</td>
<td>77 (68.8)</td>
<td>0.11 (-0.03 to 0.23)</td>
</tr>
<tr>
<td>6. I usually feel uncomfortable or helpless when I am alone (^1)</td>
<td>24 (36.9)</td>
<td>51 (45.5)</td>
<td>0.08 (-0.06 to 0.23)</td>
</tr>
<tr>
<td>7. I am careful about what I tell others about myself (^1)</td>
<td>46 (70.8)</td>
<td>69 (61.6)</td>
<td>0.09 (-0.06 to 0.23)</td>
</tr>
<tr>
<td>8. I often feel “empty” inside (^4)</td>
<td>60 (92.3)</td>
<td>94 (84.7)</td>
<td>0.08 (-0.03 to 0.16)</td>
</tr>
<tr>
<td>9. I worry about being left alone and having to care for myself (^1)</td>
<td>28 (43.1)</td>
<td>63 (56.3)</td>
<td>0.13 (-0.02 to 0.28)</td>
</tr>
<tr>
<td>10. I prefer activities that I can do by myself (^1)</td>
<td>63 (96.9)</td>
<td>86 (76.8)</td>
<td>0.20 (0.10 to 0.29)**</td>
</tr>
<tr>
<td>11. I lose my temper and get into physical fights (^3)</td>
<td>25 (39.1)</td>
<td>30 (26.8)</td>
<td>0.12 (-0.02 to 0.27)</td>
</tr>
<tr>
<td>12. I often seek advice or reassurance about everyday decisions (^1)</td>
<td>23 (35.4)</td>
<td>59 (52.7)</td>
<td>0.17 (0.02 to 0.31) *</td>
</tr>
<tr>
<td>13. Everyone does not need a friend or two to be happy (^3) (R)</td>
<td>18 (28.1)</td>
<td>19 (17.0)</td>
<td>0.11 (-0.01 to 0.25)</td>
</tr>
<tr>
<td>14. I discover hidden threats in what some people tell me (^4)</td>
<td>32 (49.2)</td>
<td>51 (45.9)</td>
<td>0.03 (-0.12 to 0.18)</td>
</tr>
<tr>
<td>15. When I am under stress things around me do not seem real (^5)</td>
<td>49 (76.6)</td>
<td>64 (57.7)</td>
<td>0.19 (0.04 to 0.32) *</td>
</tr>
<tr>
<td>16. I have been the victim of unfair attacks on my character or reputation (^5)</td>
<td>53 (82.8)</td>
<td>75 (67.6)</td>
<td>0.15 (0.02 to 0.27) *</td>
</tr>
<tr>
<td>17. I do not show much emotion (^1)</td>
<td>50 (76.9)</td>
<td>78 (69.1)</td>
<td>0.07 (-0.07 to 0.20)</td>
</tr>
<tr>
<td>18. I (do not) feel at ease in social situations (^4)(R)</td>
<td>57 (87.7)</td>
<td>66 (60.6)</td>
<td>0.27 (0.14 to 0.38)**</td>
</tr>
<tr>
<td>19. I find it hard to disagree with people I depend on a lot (^7)</td>
<td>23 (36.5)</td>
<td>58 (52.3)</td>
<td>0.16 (0.03 to 0.30) *</td>
</tr>
<tr>
<td>20. I do not have close friends (^1) (R)</td>
<td>28 (43.1)</td>
<td>29 (25.9)</td>
<td>0.17 (0.03 to 0.31) *</td>
</tr>
</tbody>
</table>

* p<0.05 \( \chi^2 \) test for difference in proportions
** p<0.001 \( \chi^2 \) test for difference in proportions

\( R \) indicates a reverse-scored item - the statement presented in the table was readjusted into a non-reversed statement for easier understanding of scores and proportions

(Denominators in each of these categories varied according to the completeness of records on IPDE scale;
The EPCACE group also scored significantly higher on seven additional IPDE items (Table 23) that were most consistent with schizotypal and avoidant personality traits on the IPDE scale.

### Table 23. Additional IPDE items scored significantly higher by the EPCACE group

<table>
<thead>
<tr>
<th>IPDE QUESTIONNAIRE</th>
<th>EPCACE N (%)</th>
<th>PD N (%)</th>
<th>PROPORTION DIFFERENCE (95% CI OF THE DIFFERENCE)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. I do not get upset when I hear bad news about someone I know ¹ (R)</td>
<td>14 (21.5)</td>
<td>11 (9.8)</td>
<td>0.12 (0.01 to 0.24) *</td>
</tr>
<tr>
<td>2. I usually do not feel bad when I hurt or upset someone ² (R)</td>
<td>10 (15.4)</td>
<td>7 (6.3)</td>
<td>0.09 (-0.001 to 0.20) *</td>
</tr>
<tr>
<td>3. When I am praised or criticized I do not let others know how I feel ³ (R)</td>
<td>37 (56.9)</td>
<td>43 (38.4)</td>
<td>0.19 (0.03 to 0.33) *</td>
</tr>
<tr>
<td>4. To avoid being criticized I prefer to work alone ³</td>
<td>59 (92.2)</td>
<td>84 (75.0)</td>
<td>0.17 (0.06 to 0.27) *</td>
</tr>
<tr>
<td>5. I often mistake objects or shadows for people ⁴</td>
<td>35 (54.7)</td>
<td>25 (22.5)</td>
<td>0.32 (0.17 to 0.46) **</td>
</tr>
<tr>
<td>6. People think I am odd or eccentric ⁵</td>
<td>38 (59.4)</td>
<td>47 (42.7)</td>
<td>0.17 (0.01 to 0.31) *</td>
</tr>
<tr>
<td>7. When I first meet someone I do not say much ⁴</td>
<td>56 (87.5)</td>
<td>79 (71.2)</td>
<td>0.16 (0.04 to 0.27) *</td>
</tr>
</tbody>
</table>

* p<0.05 X² test for difference in proportions
** p<0.001 X² test for difference in proportions

R indicates a reverse-scored item - the statement presented in the table was readjusted into a non-reversed statement for easier understanding of scores and proportions.

(Denominators in each of these categories varied according to the completeness of records on IPDE scale; ¹ EPCACE =65 vs PD= 112; ² EPCACE =64 vs PD= 110; ³ EPCACE =64 vs PD= 112; ⁴ EPCACE =64 vs PD= 111; ⁵ EPCACE =64 vs PD= 110).

### 4.7.4. Mental health and social dysfunction

The next set of analyses compared the measures of mental health and interpersonal functioning between EPCACE and PD patients. These were done to test the secondary hypotheses predicting higher levels of reported PTSD symptoms in the EPCACE patients than...
Lasting personality pathology after trauma

PD group and similarly high levels of social dysfunction in both groups (Chapter 2.2, pp. 106-107).

Univariate analysis showed that patients with EPCACE pathology had significantly more depression, anxiety and PTSD symptoms (Table 24) than PD patients and had more interpersonal dysfunction with similarly high unemployment level (although the proportion of unemployed EPCACE patients was slightly higher, 83.1% vs 74.1%).

**Table 24. Comparisons of psychological and social functioning between EPCACE and PD patients**

<table>
<thead>
<tr>
<th>Variables</th>
<th>EPCACE</th>
<th>PD</th>
<th>Mean or proportion difference (95% CI of the difference)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depressive symptoms¹ Mean (SD)</td>
<td>2.76 (0.61)</td>
<td>2.52 (0.62)</td>
<td>0.24 (0.05 to 0.43)*</td>
</tr>
<tr>
<td>Anxiety symptoms¹ Mean (SD)</td>
<td>2.70 (0.64)</td>
<td>2.46 (0.71)</td>
<td>0.23 (0.02 to 0.45)*</td>
</tr>
<tr>
<td>PTSD symptoms² Mean (SD)</td>
<td>3.06 (0.58)</td>
<td>2.36 (0.77)</td>
<td>0.70 (1.25 to 1.56)**</td>
</tr>
<tr>
<td>Social functioning³ (SFQ) Mean (SD)</td>
<td>13.45 (3.40)</td>
<td>12.17 (4.12)</td>
<td>1.28 (0.76 to 2.49)*</td>
</tr>
<tr>
<td>Suicidality¹ N (%)</td>
<td>44 (67.7)</td>
<td>53 (47.3)</td>
<td>0.20 (0.05 to 0.34)**</td>
</tr>
<tr>
<td>Employment¹ N (%) Unemployed</td>
<td>54 (83.1)</td>
<td>83 (74.1)</td>
<td>0.09 (-0.04 to 0.20)</td>
</tr>
</tbody>
</table>

* p<0.05 t-test for difference in two means
** p<0.001 t-test for difference in two means
*** p<0.05 X² test for difference in proportions

(Denominators in each of these categories varied according to the completeness of the related scales/records; ¹EPCACE =65, PD =112; ²EPCACE =62, PD =100; ³EPCACE =64, PD =106).

Data on mental health and social functioning were further analysed by reclassifying each as dichotomous variable (i.e. met criteria for PTSD vs did not meet criteria for PTSD) and conducting multivariate comparisons by using standard logistic regression. A summary of the results is given in Table 25. The size of difference between groups are reported as odds ratios.
along with corresponding confidence intervals. These are presented as the odds of the outcome in EPCACE group relative to the odds in PD group.

The analyses suggested that anxiety, PTSD, social functioning and suicidal thoughts significantly differed between groups when the demographics of the patients were not considered in the analysis (unadjusted analysis). For all variables where there was a difference, the outcomes were more likely in the EPCACE group than in the PD group.

### Table 25. Comparisons of mental health between EPCACE and PD patients

<table>
<thead>
<tr>
<th>Variables</th>
<th>EPCACE N (%)</th>
<th>PD N (%)</th>
<th>OR (95% CI) *</th>
<th>P-value</th>
<th>Adjusted OR (95% CI) *</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depressive symptoms¹</td>
<td>62 (95%)</td>
<td>101 (90%)</td>
<td>2.25 (0.60 to 8.39)</td>
<td>0.23</td>
<td>1.70 (0.42 to 6.86)</td>
<td>0.45</td>
</tr>
<tr>
<td>Anxiety symptoms²</td>
<td>60 (92%)</td>
<td>89 (79%)</td>
<td>3.10 (1.12 to 8.61)</td>
<td>0.03</td>
<td>2.42 (0.83 to 7.04)</td>
<td>0.11</td>
</tr>
<tr>
<td>PTSD symptoms²</td>
<td>51 (82%)</td>
<td>51 (51%)</td>
<td>4.45 (2.08 to 9.53)</td>
<td>&lt;0.001</td>
<td>2.94 (1.30 to 6.67)</td>
<td>0.01</td>
</tr>
<tr>
<td>Social dysfunction³</td>
<td>56 (88%)</td>
<td>78 (74%)</td>
<td>2.51 (1.07 to 5.92)</td>
<td>0.04</td>
<td>2.28 (0.90 to 5.74)</td>
<td>0.08</td>
</tr>
<tr>
<td>Employed¹</td>
<td>11 (17%)</td>
<td>29 (26%)</td>
<td>0.58 (0.27 to 1.26)</td>
<td>0.17</td>
<td>0.82 (0.35 to 1.88)</td>
<td>0.63</td>
</tr>
<tr>
<td>Suicidal thoughts¹</td>
<td>44 (68%)</td>
<td>53 (47%)</td>
<td>2.33 (1.23 to 4.42)</td>
<td>0.009</td>
<td>1.96 (0.99 to 3.86)</td>
<td>0.05</td>
</tr>
</tbody>
</table>

*Odds ratios presented as odds of outcome in EPCACE subgroup relative to odds in PD subgroup  
(Denominators in each of these categories varied according to the completeness of the related scales/records; ¹EPCACE =65, PD =112; ²EPCACE =62, PD =100; ³EPCACE =64, PD =106).

After adjusting for gender and marital status, there was no longer any statistically significant difference in anxiety between groups, although anxiety was raised in the EPCACE group. The differences in social functioning and suicidal thoughts between groups were also not quite statistically significant after adjusting for the patient demographics. Differences in PTSD between groups remained after the adjustments.
4.7.5. Comparisons of adverse childhood experience and childhood behavioural problems between EPCACE and PD patients

Mann-Whitney U Test revealed that PD patients reported significantly higher levels of childhood adverse events on CTQ scale (Md=1.88, n=110) compared with EPCACE group (Md=1.36, n=66), U=1620. 0, p<0.001. PD patients reported significantly higher levels of childhood behavioural problems on CDS scale (Md=1.90, n=111) compared with EPCACE patients (Md=1.50, n=64, U=2209.5, p<0.001.

Further comparisons were made of childhood maltreatment (abuse and neglect) and childhood behavioural problems between groups, with the results summarized in Table 26. The figures are the number and percentage of ‘positive’ values in each of the two case subgroups.

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>PD (N=112) YES - N (%)</th>
<th>EPCACE (N=65) YES - N (%)</th>
<th>P-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioural difficulties</td>
<td>52 (47%)</td>
<td>14 (22%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Emotional Abuse</td>
<td>68 (61%)</td>
<td>8 (13%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Physical Abuse</td>
<td>59 (53%)</td>
<td>8 (12%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Sexual Abuse</td>
<td>45 (41%)</td>
<td>12 (18%)</td>
<td>0.003</td>
</tr>
<tr>
<td>Emotional Neglect</td>
<td>80 (71%)</td>
<td>32 (49%)</td>
<td>0.003</td>
</tr>
<tr>
<td>Physical Neglect</td>
<td>69 (62%)</td>
<td>34 (52%)</td>
<td>0.23</td>
</tr>
<tr>
<td>Minimisation/denial score</td>
<td>35 (31%)</td>
<td>22 (34%)</td>
<td>0.36</td>
</tr>
</tbody>
</table>

All types of childhood maltreatment, aside from physical neglect, were less common in the EPCACE group than in the PD group. They also had less childhood and adolescence behavioural problems.
Findings from multivariate analyses using binary logistic regression (enter method) with unadjusted and adjusted odds ratios are presented in Table 27. All types of childhood maltreatment, aside from physical neglect, were less common in the EPCACE group than in the PD group. These remained significant after being controlled for gender and marital status. Childhood behavioural problems were also less common in EPCACE group and remained significant following adjustments.

<table>
<thead>
<tr>
<th>Variables</th>
<th>EPCACE N (%)</th>
<th>PD N (%)</th>
<th>OR (95% CI) *</th>
<th>P-value</th>
<th>Adjusted OR (95% CI)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioural difficulties</td>
<td>14 (22%)</td>
<td>52 (47%)</td>
<td>0.32 (0.16 to 0.64)</td>
<td>0.001</td>
<td>0.20 (0.09 to 0.43)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Emotional Abuse ¹</td>
<td>8 (12.5)</td>
<td>68 (60.7)</td>
<td>0.09 (0.04 to 0.21)</td>
<td>&lt;0.001</td>
<td>0.12 (0.05 to 0.28)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Physical Abuse ²</td>
<td>8 (12.3)</td>
<td>59 (53.2)</td>
<td>0.12 (0.05 to 0.28)</td>
<td>&lt;0.001</td>
<td>0.13 (0.06 to 0.31)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Sexual Abuse ³</td>
<td>12 (18.5)</td>
<td>45 (40.5)</td>
<td>0.33 (0.16 to 0.69)</td>
<td>0.003</td>
<td>0.34 (0.16 to 0.74)</td>
<td>0.007</td>
</tr>
<tr>
<td>Emotional Neglect ¹</td>
<td>32 (49.2)</td>
<td>80 (71.4)</td>
<td>0.39 (0.21 to 0.73)</td>
<td>0.004</td>
<td>0.48 (0.24 to 0.94)</td>
<td>0.03</td>
</tr>
<tr>
<td>Physical Neglect ³</td>
<td>34 (52.3)</td>
<td>69 (61.6)</td>
<td>0.68 (0.37 to 1.27)</td>
<td>0.23</td>
<td>0.63 (0.32 to 1.22)</td>
<td>0.17</td>
</tr>
</tbody>
</table>

* Odds ratios presented as odds of outcome in EPCACE subgroup relative to odds in PD subgroup

(Denominators in each of these categories varied according to the completeness of the CTQ scale; ¹EPCACE =64, PD =112; ²EPCACE =65, PD =111; ³EPCACE =65, PD =112).
4.8. Comparisons of childhood maltreatment and behavioural difficulties between EPCACE and controls (65 vs. 86)

The next set of analyses compared the measures of childhood experience and childhood behavioural problems between EPCACE and controls. These were done to test the secondary hypothesis that the level of childhood trauma would not be higher among the EPCACE patients than controls (Chapter 2.2, p.107).

4.8.1. Childhood adverse experience

A Mann-Whitney U Test showed that EPCACE patients reported significantly higher levels of childhood maltreatment on CTQ scale (Md=1.36, n=64) compared with the controls (Md=1.12, n=84), U=1015.50, p<0.001.

The next set of comparisons examined different types of childhood maltreatment between groups. Each of these variables was considered as a binary measure. The results are summarised in Table 28.

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>CONTROL (N=86)</th>
<th>EPCACE (N=65)</th>
<th>P-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>N (%)</td>
<td>N (%)</td>
<td></td>
</tr>
<tr>
<td>Emotional Abuse</td>
<td>1 (1%)</td>
<td>8 (13%)</td>
<td>0.004</td>
</tr>
<tr>
<td>Physical Abuse</td>
<td>7 (8%)</td>
<td>8 (12%)</td>
<td>0.40</td>
</tr>
<tr>
<td>Sexual Abuse</td>
<td>2 (2%)</td>
<td>12 (18%)</td>
<td>0.001</td>
</tr>
<tr>
<td>Emotional Neglect</td>
<td>14 (16%)</td>
<td>32 (49%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Physical Neglect</td>
<td>7 (8%)</td>
<td>34 (52%)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

All variables, with the exception of physical abuse, were found to significantly more common in EPCACE group.
Differences in the same measures between groups were re-examined, this time splitting each childhood maltreatment variable according to severity levels into mild, moderate and severe categories. A summary of the results is given in Table 29.

Table 29. Comparisons of different types of childhood maltreatment and severity levels between EPCACE and controls

<table>
<thead>
<tr>
<th>Variable</th>
<th>EPCACE patients</th>
<th>Controls (IPDE negative)</th>
<th>Proportion difference (95% CI of the difference)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Abuse¹ N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>1 (2%)</td>
<td>0 (0%)</td>
<td>0.02 (-0.03 to 0.08)</td>
</tr>
<tr>
<td>Moderate</td>
<td>2 (3%)</td>
<td>0 (0%)</td>
<td>0.03 (-0.02 to 0.11)</td>
</tr>
<tr>
<td>Mild</td>
<td>5 (8%)</td>
<td>1 (1%)</td>
<td>0.07 (-0.001 to 0.16)</td>
</tr>
<tr>
<td>None</td>
<td>57 (88%)</td>
<td>85 (99%)</td>
<td>0.11 (0.03 to 0.21)*</td>
</tr>
<tr>
<td>Physical Abuse² N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0.00 (-0.04 to 0.06)</td>
</tr>
<tr>
<td>Moderate</td>
<td>1 (2%)</td>
<td>2 (2%)</td>
<td>0.01 (-0.06 to 0.07)</td>
</tr>
<tr>
<td>Mild</td>
<td>7 (11%)</td>
<td>5 (6%)</td>
<td>0.05 (-0.04 to 0.15)</td>
</tr>
<tr>
<td>None</td>
<td>57 (87%)</td>
<td>79 (92%)</td>
<td>0.04 (-0.06 to 0.15)</td>
</tr>
<tr>
<td>Sexual Abuse² N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0.00 (-0.04 to 0.06)</td>
</tr>
<tr>
<td>Moderate</td>
<td>4 (6%)</td>
<td>2 (2%)</td>
<td>0.06 (0.01 to 0.15)*</td>
</tr>
<tr>
<td>Mild</td>
<td>8 (12%)</td>
<td>2 (2%)</td>
<td>0.10 (0.02 to 0.20)*</td>
</tr>
<tr>
<td>None</td>
<td>53 (82%)</td>
<td>84 (98%)</td>
<td>0.16 (0.07 to 0.27)*</td>
</tr>
<tr>
<td>Emotional Neglect² N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>3 (5%)</td>
<td>0 (0%)</td>
<td>0.05 (-0.01 to 0.13)</td>
</tr>
<tr>
<td>Moderate</td>
<td>6 (9%)</td>
<td>0 (0%)</td>
<td>0.09 (0.03 to 0.19)*</td>
</tr>
<tr>
<td>Mild</td>
<td>23 (35.4)</td>
<td>14 (16.5)</td>
<td>0.19 (0.05 to 0.33)*</td>
</tr>
<tr>
<td>None</td>
<td>33 (51%)</td>
<td>71 (16%)</td>
<td>0.32 (0.17 to 0.45) **</td>
</tr>
<tr>
<td>Physical Neglect² N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>3 (5%)</td>
<td>0 (0%)</td>
<td>0.05 (-0.01 to 0.13)</td>
</tr>
<tr>
<td>Moderate</td>
<td>18 (28%)</td>
<td>0 (0%)</td>
<td>0.28 (0.17 to 0.40)**</td>
</tr>
<tr>
<td>Mild</td>
<td>13 (20%)</td>
<td>7 (8%)</td>
<td>0.12 (0.01 to 0.24)*</td>
</tr>
<tr>
<td>None</td>
<td>31 (48%)</td>
<td>79 (92%)</td>
<td>0.44 (0.30 to 0.57) **</td>
</tr>
<tr>
<td>Minimisation/denial score² N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>22 (33.8)</td>
<td>46 (53.5)</td>
<td>0.20 (0.04 to 0.34)*</td>
</tr>
</tbody>
</table>

* p<0.05 X² test for difference in proportions

** p<0.001 X² test for difference in proportions

(Denominators in each of these categories varied according to the completeness of the CTQ scale; ¹EPCACE =64, controls =86; ²EPCACE =65, controls =86)
In terms of severity levels, there was no significant difference between the groups on the severe level of any of the five abuse/neglect subsections of the CTQ. The results showed that the EPCACE group generally scored higher on mild levels of childhood adverse events, and also in the two moderate subgroups. Controls scored significantly higher on the CTQ minimisation/denial scale, suggesting some caution is needed when interpreting low scores in this group.

Multivariate analyses using binary logistic regression (enter method) with unadjusted and adjusted odds ratios (for gender and educational attainment) are presented in Table 30. Again data on childhood maltreatment were analysed by collapsing severity categories of the abuse/neglect variables into dichotomised variable (‘positive’ and ‘negative’) for each type of abuse/neglect.

\[ \text{Table 30. Logistic Regression of associations between different types of childhood maltreatment between EPCACE patients and control group} \]

<table>
<thead>
<tr>
<th>Variables</th>
<th>EPCACE N (%)</th>
<th>PD N (%)</th>
<th>OR (95% CI) *</th>
<th>P-value</th>
<th>Adjusted OR (95% CI)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emotional Abuse</td>
<td>8 (12.5)</td>
<td>68 (60.7)</td>
<td>12.1 (1.48, 99.8)</td>
<td>0.02</td>
<td>11.2 (1.23, 102)</td>
<td>0.03</td>
</tr>
<tr>
<td>Physical Abuse</td>
<td>8 (12.3)</td>
<td>59 (53.2)</td>
<td>1.58 (0.54, 4.62)</td>
<td>0.40</td>
<td>1.30 (0.41, 4.11)</td>
<td>0.65</td>
</tr>
<tr>
<td>Sexual Abuse</td>
<td>12 (18.5)</td>
<td>45 (40.5)</td>
<td>9.51 (2.05, 44.2)</td>
<td>0.004</td>
<td>8.74 (1.52, 50.3)</td>
<td>0.02</td>
</tr>
<tr>
<td>Emotional Neglect</td>
<td>32 (49.2)</td>
<td>80 (71.4)</td>
<td>4.92 (2.32, 10.4)</td>
<td>&lt;0.001</td>
<td>3.86 (1.72, 8.63)</td>
<td>0.001</td>
</tr>
<tr>
<td>Physical Neglect</td>
<td>34 (52.3)</td>
<td>69 (61.6)</td>
<td>12.4 (4.97, 30.9)</td>
<td>&lt;0.001</td>
<td>11.4 (4.28, 30.1)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

* Odds ratios presented as odds of outcome in EPCACE subgroup relative to odds in control group
The results suggested a significant difference between groups for all measures with the exception of physical abuse, where the groups did not significantly vary. For all outcomes there was relatively little difference in size of the group differences between the unadjusted analyses and those with adjustments for the patient demographics.

4.8.2. Childhood behavioural problems

EPCACE group reported significantly higher levels of childhood behavioural problems on CDS scale (Md=1.50, n=64) compared with the controls (Md=1.20, n=85), U=1414. 0, p<0.001.

When data was reclassified according to the severity levels (Table 31), the only significant result was a higher level of the mild childhood behavioural disturbance in EPCACE patients compared to the control group. There was a significant difference on CDS minimisation/denial scale with higher proportion of controls scoring positive (53.5 vs 33.8%), suggesting possible underreporting of maltreatment (false negatives) in the control group.

Table 31. Comparisons of childhood behavioural difficulties between EPCACE and controls

<table>
<thead>
<tr>
<th>Variable</th>
<th>EPCACE N=64</th>
<th>Controls (IPDE negative) N=85</th>
<th>Proportion difference (95% CI of the difference)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Childhood Behavioural problems N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>1 (2%)</td>
<td>0 (0%)</td>
<td>0.02 (-0.03 to 0.08)</td>
</tr>
<tr>
<td>Moderate</td>
<td>0 (0%)</td>
<td>1 (1%)</td>
<td>0.01 (-0.05 to 0.06)</td>
</tr>
<tr>
<td>Mild</td>
<td>13 (20%)</td>
<td>2 (2%)</td>
<td>0.18 (0.08 to 0.29)**</td>
</tr>
<tr>
<td>None</td>
<td>50 (78%)</td>
<td>82 (96%)</td>
<td>0.18 (0.08 to 0.30)**</td>
</tr>
<tr>
<td>Minimisation/denial score N (%)</td>
<td>22 (33.8)</td>
<td>46 (53.5)</td>
<td>0.20 (0.04 to 0.34)*</td>
</tr>
</tbody>
</table>

* p<0.05 X² test for difference in proportions

** p<0.001 X² test for difference in proportions
For further analysis severity levels of behavioural problems were collapsed into a single dichotomised variable. EPCACE patients were more likely to report childhood behavioural difficulties (OR= 7.65, 95% CI 2.09 to 27.96, p= 0.002). Adjusting for gender and educational attainment yielded lower but still significant OR = 4.37, 95% CI 1.15 to 16.68, p= 0.03.

4.9. **Comparisons of EPCACE patients with controls who experienced catastrophic trauma (65 vs 21)**

The aim of the next set of comparisons was to examine differences between the EPCACE group (n=65) and the subgroup of controls who underwent a catastrophic event (n=21).

4.9.1. **Demographic characteristics**

Demographic characteristics of EPCACE participants were compared to twenty-one controls who reported exposure to severe trauma (Table 32). Fewer people in the control group were recruited from outpatients (81% vs. 98.5). The remaining demographic characteristics did not vary significantly between groups.
Table 32. A comparison of demographic factors in EPCACE patients and controls who were exposed to catastrophic trauma

<table>
<thead>
<tr>
<th>Variable</th>
<th>EPCACE N= 65</th>
<th>Controls who experienced catastrophic trauma N= 21</th>
<th>Mean or proportion difference (95% CI of the difference)</th>
<th>P-values</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age - Mean (SD)</td>
<td>46.51 (8.37)</td>
<td>48.86 (9.37)</td>
<td>2.35 (-1.96 to 6.65)</td>
<td>0.28</td>
</tr>
<tr>
<td>Gender N (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>55 (84.6.)</td>
<td>15 (71.4)</td>
<td>0.13 (-0.05 to 0.36)</td>
<td>0.18</td>
</tr>
<tr>
<td>Female</td>
<td>10 (15.4)</td>
<td>6 (28.6)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ethnicity N (%)</td>
<td></td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
<tr>
<td>Croatian</td>
<td>63 (96.9)</td>
<td>21 (100.0)</td>
<td>0.03 (-0.13 to 0.11)</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>2 (3.1)</td>
<td>0 (0.00)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>No qualifications</td>
<td>4 (6.2)</td>
<td>3 (14.3)</td>
<td>0.08 (-0.05 to 0.29)</td>
<td>0.43</td>
</tr>
<tr>
<td>A levels/vocational</td>
<td>51 (78.5)</td>
<td>14 (66.7)</td>
<td>0.12 (-0.08 to 0.35)</td>
<td></td>
</tr>
<tr>
<td>University</td>
<td>10 (15.4)</td>
<td>4 (19.0)</td>
<td>0.04 (-0.12 to 0.26)</td>
<td></td>
</tr>
<tr>
<td>Marital status N (%)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single</td>
<td>10 (15.4)</td>
<td>3 (14.3)</td>
<td>0.01 (-0.20 to 0.15)</td>
<td>0.93</td>
</tr>
<tr>
<td>Married/with partner</td>
<td>53 (81.5)</td>
<td>17 (81.0)</td>
<td>0.01 (-0.15 to 0.23)</td>
<td></td>
</tr>
<tr>
<td>Divorced/separated/widow</td>
<td>2 (3.1)</td>
<td>1 (4.8)</td>
<td>0.02 (-0.07 to 0.20)</td>
<td></td>
</tr>
<tr>
<td>Recruitment area N (%)</td>
<td></td>
<td></td>
<td></td>
<td>0.01</td>
</tr>
<tr>
<td>Outpatient</td>
<td>64 (98.5)</td>
<td>17 (81.0)</td>
<td>0.18 (0.04 to 0.39)*</td>
<td></td>
</tr>
<tr>
<td>Inpatients</td>
<td>1 (1.5)</td>
<td>4 (19.0)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.9.2. Mental health and social functioning

Univariate analysis showed that the EPCACE group had significantly more depression, anxiety and PTSD symptoms (Table 33). They had more interpersonal dysfunction and significantly higher unemployment.
Lasting personality pathology after trauma

Table 33. Comparisons of psychological and social functioning between EPCACE and 21 controls exposed to severe trauma

<table>
<thead>
<tr>
<th>Variables</th>
<th>EPCACE</th>
<th>Control subgroup who experienced catastrophic trauma</th>
<th>Mean or proportion difference (95% CI of the difference)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depressive symptoms¹ Mean (SD)</td>
<td>2.76 (0.60)</td>
<td>1.60 (0.37)</td>
<td>1.16 (0.88 to 1.16) *</td>
<td>0.001</td>
</tr>
<tr>
<td>Anxiety symptoms² Mean (SD)</td>
<td>2.70 (0.64)</td>
<td>1.60 (0.57)</td>
<td>1.10 (0.78 to 1.41) *</td>
<td>0.001</td>
</tr>
<tr>
<td>PTSD symptoms² Mean (SD)</td>
<td>3.05 (0.58)</td>
<td>1.49 (0.62)</td>
<td>1.57 (1.25 to 1.88) *</td>
<td>0.001</td>
</tr>
<tr>
<td>Suicidal thoughts¹ N (%)</td>
<td>44 (68%)</td>
<td>0 (0%)</td>
<td>0.60 (0.48 to 0.78) *</td>
<td>0.001</td>
</tr>
<tr>
<td>Social functioning³ Mean (SD)</td>
<td>13.45 (3.40)</td>
<td>5.30 (2.74)</td>
<td>8.15 (6.49 to 9.82) *</td>
<td>0.001</td>
</tr>
<tr>
<td>Employment¹ N (%) Employed</td>
<td>11 (17%)</td>
<td>10 (48%)</td>
<td>0.31 (0.09 to 0.52) **</td>
<td>0.004</td>
</tr>
</tbody>
</table>

(Denominators in each of these categories varied according to the completeness of the related scales/records; ¹EPCACE =65, controls =21; ²EPCACE =62, controls =18; ³EPCACE =64, controls =20.

The analyses suggested that all measures varied significantly between groups. Levels of anxiety, depression, PTSD and social dysfunction were all higher in the EPCACE group, as was the occurrence of suicidal thoughts. Conversely, employment was significantly lower in the EPCACE group.

Data on mental health was further analysed by reclassifying each as dichotomous variable (i.e. met criteria for PTSD vs did not meet criteria for PTSD) and is presented in Table 34.
Table 34. Comparisons of mental health between EPCACE and 21 controls exposed to severe trauma

<table>
<thead>
<tr>
<th>Variables</th>
<th>EPCACE</th>
<th>Controls who experienced catastrophic trauma</th>
<th>Proportion difference (95% CI of the difference)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Depressive symptoms(^1) Mean (SD)</td>
<td>62 (95.4)</td>
<td>6 (28.6)</td>
<td>0.67 (0.44 to 0.82)*</td>
</tr>
<tr>
<td>Anxiety symptoms(^2) Mean (SD)</td>
<td>60 (92.3)</td>
<td>6 (28.6)</td>
<td>0.64 (0.41 to 0.71)*</td>
</tr>
<tr>
<td>PTSD symptoms(^2) Mean (SD)</td>
<td>51 (82.3)</td>
<td>1 (5.6)</td>
<td>0.77 (0.54 to 0.86)*</td>
</tr>
</tbody>
</table>

* p<0.001 \(\chi^2\) test for difference in proportions

(Denominators in each of these categories varied according to the completeness of the related scales/records; \(^1\)EPCACE =65, controls =21; \(^2\)EPCACE =62, controls =18)

4.9.3. Childhood adverse experience and behavioural difficulties

The next set of analyses compared the measures of childhood experience and childhood behavioural problems between groups. The results are summarised in Table 35. The figures are the number and percentage of 'positive' values in each of the groups.

Table 35. Comparisons of different types of childhood maltreatment and behavioural problems between EPCACE and controls who experienced catastrophic trauma

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>CONTROLS (N=21)</th>
<th>EPCACE (N=65) N(%)</th>
<th>P-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Behavioural difficulties</td>
<td>0 (0%)</td>
<td>14 (22%)</td>
<td>0.02</td>
</tr>
<tr>
<td>Emotional Abuse</td>
<td>0 (0%)</td>
<td>8 (13%)</td>
<td>0.09</td>
</tr>
<tr>
<td>Physical Abuse</td>
<td>1 (5%)</td>
<td>8 (12%)</td>
<td>0.33</td>
</tr>
<tr>
<td>Sexual Abuse</td>
<td>0 (0%)</td>
<td>12 (18%)</td>
<td>0.03</td>
</tr>
<tr>
<td>Emotional Neglect</td>
<td>2 (10%)</td>
<td>32 (49%)</td>
<td>0.001</td>
</tr>
<tr>
<td>Physical Neglect</td>
<td>0 (0%)</td>
<td>34 (52%)</td>
<td>&lt;0.001</td>
</tr>
</tbody>
</table>

There was some evidence that all variables, with the exception of physical abuse, were found to significantly vary between the two groups although the result for emotional abuse was not
quite statistically significant. Of the measures that varied between groups, all were significantly more common in the EPCACE group than in the subgroup of the control group.

The above results suggested that there were few patients with any of the childhood experience and childhood behavioural problems in the control subgroup, and no patients for a large number of the outcomes. As a result, there was really insufficient data to perform logistic regression in this instance.

Further comparisons were done to compare cases and controls on different types of childhood abuse and neglect and their severity levels (Table 36). Fisher’s exact test was used when any one cells had expected frequency of <5. EPCACE group scored significantly higher on mild emotional neglect and moderate and mild physical neglect. The groups also varied on mild level of behavioural problems. There was no significant difference on the CTQ minimisation/denial scale between the two groups.
Table 36. Comparisons of childhood maltreatment and behavioural problems according to severity levels between EPCACE and controls who experienced catastrophic trauma

<table>
<thead>
<tr>
<th>Variable</th>
<th>EPCACE patients</th>
<th>Controls who experienced catastrophic trauma</th>
<th>Proportion difference (95% CI of the difference)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Childhood Behavioural problems N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>1 (2%)</td>
<td>0 (0%)</td>
<td>0.02 (-0.14 to 0.08)</td>
</tr>
<tr>
<td>Moderate</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0.00 (-0.15 to 0.06)</td>
</tr>
<tr>
<td>Mild</td>
<td>13 (20%)</td>
<td>0 (0%)</td>
<td>0.20 (0.03 to 0.32)*</td>
</tr>
<tr>
<td>None</td>
<td>51 (78%)</td>
<td>21 (100%)</td>
<td>0.22 (0.04 to 0.33)*</td>
</tr>
<tr>
<td>Emotional Abuse¹ N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>1 (2%)</td>
<td>0 (0%)</td>
<td>0.02 (-0.14 to 0.08)</td>
</tr>
<tr>
<td>Moderate</td>
<td>2 (3%)</td>
<td>0 (0%)</td>
<td>0.03 (-0.13 to 0.11)</td>
</tr>
<tr>
<td>Mild</td>
<td>5 (8%)</td>
<td>0 (0%)</td>
<td>0.08 (-0.08 to 0.17)</td>
</tr>
<tr>
<td>None</td>
<td>57 (88%)</td>
<td>21 (100%)</td>
<td>0.12 (-0.04 to 0.22)</td>
</tr>
<tr>
<td>Physical Abuse² N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0.00 (-0.15 to 0.06)</td>
</tr>
<tr>
<td>Moderate</td>
<td>1 (1%)</td>
<td>0 (0%)</td>
<td>0.02 (-0.14 to 0.08)</td>
</tr>
<tr>
<td>Mild</td>
<td>7 (11%)</td>
<td>1 (5%)</td>
<td>0.06 (-0.13 to 0.17)</td>
</tr>
<tr>
<td>None</td>
<td>57 (88%)</td>
<td>20 (95%)</td>
<td>0.07 (-0.11 to 0.18)</td>
</tr>
<tr>
<td>Sexual Abuse² N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>0 (0%)</td>
<td>0 (0%)</td>
<td>0.00 (-0.15 to 0.06)</td>
</tr>
<tr>
<td>Moderate</td>
<td>4 (6%)</td>
<td>0 (0%)</td>
<td>0.06 (-0.10 to 0.15)</td>
</tr>
<tr>
<td>Mild</td>
<td>8 (12%)</td>
<td>0 (0%)</td>
<td>0.12 (-0.04 to 0.22)</td>
</tr>
<tr>
<td>None</td>
<td>53 (82%)</td>
<td>21 (100%)</td>
<td>0.18 (0.01 to 0.30)*</td>
</tr>
<tr>
<td>Emotional Neglect³ N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>3 (5%)</td>
<td>0 (0%)</td>
<td>0.05 (-0.01 to 0.13)</td>
</tr>
<tr>
<td>Moderate</td>
<td>6 (9%)</td>
<td>0 (0%)</td>
<td>0.09 (0.03 to 0.19)</td>
</tr>
<tr>
<td>Mild</td>
<td>23 (35%)</td>
<td>2 (9.5)</td>
<td>0.19 (0.05 to 0.33)*</td>
</tr>
<tr>
<td>None</td>
<td>32 (49%)</td>
<td>19 (90%)</td>
<td>0.41 (0.19 to 0.55) *</td>
</tr>
<tr>
<td>Physical Neglect³ N (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Severe</td>
<td>3 (5%)</td>
<td>0 (0%)</td>
<td>0.05 (-0.01 to 0.13)</td>
</tr>
<tr>
<td>Moderate</td>
<td>18 (28%)</td>
<td>0 (0%)</td>
<td>0.28 (0.10 to 0.40)*</td>
</tr>
<tr>
<td>Mild</td>
<td>13 (20%)</td>
<td>0 (0%)</td>
<td>0.20 (0.03 to 0.31)*</td>
</tr>
<tr>
<td>None</td>
<td>34 (52%)</td>
<td>21 (100%)</td>
<td>0.48 (0.28 to 0.60)* *</td>
</tr>
<tr>
<td>Minimisation/denial score³ N (%)</td>
<td>22 (34%)</td>
<td>10 (48%)</td>
<td>0.14 (-0.09 to 0.36)</td>
</tr>
</tbody>
</table>

* p<0.05 X² test for difference in proportions

**p<0.001 X² test for difference in proportions

(Denominators in each of these categories varied according to the completeness of the CTQ scale; ¹EPCACE =64, traumatised controls =21; ²EPCACE =65, traumatised controls =21)
4.9.4. **Comparisons of exposure to catastrophic trauma events between EPCACE and 21 control patients**

The two groups were examined for potential differences in the type of catastrophic trauma participants were exposed to (Table 37). Findings indicated that EPCACE patients reported significantly higher levels of exposure to five catastrophic traumatic events out of 17. Three of those events involved witnessing murder, torture, or burned/disfigured bodies. The other two traumatic events involved individuals being directly exposed to exceptionally threatening ‘life-or-death’ situations (being under sniper fire and running into an ambush).
### Table 37. Comparisons of severe trauma events between EPCACE group and 21 control patients exposed to catastrophic trauma

<table>
<thead>
<tr>
<th>Type of severe traumatic event (based on Harvard Trauma Questionnaire)</th>
<th>EPCACE N=65</th>
<th>Controls exposed to catastrophic trauma N=21</th>
<th>Proportion difference (95% CI of the difference)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Being under sniper fire N (%)</td>
<td>52 (80.8)</td>
<td>11 (52.4)</td>
<td>0.28 (0.05 to 0.49)*</td>
</tr>
<tr>
<td>Witnessed burned or disfigured bodies N (%)</td>
<td>50 (76.9)</td>
<td>7 (33.3)</td>
<td>0.44 (0.19 to 0.62)**</td>
</tr>
<tr>
<td>Murder or death due to violence of other family members (not spouse or a child) or friends N (%)</td>
<td>32 (49.2)</td>
<td>8 (38.1)</td>
<td>0.11 (-0.13 to 0.32)</td>
</tr>
<tr>
<td>Ran into an ambush N (%)</td>
<td>36 (55.4)</td>
<td>3 (14.3)</td>
<td>0.41 (0.17 to 0.56)**</td>
</tr>
<tr>
<td>Witnessed torture N (%)</td>
<td>16 (24.6)</td>
<td>1 (4.8)</td>
<td>0.20 (-0.001 to 0.32)</td>
</tr>
<tr>
<td>Witness killing or murder N (%)</td>
<td>17 (26.2)</td>
<td>0 (0)</td>
<td>0.26 (0.08 to 0.38)</td>
</tr>
<tr>
<td>Serious physical injury from combat or landmine N (%)</td>
<td>11 (16.9)</td>
<td>1 (4.8)</td>
<td>0.12 (-0.07 to 0.24)</td>
</tr>
<tr>
<td>Other types of sexual abuse or sexual humiliation (excluding rape) N (%)</td>
<td>5 (7.7)</td>
<td>0 (0.0)</td>
<td>0.08 (-0.08 to 0.17)</td>
</tr>
<tr>
<td>Torture N (%)</td>
<td>4 (6.2)</td>
<td>0 (0.0)</td>
<td>0.06 (-0.10 to 0.15)</td>
</tr>
<tr>
<td>Forced to find and bury bodies of the dead N (%)</td>
<td>6 (9.2)</td>
<td>0 (0.0)</td>
<td>0.09 (-0.07 to 0.19)</td>
</tr>
<tr>
<td>Solitary confinement N (%)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0.00 (-0.15 to 0.06)</td>
</tr>
<tr>
<td>Forced to harm others N (%)</td>
<td>3 (4.6)</td>
<td>0 (0.0)</td>
<td>0.05 (-0.11 to 0.13)</td>
</tr>
<tr>
<td>Murder or death due to violence of son or daughter N (%)</td>
<td>2 (3.1)</td>
<td>2 (9.5)</td>
<td>0.06 (-0.04 to 0.26)</td>
</tr>
<tr>
<td>Rape N (%)</td>
<td>0 (0.0)</td>
<td>0 (0.0)</td>
<td>0.00 (-0.15 to 0.06)</td>
</tr>
<tr>
<td>Kidnapped N (%)</td>
<td>0 (0.0)</td>
<td>1 (4.8)</td>
<td>0.01 (-0.03 to 0.04)</td>
</tr>
<tr>
<td>Murder or death due to violence of spouse N (%)</td>
<td>1 (1.5)</td>
<td>0 (0.0)</td>
<td>0.01 (-0.02 to 0.06)</td>
</tr>
<tr>
<td>Witnessed rape or sexual abuse N (%)</td>
<td>1(1.5)</td>
<td>0 (0.0)</td>
<td>0.01 (-0.03 to 0.04)</td>
</tr>
</tbody>
</table>

* p<0.05 $\chi^2$ test for difference in proportions with 1 degree of freedom

** p<0.001 $\chi^2$ test for difference in proportions with 1 degree of freedom

### 4.10. Factors associated with increased personality pathology following severe trauma in adults

The aim of the following comparisons was to examine factors differentiating between the EPCACE group and controls exposed to a traumatic event. The association difference in
Lasting personality pathology after trauma

demographics between the two groups has been examined in section 4.9.1. This suggested that the two groups differed in terms of their inpatient/outpatient status only.

Comparisons between the two groups in terms of measures of childhood maltreatment, behavioural problems and traumatic exposure are summarized in Table 38. Due to the small numbers of subjects in the subgroup of the control group, childhood abuse and neglect were collapsed to a dichotomous variable for abuse and neglect (i.e. positive or negative for each type). For the same reason, traumatic events were categorized in two groups: direct exposure to a life-threatening event and witnessing others being exposed to extreme violence. The figures presented are the number and percentage of subjects in each group along with the p-values indicating the significance of the results.

Table 38. Comparisons of adverse childhood events and traumatic exposure between EPCACE group and a subgroup of 21 controls

<table>
<thead>
<tr>
<th>VARIABLE</th>
<th>CONTROLS</th>
<th>EPCACE</th>
<th>P-VALUE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abuse</td>
<td>1 (5%)</td>
<td>19 (30%)</td>
<td>0.02</td>
</tr>
<tr>
<td>Neglect</td>
<td>2 (10%)</td>
<td>42 (65%)</td>
<td>&lt;0.001</td>
</tr>
<tr>
<td>Behavioural problems</td>
<td>0 (0%)</td>
<td>14 (22%)</td>
<td>0.02</td>
</tr>
<tr>
<td>Direct exposure to a life-threatening event</td>
<td>11 (52%)</td>
<td>56 (87%)</td>
<td>0.001</td>
</tr>
<tr>
<td>Witnessing threats to others</td>
<td>8 (38%)</td>
<td>51 (78%)</td>
<td>0.001</td>
</tr>
</tbody>
</table>

The analyses suggested that all five variables were significantly more common in the EPCACE group than the subgroup of controls. The difference was particularly marked for neglect, with 65% in the EPCACE group experiencing neglect, compared to only 10% in the control group.
The next stage of the analysis examined factors associated with being in the EPCACE rather than control group using logistic regression. As there were no cases of behavioural problems in the control group, it was not possible to include this factor in the regression analysis. Also, due to the small numbers of subjects in the subgroup of the control group, only factors found to significantly vary between groups (and those identified as important) were considered for this stage of the analysis. All variables were retained in the final regression model regardless of statistical significance.

Two different models were fitted. The first considered just those variables found to vary between the two groups. A second model additionally included age, as this was noted to be an important factor. Age was categorised into three categories (<40, 40-54, ≥55) to examine whether there were any associations between the age when a person experienced trauma and development of personality pathology. By choosing aforementioned age categories, participants were separated in those who were below 25 at time of the civil war (exposure to trauma), those who were between 25-40 years old and above 40 years of age.

A summary of the results is given in Table 39. The logistic regression results are summarised by odds ratios. These give the odds of being in the EPCACE group for each variable (along with a corresponding confidence interval).
Table 39. Odds ratios and 95% confidence intervals for factors associated with EPCACE group compared to controls who experienced severe trauma

<table>
<thead>
<tr>
<th>Model</th>
<th>Variable</th>
<th>OR (95% CI)</th>
<th>P level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td>Inpatient/outpatient status</td>
<td>0.09 (0.01 to 3.13)</td>
<td>0.18</td>
</tr>
<tr>
<td></td>
<td>Abuse</td>
<td>13.05 (0.96 to 177.59)</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>Neglect</td>
<td>20.41 (3.04 to 137.08)</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>Exposed to life-threatening event</td>
<td>4.41 (0.82 to 23.65)</td>
<td>0.08</td>
</tr>
<tr>
<td></td>
<td>Witnessing trauma to others</td>
<td>6.76 (1.39 to 32.75)</td>
<td>0.02</td>
</tr>
<tr>
<td>Model 2</td>
<td>Inpatient/outpatient status</td>
<td>0.04 (0.01 to 4.84)</td>
<td>0.18</td>
</tr>
<tr>
<td></td>
<td>Abuse</td>
<td>5.56 (0.48 to 64.45)</td>
<td>0.17</td>
</tr>
<tr>
<td></td>
<td>Neglect</td>
<td>26.61 (3.22 to 220.24)</td>
<td>0.002</td>
</tr>
<tr>
<td></td>
<td>Exposed to life-threatening event</td>
<td>7.09 (1.07 to 47.01)</td>
<td>0.04</td>
</tr>
<tr>
<td></td>
<td>Witnessing trauma to others</td>
<td>8.33 (1.43 to 48.66)</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>Age (&lt;40 years)</td>
<td>0.05 (0.01 to 1.24)</td>
<td>0.07</td>
</tr>
<tr>
<td></td>
<td>Age (40 - 54 years)</td>
<td>0.08 (0.01 to 1.70)</td>
<td>0.10</td>
</tr>
<tr>
<td></td>
<td>Age (&gt;55 years)</td>
<td>0.10 (0.01 to 1.24)</td>
<td>0.10</td>
</tr>
</tbody>
</table>

Both models suggested that neglect was strongly associated with being an EPCACE subject. Those undergoing neglect had odds of being in the EPCACE group that were over 20 times higher than those in control group. There was also some evidence that abuse was also associated with the outcome, although the results for this variable were only of borderline statistical significance in the first model but did not reach significant level in the second model.

Both models also suggested that witnessing others being exposed to extreme levels of violence was strongly associated with being an EPCACE subject. Being directly exposed to a
life-threatening event was not associated with the EPCACE group in the first model but became significant in the second model.
5. DISCUSSION

5.1. Principal findings

The aim of this retrospective, case-control study was to investigate the relationship between severe psychological trauma and the development of personality pathology in adults. More specifically, the main objective was to investigate whether exposure to catastrophic war-related trauma could lead to adult onset personality pathology. Since the study was done in a country affected by civil war more than a decade ago, the chosen case-control design was considered to be the most appropriate study design based on the assumption that personality change in adults following war trauma would be a rare occurrence. Principal findings of the study will be discussed in relation to each hypothesis and presented under separate subheadings.

5.1.1. Trauma exposure

Comparing individuals who have significant personality difficulties according to the International Personality Disorder Examination (IPDE) screen (cases) to those who did not have personality-related problems (controls), this study indicated that cases were almost twice as likely as controls to report at least one war-related event on the HTQ trauma event scale than controls. However, when war-related events on the HTQ scale were reclassified according to the severity to those considered to be of a catastrophic nature and those that were not, the results showed that people with personality pathology were eight times more likely to have been exposed to severe war-related trauma than those without personality disorder. This association increased after adjustment for demographic factors, indicating that people with personality pathology were ten times more likely to report exposure to one or more
catastrophic war-related event which included either personally experiencing life-threatening events or witnessing others being subjected to violence. These findings were consistent with my primary hypothesis that people who have clinically significant personality difficulties would be more likely to have been exposed to war-related trauma (primary exposure) than those who did not have personality-related problems. These findings also suggest that the impact of severe trauma on personality disturbance is potentially long lasting as participants had personality pathology and interpersonal dysfunction 15 years after the civil war.

When considering different types of trauma according to the war-related event scale in the Harvard Trauma Questionnaire (from less severe to those of catastrophic nature), the most frequently reported traumatic events in the total sample were lack of support from the local authority for emotional and physical problems (50.4%), being exposed to incoming fire (47.4%) and lack of shelter (47.4%). However, when only catastrophic trauma was examined, two distinctive types of traumatic events dominated: one group of events involved participants’ own life being in direct danger (for example being under sniper fire or running into an ambush) and the second group of events involved participants witnessing extreme violence inflicted on others or the result of violence towards others (such as murder, torture, seeing burned or disfigured bodies). Although both cases and controls reported the aforementioned traumatic events, a significantly higher proportion of cases were exposed to catastrophic traumatic events.

5.1.2. Personality pathology in cases

Findings from this study showed that the most frequent types of personality pathology among cases were avoidant, borderline and anankastic PD. These are also the most frequently observed types of personality disorder reported in secondary mental health services in
Western countries (Zimmerman et al., 2005; Newton-Howes et al., 2010). When compared across different PD clusters, Cluster C was the most frequent (59%), followed by Cluster A (55%) and much less frequently Cluster B (38%). Results also indicated that more than two-thirds of cases met diagnostic criteria for personality traits across two or more DSM-IV clusters, whilst one-third of IPDE screen positive participants had personality characteristics across all three PD clusters.

5.1.3. Mental health, social functioning and substance misuse: differences between cases and controls

As expected, people who had clinically significant personality pathology (cases) had poorer mental health and social functioning than controls indicating more global impairment. They reported significantly more depressive and anxiety symptoms, had higher levels of social dysfunction and similarly high rates of unemployment. These findings are consistent with prior research which reported considerable comorbidity and increased levels of social dysfunction in patients with personality disorders (Coid et al., 2006; Newton-Howes et al., 2010; Tyrer et al., 2005; Zimmerman et al., 2005).

People who were IPDE positive were also more likely to report having PTSD symptoms compared to controls. This is likely to be explained by higher levels of exposure to war trauma with cases almost twice as likely to report experiencing at least one trauma event on the HTQ scale than controls (see Chapter 5.1.1.).

Similar proportions of cases and controls reported current use of alcohol (39.8% vs. 37.2%) which is out of keeping with the results of research conducted in the UK showing higher prevalence of excessive alcohol use in patients with PD (Bowden-Jones et al., 2004, Zanarini
et al., 2010). However, when alcohol misuse was compared between participants who did and did not experience a catastrophic traumatic event, a significantly higher proportion of participants who experienced catastrophic trauma reported current alcohol use (46.7% vs. 28.7%) and a higher proportion of them was drinking above 20 units of alcohol per week (p=0.007). These findings are consistent with prior research on trauma and PTSD which suggested higher levels of alcohol abuse in people who have suffered traumatic experience (Kessler et al., 1995).

Although the level of drug misuse was also relatively low in the present study, a higher proportion of cases reported current substance misuse (8.2% vs. 0.0%) which is consistent with prior research evidence reporting higher levels of substance misuse in personality disorder patients (Bowden-Jones et al., 2004). Similarly, significantly more participants who were exposed to catastrophic trauma reported current substance misuse when compared to participants who did not experience severe psychological trauma (9.2% vs. 0.9%).

Although both alcohol and drug misuse were relatively rare in this study, it is of note that low levels of substance misuse were also found in cross-sectional studies with people exposed to war-trauma when assessed many years later (Stewart, 1996; Marshall et al., 2005). Findings from a cross-sectional study examining mental disorders in an adult population who were directly exposed to war in the Balkans (Priebe et al., 2010), found a low prevalence of any substance use disorder. Some of the findings from this survey that related specifically to Croatia, reported that the prevalence of alcohol abuse was 2.8% and drug abuse 0.6%, suggesting a relatively low prevalence of any substance abuse in this war-exposed population (Priebe et al., 2010).
5.1.4. Comparisons between EPCACE and PD patients

The main aim of the present study was to investigate whether exposure to war trauma could lead to personality pathology in adults. Having found that people who had personality-related problems were more likely to have been exposed to war trauma, I then set about examining the role that the war trauma may have played in the onset of their condition. To do this, I examined whether people had evidence of personality-related problems prior to their exposure to war trauma and compared the characteristics of the people with PD with those whose personality-related problems appeared to follow exposure to trauma in adulthood. As emphasized in both the introduction and methods sections of this thesis, to receive a diagnosis of personality change after catastrophic experience, one needs to be exposed to a severe level of trauma and have no evidence of pre-trauma personality disorder. A detailed description of the process I used to separate cases on the basis of the onset of personality pathology is presented in the methods section (Chapter 3.3.5) and the results section (Chapter 4.6) of this thesis. Briefly, whether I considered a participant to have EPCACE or PD was based on a combination of scores from three variables: IPDE scores, exposure to catastrophic trauma and the time of the onset of personality pathology using data from a clinical interview.

Among 182 cases who were IPDE screen positive, 65 participants (35.7%) had no history of pre-trauma personality pathology, suggesting development of personality problems in adulthood which followed their exposure to severe trauma (EPCACE). This study was not designed to estimate the prevalence of EPCACE, but my data suggest that a considerable proportion of people who have personality pathology and use secondary care services in Croatia have personality pathology that develops in adulthood following exposure to war trauma.
Mental health and social functioning in PD and the EPCACE groups

When compared to PD patients, the EPCACE group had poorer mental health and social functioning and similarly high rates of unemployment. My data show that the EPCACE patients were three times more likely to report anxiety symptoms and 4.5 times more likely to suffer from PTSD than the PD group. The association between PTSD and EPCACE remained significant when adjusted for covariates (gender and marital status) indicating the EPCACE patients were three times more likely to suffer from PTSD than their PD counterparts. Furthermore, they reported significantly more suicidal thoughts than the PD group (68% vs 47%). These data provide evidence that people with EPCACE have levels of emotional distress that are as high, if not higher, than patients with personality disorder. These symptoms appear to be enduring and impact on interpersonal functioning for more than 15 years following exposure to catastrophic trauma.

Personality characteristics

Aspects of disordered personality were assessed in this study using the IPDE 77-item questionnaire. The threshold for avoidant personality was reached by 86.2% of EPCACE patients, borderline by 86.2%, schizotypal by 75.4%; schizoid by 73.8%, paranoid by 67.7%), and anankastic by 60%. A significantly higher proportion of EPCACE patients scored positive on the schizoid (73.8% vs 41.1%) and schizotypal subscales (75.4% vs. 47.3%) of the IPDE scale compared with PD patients, and there was a statistically non-significant trend towards the EPCACE patients scoring higher than the PD group on avoidant, borderline and paranoid traits.

An additional and important finding was that people with adult-onset personality pathology following exposure to catastrophic trauma were three times more likely to meet the criteria for
personality problems across all three DSM-IV conceptual clusters than the PD group. These findings suggest that the complexity and degree of personality pathology in patients with EPCACE is greater than in those with PD alone. The present findings indicating that a considerable proportion of cases met threshold for two or more personality traits are consistent with prior research which suggested that most people with a diagnosis of personality disorder ‘do not fit’ into a single personality disorder subcategory. Instead, they tend to meet criteria for two or more subcategories within one cluster or across two or even all three clusters (Coid et al., 2006; Tyrer & Johnson, 1996).

**Comparing ICD - 10 diagnostic criteria for EPCACE and observed personality pathology in the EPCACE group**

One of the aims of this thesis was to examine whether the presenting symptomatology in the EPCACE group corresponded to the current diagnostic criteria in ICD-10 (see Box 13 below). My findings indicated that the observed personality pathology in EPCACE is multifarious. It included persistent feelings of emptiness (92%), frequent mood changes (84%), anger regulation problems (88%), increased suspiciousness (71%) and avoidance of social interactions (80%). More than two-thirds reported feeling ‘cold and detached’, having difficulties showing emotions (77%) and general lack of enjoyment in life (86%). Feelings of being treated unfairly by others (83%) and not being able to trust others (69%) were equally frequent. Impulsiveness, suicidal ideation and threats of self-harm and identity problems were reported by more than 60% of participants in this group. More than half of people with EPCACE reported feeling ‘odd and eccentric’, being rigid and inflexible and sensitive to criticism. Surprisingly, increased dependency (one of the Group B criteria in ICD-10) was generally low (35%) and significantly lower than in PD group (53%).
Based on the above described personality traits and features, it seems that personality psychopathology of people experiencing severe trauma in adulthood is complex and specific features that distinguish it from the range of problems experienced by people with PD may not exist. Some of the characteristics I elicited are consistent with the current ICD-10 criteria for F62.0, such as hostility and distrust, feelings of emptiness, inability to show emotions and social withdrawal. However, many others such as affect regulation difficulties, anger modulation problems, impulsivity, feelings of being cold, detached, eccentric, oversensitive to criticism, rigidity and inflexibility in interpersonal interactions, increased suicidality, and self-identity problems (see Box 13) are not currently included in the ICD-10 diagnostic classification.
Furthermore, the above broad range of personality pathology elicited in adults with EPCACE encompasses problems seen in all three DSM clusters of personality pathology. Increased levels of suspiciousness, distrust, avoidance and rigidity (Cluster A and C traits) are additional factors which add to the complexity of this phenomenon and could be linked to a less favourable long-term prognosis and poorer response to treatment as reported by previous research (Bisson et al., 2007).
Additional findings

An unexpected finding was that a significantly greater number of the EPCACE patients were married or living with a partner compared to the PD group (82% vs. 58%) and a lower number of them were divorced or separated (3% vs. 18%). These findings may reflect a higher level of interpersonal functioning in the EPCACE patients prior to the war trauma, increasing the likelihood of them being in long-term relationships following the trauma. The results could also reflect a higher level of tolerability among their partners who might be more likely to attribute the EPCACE patients’ psychopathology to external factors (i.e. war) rather than to the patient’s character. In contrast, people with PD have had interpersonal problems for a longer period affecting their ability to develop and sustain close personal relationships in adulthood, which explains this study’s finding of a significantly higher number of personality disorder patients living on their own and being separated/divorced.

5.1.5. Comparisons of childhood adverse events and behavioural difficulties across different groups

As expected, cases (IPDE positive) reported higher levels of childhood maltreatment and childhood behavioural problems than controls. This was observed across all three levels of abuse (emotional, physical and sexual) and the two neglect categories (emotional and physical). Following adjustment for demographic factors, emotional and sexual abuse and physical neglect remained strong positive predictors for personality related psychopathology in adults. These findings are consistent with other studies which found higher levels of childhood maltreatment in patients with personality disorder (Bernstein et al., 1998; Bandelow et al., 2005; Cohen et al., 2014; Helgeland & Torgersen, 2004; Moran et al., 2011; Purtscher, 2008; Riggs et al., 2007).
In terms of childhood behavioural problems, cases reported more behavioural difficulties during late childhood and adolescence than controls. They differed significantly in both mild and moderate levels of behavioural disturbance, whilst there was no difference in at the severe end of the scale with both groups reporting low levels of severe childhood behavioural problems. These findings are in line with previous research (Coid et al., 1999), although the proportion of patients reporting symptoms of serious childhood behavioural problems during their adolescent life was rather low in the current study.

Comparisons of childhood maltreatment and early behavioural problems between personality disorder patients and the EPCACE group, indicated that all types of childhood maltreatment, aside from physical neglect were more common in patients with personality disorder than the EPCACE patients. They also had more behavioural problems than the EPCACE group, although both groups had low levels of severe conduct disorder-like problems.

Further comparisons between the EPCACE and control group (IPDE negative) revealed that, with the exception of physical abuse, the EPCACE group reported more adverse childhood events and behavioural problems than controls. Further sub-analyses indicated that the difference between the two groups lay mainly at mild and some moderate levels of abuse/neglect, whilst severe levels of abuse/neglect were equally low in both groups. Similar results were found when the EPCACE patients were compared to those who were exposed to catastrophic trauma but had no personality pathology.

In summary, my findings suggest that patients with personality disorders had much higher levels of childhood maltreatment than controls. Among cases (IPDE positive), the EPCACE patients reported significantly lower levels of abuse/neglect than the PD patients. These
results are in line with the current ICD 10 diagnostic criteria, according to which pre-trauma personality pathology excludes diagnosis of personality change after catastrophic trauma. However, the results also indicated that the EPCACE group showed, apart from physical abuse, higher levels of abuse/neglect when compared to controls (mainly on mild and some moderate levels). It is important to emphasize that the Childhood Trauma Questionnaire has a very high sensitivity for adverse childhood events and for instance scoring positively only on one item indicates mild level of abuse. It is also important to bear in mind that scoring mild to moderate on this scale suggests a potential risk factor for the development of personality disorder, but it is not equal to being diagnosed with personality disorder. An additional difficulty in drawing conclusions based on these results is related to the high scores on CTQ minimisation/denial scale in the control group which could be a result of significant underreporting of the childhood maltreatment events in controls (particularly the mild ones).

There are several explanations that could potentially account for the above findings. It is possible that being exposed to mild/moderate adverse events in childhood, as observed in the EPCACE group, may result in some form of pre-trauma vulnerability. Under circumstances of exposure to catastrophic stress this vulnerability could make these individuals more susceptible to developing psychopathology, including personality related problems. The greater incidence of mild level of emotional and physical neglect in childhood reported in the EPCACE group compared to the controls that experienced catastrophic trauma but had no personality pathology could potentially explain their different response to war trauma.

Another possibility could be that these patients might have had sub-threshold levels of personality problems prior the war with no or minimal interpersonal problems living in a relatively stable environment and functioning reasonably well i.e. able to complete studying,
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hold a job and be in a longer-term relationship. Although currently not included in ICD-10 disease classification systems, it has been known for some time that having personality difficulties could make people more vulnerable to stresses and a particularly stressful situation could accentuate personality traits and interfere with interpersonal functioning in people who at other times would function well (Tyrer & Johnson, 1996). Even greater stress of a catastrophic nature such as life-threatening situations during war or witnessing interpersonal violence could in vulnerable individuals potentiate their personality difficulties. If the stressors are severe enough and sustained for a longer period, this could potentially lead to lasting personality psychopathology. The retrospective nature of this study and methodology used to elicit past and current personality pathology would not have been sensitive enough to investigate whether the EPCACE patients had sub-threshold personality pathology pre-war trauma. However, addressing this issue in future research would be important as it could be a potential risk factor in the development of clinically significant personality pathology in adult life.

Finally, a plausible explanation for the differences observed between the controls and the EPCACE patients could be that these results are due to chance and a result of Type I error particularly if we take into account high scores on CTQ minimisation/denial scale in the control group. This could be a result of significant underreporting of the childhood adverse events in controls, particularly the events related to mild levels of neglect where the two groups differed. This underreporting may also reflect a lower degree of awareness of potential effects of the adverse childhood events in controls, in contrast to cases whose awareness of the same would have been expected to be much higher due to many years of contact with mental health services. Through regular and frequent contacts with mental health professionals, cases could have become much more cognizant and almost ‘primed’ to
questions related to emotional and behavioural problems during late childhood and adolescence.

5.2. Risk factors associated with increased personality pathology following severe trauma in adults

The potential risk factors that might make individuals more vulnerable to develop EPCACE were explored by comparing the patients with adult onset personality pathology following catastrophic trauma and participants that reported exposure to catastrophic stress but did not develop personality problems subsequently.

No demographic factors were found to be predictors of EPCACE. The strongest associations with an EPCACE diagnosis were childhood neglect and witnessing others going through extreme levels of interpersonal violence. These associations remained significant after adjusting for other covariates. When patients at different ages were examined (below 40 years, between 40 to 54 years, 55 and above years), being directly exposed to life-threatening events was also found to be a significant predictor of an EPCACE diagnosis. On the other hand, childhood abuse which was another important predictor investigated in this study, was only of borderline statistical significance. This could potentially be due to low power as the number of participants included in this subanalysis was relatively small.

These findings confirm the importance of neglect (even at a mild level) as a risk factor, which combined with exposure to catastrophic trauma could make individuals more susceptible and potentially lead to the development of longer-term personality problems and interpersonal dysfunction. These findings are consistent with emerging evidence that neglect in childhood
is a risk factor the development of mental disorders, and possibly as harmful as emotional and physical abuse (Carr et al., 2013; Norman et al., 2012).

The current findings also indicated that exposure to severe forms of trauma (witnessing extreme levels of interpersonal violence and being exposed to life threatening situations) are important predictors for the development of personality disturbance later in life.

5.3. General methodological considerations (strengths and limitations)

5.3.1. Strengths of the study

The present study has a number of strengths. This research project was started with pre-specified aims and clearly defined hypotheses I intended to test. Also, I developed the plan for the main analysis before testing of any hypotheses to reduce the likelihood of Type I error (false positive findings). Additionally, a sample size calculation was conducted prior to data collection and I was subsequently able to recruit the required number of participant ensuring that the study was adequately powered to address the main study hypothesis and have a high probability of finding the difference between the two groups if it really exists, thus reducing the likelihood of Type II error.

Most of the existing research in the area of personality pathology in adults following trauma, is based on cross-sectional studies and large case series which have not used a comparative group or, as in some studies, used less appropriate controls based on ‘convenience’ samples (Munjiza et al., 2014). The case-control design employed in this study allowed the use of an appropriate comparison group (patients from secondary general medical outpatient/inpatient) and applied similar exclusion and inclusion criteria for controls and cases. Had I recruited
controls from the general population or primary care, it is quite likely that this would have led to an overestimate of effect sizes if ‘super-healthy’ controls were compared to unrepresentatively ill cases and thus increased the likelihood of Type I error (Lee et al., 2007).

Most importantly, the study assessed for pre-trauma personality pathology, which allowed me to separate those who developed personality related problems following the traumatic war experience in adulthood from patients who had pre-existing personality disorder, which is the exclusion criteria for the diagnosis of enduring personality change after catastrophic experience (F62.0). In other words, this study addressed a confound encountered in much of the previously published literature as very few studies assessing the impact of catastrophic trauma, investigated presence of pre-morbid personality pathology (Munjiza et al., 2014). Without attempting to answer this fundamental question, it is difficult to conclude that post-traumatic personality changes are truly a result of catastrophic trauma rather than pre-existing undiagnosed PD. Although in my study this information was gathered retrospectively and thus prone to a recall bias, this was particularly explored during the clinical interview with each participant. By conducting the clinical interview with this clearly specified aim and finding little or no evidence of interpersonal dysfunction prior to war trauma in a proportion of participants, the likelihood of someone having undiagnosed PD prior to exposure to war trauma was decreased.

An additional strength to this study is that it was conducted in a war-affected area which allowed recruitment of a large number of participants with exposure to war trauma (the primary exposure of interest). Both cases and controls came from the same geographical region and had similar cultural upbringing which helped to control for potential biases that could have been introduced had they come from a different ethnic and cultural background.
Another important strength of this study is that it used validated and standardized measures for the assessment of trauma (primary exposure), common mental health disorders and PTSD (Harvard Trauma Questionnaire, Hopkins Symptom Checklist, HSCL-25) which had been translated into the Croatian language and culturally adapted and extensively used, tested and validated in the communities of the former Yugoslavia including Croatia itself (Mollica et al., 1999; Mollica et al., 2001). The study also used the Childhood Trauma Questionnaire, a standardized and validated measure to assess for adverse childhood events (Bernstein et al., 1997).

An additional strength of this study is that all clinical interviews were conducted by the same researcher (myself) and all self-reported measures were collected by me, so any queries participants had were addressed by the same person assuring consistency of data collection and subsequent analysis and interpretation. Participants were also able to answer questions during the interview and complete self-report instruments in their native language without a need for interpreters.

However, the retrospective nature of this study also means that it had some important methodological limitations which must be considered when interpreting the results. Although some of the limitations relate to case-control design in general, I will particularly focus on the more specific limitations related to this study. These will be discussed in more detail under separate sub-headings.

5.3.2. Confounding

Multivariate analysis was used to avoid undesirable effects of potential confounders in this study. Associations with the outcome (binary variable defined as positive or negative) were
expressed as odds ratios and analysed using logistic regression and controlled for the effects of demographic factors (age, gender, education, ethnicity, marital status, inpatient/outpatient status). Although some authors argue that controlling of confounders is preferable at the study design stage (Daly & Bourke, 2000), control of confounding by using statistical techniques such as multivariate analysis is appropriate when the former is not fully feasible (Grimes & Schulz, 2002). As discussed in the introduction (Chapter 3.1.5) I did not use matching to recruit participants in my study. This was mainly due to disadvantages associated with this recruitment method as it is less cost-effective, prolongs recruitment time and also can result in the exclusion of cases when a matching control cannot be found (Hennekens & Buring, 1987; Ben-Shlomo et al., 2013). This would have considerably reduced my ability to recruit the required sample size.

5.3.3. Limitations related to collection of retrospective data

Although attempts were made to reduce recall bias, it is possible that it could have influenced the participants’ accounts of traumatic war experience. Past exposure to war-related trauma may have been more vivid and memorable to cases, because they developed an awareness that war trauma is a potential risk factor for PTSD through repeated interviewing by mental health professionals. Equally, it was quite likely that traumatic war experience was widely publicised as a risk factor for PTSD in the years following the civil war and this could have increased participants awareness and resulted in potential priming for war-related traumatic events. Another problem related to reliance on data derived from retrospective interviews (as in this study which was conducted 15 years after the Yugoslav civil war), was that participants’ accounts of past events might have been influenced by their current psychological status and social circumstances, which could have changed due to important local and global socio-economic changes in the region. Thus, the consequences of the current socio-economic crisis
affecting the region could have influenced participants more negative accounts of their personal circumstances being a consequence of the civil war.

Although almost unavoidable in case-control studies, recall bias can be minimised if exposure status between cases and controls is assessed in a sufficiently similar way. In this study, using a standardised self-report measure to assess trauma exposure (HTQ) in cases and controls ensured that the exposure of interest (war trauma) was equally assessed in both groups with no additional prompts from a researcher. Some authors argue that using standardized self-report measures might be more appropriate than using lengthy and complex clinical interviews which potentially could introduce observer bias potentiated by giving additional prompts to some participants but not to others (Mollica et al., 2004). When I was asked for clarifications of questions related to the standardised self-report measures, I explained the purpose of the question in a consistent way without giving additional prompts. This was done to avoid enhanced recall and overreporting of specific past events in some participants (in one group) and under-reporting in others (belonging to a different group). Additionally, in order to prevent potential ‘carry over’ effects from traumatic memories triggered by filling out the HTQ to other standardised questionnaires, exposure to traumatic events and PTSD symptoms were examined last (after participants had completed IPDE, SFQ, CTQ and childhood behavioural problems scales). In other words, even if the study participants were more likely to score higher on PTSD screening tool (HTQ, part IV) due to the aforementioned factors, it is unlikely that this would have significantly influenced their scores on the personality measure (IPDE scale was completed before the HTQ) which was the primary outcome measure in this study.
5.3.4. Limitations related to selection of cases

One of the potential limitations of this study is related to the selection of cases. Although this was not a cross-sectional study, which could provide evidence of the prevalence of personality pathology in adults following trauma, a high percentage of the recruited patients were found to have adult onset personality pathology. There may be a number of reasons for this. Prior to the start of the recruitment process, local mental health clinicians were asked to refer all patients with any clinically significant personality pathology and they were not aware of the study’s primary and secondary hypotheses. However, it is possible that clinicians might have approached and referred patients that they perceived to be more suitable for the study i.e. who they thought had a diagnosis F62.0 (EPCACE) rather than personality disorder despite my specific encouragement and advice to refer both groups (i.e. all patients with clinically significant personality pathology). Another possible explanation is that these patients were more frequently reviewed in outpatients’ settings due to their level of emotional distress, therefore more likely to be referred during the intermittent recruitment process in this study. This problem partially relates to the higher number of male participants being recruited in the cases than controls. From personal observation during the study recruitment process, noticeably more male than female patients were attending mental health outpatient clinics, although I do not have specific figures to support this observation. This impacted on the study recruitment process resulting in a higher number of male patients being recruited to take part in the study. In contrast, this gender discrepancy was not observed in the general medical setting where a roughly equal number of both sexes were recruited. One way of dealing with this problem could have been to use a matching technique and thus restrict the number of male recruits in cases or female participants in controls. However, due to other constraints (data collected abroad and not having a local recruitment team due to the lack of funding) this
was not feasible. Multivariate analysis was used to control for gender as a possible confounder.

An additional bias related to the selection of cases is that they came from a treatment-seeking patient group which potentially could affect the generalisability of the findings. Treatment-seeking participants are usually much more motivated and also have a higher awareness of potentially harmful factors on psychological wellbeing (i.e. psychological trauma being linked to mental health problems). Therefore, it is possible that some respondents exaggerated either the extent of their exposure to traumatic war related events or the number of stress symptoms they experienced. It is equally possible that some participants underreported symptoms thus affecting the strength of some statistical associations. In this study participants were asked to tick the traumatic event they experienced rather than being asked to rate the severity of exposure (low, medium, high) which was subsequently recoded by the researcher into catastrophic trauma and non-catastrophic trauma.

### 5.3.5. Limitations related to selection of controls

Choosing appropriate controls in a case control study is always a challenging task. Although no ideal control group exists, in this study an attempt was made to choose as representative a control group as possible. This means that controls should represent those individuals who would have been selected as cases had they developed the condition of interest, i.e. they represent the level of exposure within the population from which cases have been identified (Grimes & Schulz, 2005; Wacholder et al., 1992b). This would provide an accurate estimate of the prevalence of exposure in the population being examined which in this study were people using secondary health care services in southern Croatia. It is important that selection of controls is independent of the exposure being investigated (Schulz & Grimes, 2002). By
recruiting controls from secondary general medical outpatient/inpatient settings rather than
primary care or the general population, I tried to reduce the risk of selection bias as cases
might be different to healthy controls in other ways rather than just having or not having the
condition of interest. Furthermore, a variety of general medical inpatient and outpatient
settings were used to recruit patients with a range of clinical diagnoses with the aim of
minimising potential selection bias that might arise had I focused on a particular medical
condition. Also, I did not recruit patients from surgical outpatients clinics/wards whose use of
secondary care services could be related to the exposure of interest (war trauma).

I also made sure to recruit cases and controls from secondary care services serving the same
geographical population. This would not have been the case had the controls come from
primary care or the general population as they would have come from mostly urban area.
While controls were not randomly selected from all patients using general medical services at
the outpatient clinics and hospitals, clinicians were asked to refer all the patients they saw,
aside from those considered too physically ill to take part in the study or those whom
clinicians knew had chronic mental illness. All of the above described attempts were used to
minimise bias in selection of controls and reduce a challenging task of choosing an
appropriate comparison group which is one of the most frequently reported limitations in case
control studies (Grimes & Schulz, 2005; Schulz & Grimes, 2002; Wacholder et al., 1992b).

5.3.6. Limitations of data obtained by measurement scales
One of the challenges I was faced with while designing this study, was related to the choice of
an appropriate personality assessment measure, i.e. whether to use a semi-structured interview
or a self-report measure. Although I was aware that validity of personality screening
questionnaires in general has been frequently questioned as they tend to produce a higher
proportions of false positive answers (low sensitivity) when compared to semi-structured interviews (Perry, 1992; Zimmerman, 1994), I chose not to use lengthy semi-structured interviews for the assessment of participants’ personality-related problems for two reasons. First, most of the cases recruited in this study already had a clinical diagnosis of personality disorder (F60.0 – F60.9) or personality change (F62.0), as well as some cases out of 19 participants that were recruited in general medical settings (although their medical clinicians were not aware of this). Another reason was that I felt that it would have been very difficult, if not impossible, to recruit a sufficient number of participants for the control group that would agree to spend three or four hours talking to a researcher and completing questionnaires following their routine medical review appointment which on average lasted 15-20 minutes. I felt that this would cause a considerable recruitment challenge for my study which potentially could have led to a significant under recruiting of controls. Therefore, by using the IPDE questionnaire, the time needed to complete questionnaires and interview was reduced considerably.

For the purpose of this study, the IPDE-77 self-reported personality measure was used to assess personality disorder features (traits), rather than to diagnose disorder per se, as cases were already diagnosed by their clinicians. Furthermore, prior research indicates that most people with a diagnosis of personality disorder ‘do not fit’ into a single personality disorder subcategory. Instead, they tend to meet criteria for two or more subcategories within one cluster or across two or even all three clusters (Tyrer & Johnson, 1996; Crawford et al., 2011b).

Also, a potential benefit of using a self-report measure is that it eliminates the additional instrument variance associated with interviewers style as all participants are responding to
exactly the same questions. Its brevity is another potential benefit as the IPDE interview is a highly structured interview which takes approximately $1 \frac{1}{2} - 2$ hours to conduct and requires considerable training in its use (Loranger et al., 1985). In this study, the screening instrument was given out by an experienced psychiatrist rather than a layperson which helped to maintain consistency in providing the same guidance to participants on how to complete the questionnaire (for instance participants were instructed when answering the IPDE questions to think what they were like over the past five years rather than ‘here and now’). I was also able to clarify queries that participants had about any items in the questionnaire.

Although when the IPDE screening questionnaire was developed, it was initially used to reduce the interview time by identifying personality domains unlikely to be present before conducting the semi-structured interviews (Loranger et al., 1985). However, over the past 10-15 years it has also been widely used in many international studies for estimating personality disorder prevalence, and reportedly provided consistent and reliable results (Huang et al., 2009; Jackson & Burgess, 2000; Lenzenweger et al., 2007; Loranger et al., 1994).

While the IPDE screen has been used to assess personality disorder in a number of international studies, its psychometric properties have not been fully examined. However, several studies reported on its satisfactory reliability (internal consistency) in clinical and non-clinical populations (Lenzenweger et al., 1997; Lenzenweger et al., 2007; Loranger et al., 1991). Lenzenweger et al. (2007) found the IPDE screen to be a significant predictor of clinical diagnoses. Because in my study most of the cases recruited already had a clinical diagnosis of personality disorder (F60.0 – F60.9) or personality change (F62.0) and aforementioned recruitment challenges involved in recruiting controls, the above reported specificity and sensitivity were considered to be satisfactory for the purpose of this study.
Another limitation of the study is that no clinical notes were reviewed to validate self-reports of psychological health or history of trauma exposure. Apart from depression, anxiety and PTSD, comorbidity of other psychiatric diagnoses was not explored. Having history of psychotic illness was one of the exclusion criteria of the study so clinicians were advised not to refer such patients to the study. These patients were excluded to minimise the confounding that could possibly arise due to including patients who have enduring personality change after psychiatric illness (F62.1), which is a separate diagnostic entity (WHO. 1992) and not related to exposure to catastrophic trauma. An additional limitation was that no collateral history was obtained to validate participants’ accounts of pre-trauma functioning and personality pathology.

Another important limitation of the study relates to the definition and use of the term ‘catastrophic trauma’. There is no clear definition or description of what catastrophic trauma means or what it would involve. In this study, types of trauma events from the HTQ – Part I (Trauma Events) questionnaire were selected independently by two clinicians (myself and MC) using the information about potential catastrophic events from the ICD-10 (WHO, 1992) and based on the international experts opinion from the paper by Beltran & Silove (1999). Based on this, traumatic events were dichotomised into a ‘catastrophic’ and ‘non-catastrophic’ events and this variable was subsequently used in combination with another two variables (the IPDE scores and the onset of personality pathology based on the clinical interview) in making a decision about whether a participant was considered to have adult onset of personality pathology or personality disorder.

In the current study, I attempted to compromise by using a combination of validated self-reported instruments to measure outcomes of interest and unstructured interview to assess
when personality related problems started with the added benefit of recruiting a larger number of participants and reducing the time and expense of more lengthy interviews. However, this process also involved a number of limitations as described above.

5.3.7. Limitations related to the interviewing process

The main purpose of the study interview was to establish when personality-related problems started in cases.

There are several limitations related to the interviewing process used in this study. The main limitation was the potential for observer bias. In order to minimise observer bias several steps were undertaken. Firstly, I did not have access to patients’ clinical records and was not aware whether the cases had a diagnosis of personality disorder (F60.1-9) or personality change following catastrophic experience (F62.0). In other words, I was ‘masked’ to clinicians’ clinical diagnosis defining personality pathology status among cases. Nor was this information collected after the interview was completed. Secondly, before the clinical interview, I only checked patients’ scores on the IPDE measure. I did not check participants scores on any other self-report measures before the clinical interview. For instance, I was not aware of participants’ scores on the Childhood Trauma Questionnaire or childhood behavioural problems scale prior to the interview which potentially might have influenced my decision on whether there was evidence of pre-existing personality difficulties during late childhood or adolescence. During the clinical interview each participant was initially asked when they first became aware of the problems for which they had circled ‘yes’ on the IPDE questionnaire. For example, I would ask cases: ‘I’ve noticed that you circled ‘yes’ for the statement ‘I feel empty inside’, how long have you been aware of having this feeling?’ or ‘When was the first time you became aware of this?’ This was repeated with another 3-4
positively scored statements. I subsequently proceeded to explore if participants had any childhood and adolescent behavioural problems and any interpersonal struggles that happened before any exposure to war-related trauma. I used this approach to assess pre-trauma personality pathology, which if present would have excluded a diagnosis of EPCACE. I also tried to keep each interview as consistent as possible between participants. An additional limitation related to the interviewing process is that information gathered about health and function some years ago is inevitably prone to recall bias. No collateral history was obtained to validate participants’ accounts of pre-trauma functioning and personality pathology. The lack of corroborative information about participants pre-war psychological functioning means that the possibility that emotional predisposition accounted for some degree of post-traumatic response cannot be dismissed. An additional limitation of this study is that one person conducted all interviews, so there was no possibility to use inter-rater reliability to check accuracy, which potentially can be a problem when assessments are done by less experienced raters/researchers.

5.3.8. Generalisability of the study findings

This study was undertaken in Croatia, an ex-republic of the former Yugoslavia. As described in the Chapter 3.2.2., the history of the Western Balkan region had been a turbulent one, particularly during the 20th century when this region was affected by two major wars (WWI and WWII), civil unrest in the 1970s prior to the disintegration of the former Yugoslavia, which was followed by the civil war of 1991-1995 affecting participants in this study. Political instability of this region was further enmeshed by ethnic and religious complexities as described in Chapter 3.2.2. Therefore, I purposely recruited my sample from an area where people had been exposed to a high level of war-related trauma as this was the main exposure of interest in this research project.
Recruiting participants from Croatia could also be seen as a disadvantage leading to reduced generalisability as the findings obtained from a country with such a complex political, ethnic and religious history, might not be applicable to other countries with less heterogeneous background. Additionally, the study sample comprised of civilians, refugees and volunteer combat veterans but almost no professional military personnel (<1%). Therefore these findings may not be generalisable to military personnel in the former Yugoslavia or other countries such as the UK and the United States, whose soldiers are considered to be highly trained professionals choosing the army as their career and more likely to be better psychologically prepared for adverse combat-related circumstances. Nevertheless, the results of this study could potentially be generalised to populations affected by civil war including civilians, refugees and volunteer combat veterans in countries of similarly diverse background.

5.4. Results in relation to previous studies

The present study found a high prevalence of war-related trauma in people with clinically significant personality pathology. They were eight times more likely to have been exposed to severe war-related trauma than those without personality disorder. These results add further evidence of the significance of interpersonal trauma on lasting personality pathology and are consistent with previous research (Barrett et al., 1996; Daud et al., 2008; Ehlers, et al., 2000; Engdahl et al., 1991; Funari et al., 1991; Hunt & Gakenyi 2005; Kozaric-Kovacic & Kocijan-Hercigonja, 2001; Marcinko et al., 2006; Richman & Frueh, 1996; Richman & Frueh, 1997; Robert et al., 1985; Sherwood et al., 1990; Skodol et al., 1996; Sutker et al., 1993; Taylor et al., 2006).
The current findings overlap with other studies on a number of findings. They show the strongest similarity with the profiles of personality features reported by Shea et al. (1999) in terms of a higher proportion of participants scoring on all three Cluster A traits, borderline and anankastic traits which were highly prevalent in both. However, they are dissimilar on Cluster C as the present study found a high rate of avoidant traits in contrast to the results reported by the same study (Shea et al., 1999).

Similarly, the current findings partially overlap with the results from some other studies on high levels of avoidant personality traits (Bollinger et al., 2000; Hyer et al., 1996; Funari et al., 1991; Robert et al., 1985; Sherwood et al., 1990; Southwick et al., 1993; Taylor et al., 2006), but not with others (Richman et al., 1996; Shea et al., 1999).

Only three studies found higher levels of schizotypal traits (Richman et al., 1996; Shea et al., 1999; Taylor et al., 2006), which would be consistent with the findings from this study (although rates varied broadly). On the other hand, some other studies did not find schizotypal traits to be prevalent among individuals with observed personality problems (Bollinger et al., 2000; Funari et al., 1991; Sherwood et al., 1990) which is different to the findings presented in this study. In terms of the high levels of schizoid traits observed in the current study, similar findings were reported by other studies although the prevalence varied considerably (Bollinger et al., 2000; Funari et al., 1991; Richman et al., 1996; Shea et al., 1999; Sherwood et al., 1990).

This study sample had a low level of antisocial personality traits which is different to some early studies (Sherwood et al., 1990; Funari et al., 1991) and those which assessed solely for ASPD (Barret et al., 1996; Escobar et al., 1983; Kulka et al., 1990) which all showed high
levels of ASPD, but consistent with some later studies (Richman et al., 1996; Shea et al., 1999; Taylor et al., 2006) which found similarly low rates of ASPD. It is possible that this difference is due to some studies using pure military samples whilst the current study’s sample comprised refuges, civilians and volunteer combat veterans. Furthermore, dependent traits in the current sample were low, which was consistent with findings reported by Sherwood et al. (1990), but differed from Taylor et al. (2006) who reported significantly higher levels of dependent traits.

Considerable variation in personality pathology between the findings in this study and results from some previous research may result from the high level of clinical and methodological heterogeneity between the studies, including the personality assessment measures used, sample size and selection, clinical settings, methodologies used, and research foci. As indicated previously in a comprehensive systematic review of literature on lasting personality pathology following exposure to catastrophic trauma (Munjiza et al., 2014), only a few studies examined pre-trauma personality pathology before the age of 18 (Barrett et al. 1996, Kozaric-Kovacic & Kocijan-Hercigonja, 2001; Marcinko et al., 2006) which seems to be a major limitation of research undertaken in this area. The present study has therefore made an important contribution to the growing evidence suggesting that people exposed to severe war-related trauma are at a significantly higher risk to develop lasting personality problems regardless of the age at which the trauma occurred.

In the PD group, the most prevalent personality traits were borderline, avoidant and compulsive. In terms of the type of personality traits reported, these findings are consistent with the results from other studies reporting on the most prevalent types of personality pathology observed in secondary mental health services (Newton-Howes et al., 2010;
Zimmerman et al., 2005). However, the present study also showed a considerably higher number of patients in the PD group that met the Cluster A diagnostic criteria. This is different to prior research where Cluster A was found to be the least frequent in secondary mental health care (Newton-Howes et al., 2010; Zimmerman et al., 2005). It is not clear why this sample of personality disorder patients had such a high prevalence of Cluster A personality characteristics. A possible explanation of this finding is that it is a characteristic of transgenerational trauma or so called ‘cumulative trauma’ as this area is well known for wars and civil unrest (in the Western Balkans these happened almost every 20-30 years during 20th century). This would be consistent with some previous research which indicated that children of parents exposed to severe trauma show more mental health and behavioural problems (Danieli, 2010; Daud et al., 2005; Rosenheck & Fontana, 1998). Therefore, having increased levels of suspiciousness and distrust of others could be a consequence of cumulative trauma experienced through generations. Huang et al. (2009) reported Cluster A personality pathology to be the most frequent cluster in developing countries (unlike in developed countries where Cluster C is most prevalent out of the three PD clusters). Thus, it is possible that Cluster A personality traits as seen in developing countries are more prevalent in areas of socioeconomic instability where struggle for survival may be much more prominent. Again, these traits could be a consequence of the environmental circumstances, but also potentially seen as a ‘protective’ factor increasing a person’s chances of survival in an adverse environment.

The findings from this study also suggest that the personality characteristics observed in the EPCACE group were multifarious and much broader than those currently included in the ICD-10 diagnostic criteria for enduring personality changes after catastrophic experience. These results are consistent with findings reported in the systematic review by Munjiza et al.
(2014), which indicated that the current diagnostic criteria for EPCACE are not valid and lacking some important personality psychopathology as observed in this particular patient group.

The findings from this study suggesting substantial levels of comorbidity in cases (people with clinically significant personality pathology) in terms of depressive and anxiety symptoms and substance misuse are consistent with findings from previous research (Bowden-Jones et al., 2004; Newton-Howes et al., 2010; Zimmerman et al., 2005).

5.5. Evidence for a causal relationship between trauma exposure and personality change

What can the evidence from the current study tell us in terms of a causal relationship between severe trauma and adult onset personality pathology?

To answer the above question I used Hill’s criteria to examine whether the findings from this study would point towards a causal relationship between the exposure of interest and the outcome of interest (Hill, 1965). These classic criteria involve several important factors, which need to be considered when deciding whether the likely interpretation of an association is causation including strength of association, temporality, dose-response, specificity, consistency, analogy, epidemiologic and biologic plausibility (Box 14).
In terms of strength of association, according to Hill (1965) there should be a strong association between the primary outcome and primary exposure variable. In this study, there was a strong association between exposure to catastrophic stress and personality pathology. People who scored positively on the IPDE were eight times more likely to have experienced catastrophic trauma than controls. When adjusted for demographic factors, this association
increased to ten times. Some authors suggest that odds ratios in case-control studies which are greater than 4 provide good evidence for causation (Grimes & Schulz, 2002). Based on this, the findings in the present study provide strong support for the cause-and-effect hypothesis. However, one obvious limitation in this study (and case-control studies in general), is that the data was obtained retrospectively, and without collateral history from others, thus was prone to recall bias.

Although the retrospective nature of this study and associated effects of recall bias should not be underestimated, one can argue that both factors made it potentially very difficult to assess accurately for the second of Hill’s criteria, which is temporality. Findings from my study showed that cases were ten times more likely to report exposure to war-related trauma. These findings could be interpreted as reverse causation. In other words, one can argue that PD patients were more likely to be exposed to severe war trauma due to their vulnerability. Whilst this might be the case for patients with pre-existing personality disorder, reverse causality could not account for psychopathology in people with late adult onset personality problems. In this study, I used a clinical interview to improve accuracy in determining the onset of personality related psychopathology. The primary function of the clinical interview was to establish the temporal relationship between the onset of personality related problems and trauma exposure. The study found that around one-third of all cases (patients who had clinically significant personality pathology) had adult onset personality-related psychopathology following exposure to catastrophic trauma, but no evidence of pre-trauma clinically significant personality problems. Although these findings are not free of recall bias, these participants appeared not to have had interpersonal dysfunction prior to war trauma which supports the hypothesis that the significant personality pathology developed post-trauma, thus pointing towards a causal relationship between the two.
Lasting personality pathology after trauma

Hill’s dose-response criterion refers to the importance of finding that the higher the level of exposure, the greater the likelihood of the illness/condition. Findings from this study indicated greater levels of interpersonal dysfunction in participants exposed to extreme trauma than mild trauma, thus providing some evidence for dose-response criterion that is suggestive of a causal relationship. Also, findings based on comparisons between the EPCACE group and participants who suffered catastrophic trauma but did not develop personality problems, revealed a much higher level of exposure to catastrophic stress in the EPCACE group.

Hill’s fourth criterion, specificity, requires research evidence to show that an exposure is specifically related to the outcome of interest. Based on the findings from this study, it would be very difficult to conclude that the war-related trauma is specific only to adult onset personality pathology since the findings suggested increased levels of PTSD, anxiety and depressive symptoms. However, this study demonstrated that a certain proportion of participants who did not appear to have pre-trauma personality problems, developed significant personality pathology following experience of war trauma. Whilst one cannot argue that catastrophic trauma is specific to adult onset personality pathology, this lack of specificity potentially indicates that war trauma is one of many factors involved in the development of the observed psychopathology in the affected individuals. Although specificity is an important aspect of a causative association, Hill (1965) acknowledged that one must not over-emphasize the importance of this factor as multi-causality is more common than single causation. Thus, a potential lack of specificity in this study can be interpreted as severe trauma being one but not the only contributing factor in the development of lasting personality-related problems.
In terms of Hill’s consistency criterion, this requires some evidence that findings suggestive of a causal relationship between the variables of interest, are also consistent with findings from other studies. Results from the current study are consistent with prior research which has shown an increased level of personality related pathology (both traits and disorder) in war veterans and refugees who experienced severe trauma (Barrett et al., 1996; Daud et al., 2008; Ehlers, et al., 2000; Engdahl et al., 1991; Funari et al., 1991; Hunt & Gakenyi 2005; Kozaric-Kovacic & Kocijan-Hercigonja, 2001; Marcinko et al., 2006; Richman & Frueh, 1996; Richman & Frueh, 1997; Robert et al., 1985; Sherwood et al., 1990; Skodol et al., 1996; Sutker et al., 1993; Taylor et al., 2006), thus satisfying the consistency criterion. Studies that provided incident cases of adult-onset personality pathology whilst excluding pre-trauma personality-related problems (Barrett et al., 1996; Kovacic & Kocijan-Hercigonja, 2001; Marcinko et al., 2006) provide further support for causative link between exposure to severe trauma and a late onset PD.

Perhaps the most difficult criteria to meet, are related to biological and epidemiologic plausibility. In terms of biological plausibility, this could be linked to the impaired sensitivity of the HPA axis hypothesis, which has been implicated in anxiety and depressive disorder and PTSD (Yehuda, 1998; Southwick et al., 2010). Hypercorticicolism has been observed in depressed individuals which is consistent with this well-known acute stress cascade, whilst hypocorticicolism was found in PTSD patients (Yehuda, 1998). Findings from studies involving patients with personality pathology suggest that BPD patients, similarly to depressive patients tend to have reduced axis feedback sensitivity. However, a small number of studies that investigated BPD patients with significant comorbid PTSD, are characterised by enhanced HPA axis feedback sensitivity and hypocorticicolism (Wingenfeld et al., 2010; Wingenfeld et al., 2015), thus pointing towards the biological and epidemiologic plausibility.
Although Hill’s criterion based on experimental evidence would provide the strongest support for the causation hypothesis, it would be unethical to expose participants to war for experimental purposes.

The last of Hill’s criteria relates to analogy which requires that some analogy can be drawn between the investigated causal relationship and some other studies, one could argue that there are similarities in the aetiological relationship of childhood trauma and borderline personality disorder, where numerous studies have found strong associations between adverse traumatic events and the development of personality disorder (Bandelow et al., 2005; Bernstein et al., 1998; Figueroa & Silk, 1997; Moran et al., 2011; Purtscher, 2008; Riggs et al., 2007).

Considering the findings of this study in the context of Hill’s classic criteria for demonstrating an aetiological relationship between two variables, one could argue that this study shows some evidence for catastrophic trauma being one of the causal factors in development of adult onset personality pathology. This study showed a strong association between the exposure and outcome with cases being ten times more likely to be exposed to catastrophic trauma than controls. One can also argue that there is some evidence that other Bradford Hill’s criteria such as dose-response, consistency, analogy and even temporality in a subgroup of participants with adult onset personality pathology are met to some degree. However, there is less certainty with respect to specificity, epidemiologic plausibility and to some extent temporality (in PD patients). However, limitations related to case-control studies, particularly to recall bias, would pose a considerable challenge to the evidence presented in this study that might point towards a causal relationship between the catastrophic trauma (exposure of interest) and adult-onset personality pathology (the outcome of interest). Therefore, more
research evidence based on prospective longitudinal cohort studies is needed before any causal relationships can be established.

5.6. Implications for future research, diagnostic classifications of mental disorders and clinical practice

5.6.1. Implications for future research

Although results from this study indicate that a proportion of previously healthy adults developed long-term personality pathology following exposure to catastrophic trauma, thus showing a strong association between the exposure and outcome, direct causal inferences with a high degree of certainty could not be made due to the retrospective nature of the case-control studies and associated recall bias. In addition, the case-control design used in this study meant that I was not able to estimate the prevalence of this phenomenon. Therefore, the findings from this study would not only need to be replicated in future research, but also indicate the need for prospective cohort studies with a longer follow-up period using appropriate controls and valid personality pathology measures to establish more accurately the prevalence of this condition.

It is also essential to investigate pre-morbid personality characteristics, since excluding pre-trauma personality pathology is fundamental prior to diagnosing a person with adult-onset personality change due to catastrophic trauma. Longitudinal studies would not only help to establish causal relationship, but also the stability of these traits. We know from the research with personality disorder patients that a significant proportion of them get better, particularly cluster B patients, and no longer meet criteria for personality disorder 8-10 years later (Paris & Zweig-Frank, 2001; Zanarini et al., 2012). It would be important to find out what
proportion of these patients gets better with and without treatment. From my own communications with colleagues who work in the field of trauma, patients with EPCACE show a limited improvement over the years and are frequently described as ‘difficult and resistant’ to treatment.

Future studies should also attempt to explore the associated risk factors that may make an individual more ‘vulnerable’ and therefore more susceptible to develop enduring personality psychopathology after suffering a severe trauma. These factors could relate to an individual’s characteristics but also to environmental circumstances (cultural, religious and socioeconomic factors). Future research should also aim to focus on investigating potential preventative and protective factors, which could lead to better patient outcomes in the long-term. Particularly important would be examination of individual’s own perceptions relating to the trauma with peri- and post-traumatic influences on the person’s experience immediately following the traumatic experience.

Another important aspect to be addressed in future research would be to examine associations between trauma, its type, severity and length of traumatic exposure and impact on personality change in adults. Although experts’ opinions in the trauma field seem to suggest that a prolonged severe trauma is more likely to be associated with EPCACE, we do not know whether a single and short episode of severe trauma (single episode of sexual violence, severe RTA) could have the same consequences. Answering some of these questions would not only help to further increase our understanding of this phenomenon, but also potentially to clarify some of the complexity involved in processing trauma, post-trauma adaptation, associated risk and preventative factors, which all together would contribute to the development of appropriate and evidence based treatments.
However, conducting a prospective study in a war-affected area may not be possible for many reasons including the sensitive nature related to circumstances surrounding war and potential reluctance in disclosing any information, particularly if people committed war-related crimes. There are also the considerable financial implications associated with conducting a longitudinal cohort study, the impact of which should not be underestimated in war-torn countries.

Although a significant amount of the research in the trauma-related field comes from work with war veterans and refugees in developed countries of the Western world, future research should also be conducted in less developed countries, so that evidence is gathered across a broad range of populations with various ethnic, cultural, religious and socio-economic backgrounds rather than relying on the consensus expert opinions which ICD-10 had to rely on. Therefore, conducting several case-control studies with high quality control groups across several war-affected countries could be a less costly and more feasible option in the absence of prospective cohort studies. Countries recently affected by civil war such as some of the states of north Africa and the Middle East or even countries involved in guerrilla wars such as some of the Latin American countries would be appropriate locations to conduct case-control studies and attempt to replicate some of the findings observed in this study.

5.6.2. Implications for the classification of mental disorders

The findings from this thesis have two important implications for the classifications of mental disorders. One is related to the onset of personality pathology and whether there are any limits to when an individual exposed to trauma of a catastrophic nature can develop a change in his/her personality. Another important issue is related to the complexity of the observed clinical symptomatology seen in people with adult onset personality pathology following
severe trauma and whether the current classifications (ICD 10 and DSM-5) are useful in clinical practice and in conducting relevant research.

Results from this study suggest that adult onset personality disorder is a valid diagnostic category and the development of personality pathology should not be restricted to those who experienced personality problems during childhood and adolescence as the current two major disease classification systems suggest (WHO, 1992; APA, 2013). In other words, where there is incidence of severe trauma, a person’s personality can change at a later point in life. Therefore, these results imply that there is no age limit for the development of personality pathology and if personality problems persist following a severe trauma, a diagnosis of personality disorder should be made.

Findings from this study also indicate that the personality psychopathology of people experiencing catastrophic trauma in adulthood is a complex phenomenon. The elicited personality characteristics are multifarious and include personality features from all three DSM-5 conceptual clusters. Furthermore, the results of this study suggest that people with personality change following catastrophic trauma in adult life are three times more likely than PD patients to meet diagnostic criteria for ‘complex’ PD i.e. personality traits across all three clusters. The most prevalent personality features include all cluster A traits in addition to avoidant, borderline and anankastic traits. This finding adds to our understanding of why these patients have a very complex clinical presentation and may have a limited response to treatment which has been observed in clinical practice (Bisson et al., 2007; Bradley et al., 2005; Britvic et al., 2006; Ljubotina et al., 2007).
In other words, the findings from this study would suggest that the current ICD-10 diagnostic criteria for the diagnosis of enduring personality change after a catastrophic experience (F62.0) are not valid and should be revised to include a much wider range of psychopathology such as affect regulation difficulties, anger modulation problems, impulsivity, feelings of being cold, detached, eccentric, oversensitive to criticism, rigidity and inflexibility in interpersonal interactions, increased suicidality, and self-identity problems. None of these are currently included in the ICD-10 diagnostic classification. Also, the fact that these individuals meet the diagnostic criteria of personality characteristics across all three PD clusters further highlights the severity of their personality pathology.

DSM-IV did not recognise enduring personality change after catastrophic trauma as a separate diagnostic entity. Instead, it added ‘associated descriptive features’ to the existing PTSD symptoms (APA, 1994). However, this approach assumes that patients need to fulfil criteria for PTSD first, thus patients who have ‘associated descriptive features’ but do not meet current PTSD criteria, would be excluded. Additionally, it assumes that a person has an anxiety disorder rather than long-term personality pathology (as stated in ICD-10) which prognostically is a different entity and potentially more difficult to treat. Furthermore, placing all patients under an umbrella term ‘PTSD’ does not help to distinguish patients who suffer from a ‘simpler’ form of PTSD from those who have a more severe and complex presentation with a considerable impact on the patient’s interpersonal function. Although DSM-5 (APA, 2013) introduced some changes by replacing the three-factor model with a four-factor model, adding a new component named ‘negative alterations in cognitions and mood’, the aforementioned concerns remain. The proposal to include either ‘complex PTSD’ (the concept originally proposed by Judith Herman in 1992) or DESNOS was again rejected as it
was felt that there was no sufficient research evidence to support either concept as a separate diagnosis in the DSM-5 (Friedman et al., 2011).

The Working Group reviewing PTSD classification in ICD-11 (Beta Draft, WHO, 2014) proposed the introduction of a new group of disorders named ‘Disorders specifically associated with stress’ which would comprise of adjustment disorder, PTSD and a newly proposed diagnostic entry named ‘Complex post-traumatic stress disorder’ (Complex PTSD). This is the term coined by Herman (1992), which has been ‘unofficially’ used for several decades but never formally included in the either classification of diseases. The ICD-11 Working Group proposes that this term should be reserved for psychopathology arising from ‘severe and prolonged stressors usually involving several or repeated adverse events’ (Maercker et al., 2013a). They also argued that the condition could develop following a single traumatic stressor and gave several examples of the type of traumatic experiences which could result in the development of ‘complex PTSD.’ These include childhood sexual abuse, domestic abuse, genocide, torture, slavery and childhood soldiering (Maercker et al., 2013b). Furthermore, they argue that ‘complex PTSD’ should completely replace the concept named ‘Enduring Personality Change After Catastrophic Experience’ (EPCACE) introduced in ICD-10 (WHO, 1990) which in their opinion has not been taken up by researchers as it did not include disorders that emerge following adverse childhood events. Indeed, according to the ICD-10 diagnostic criteria, there should be no evidence of pre-existing personality disorder before one can receive a diagnosis of EPCACE. In this way personality disorder and its associated vulnerability, has been separated from EPCACE, the concept that links severe trauma to the development of personality change in adulthood.
The proposed ‘Complex PTSD’ condition is characterised by three clusters of symptoms: affect dysregulation, problems with self-identity and interpersonal functioning in addition to the three core PTSD symptom clusters (reliving, avoidance and hyperarousal) which need to be present (Maercker et al., 2013b). These additional features of the proposed new diagnostic entity clearly overlap with the symptomatology experienced by people with personality disorder, particularly in the context of childhood sexual abuse.

Maercker et al. (2013b) acknowledge the similarity between ‘complex PTSD’ and borderline PD, but argue that what separates the two conditions are the differences in risk of self-harm, fear of abandonment and no requirement for the presence of the stressor (trauma) event in BPD patients. They also argued that the additional difference between the two lies in the type of treatment required for a good outcome.

However, these arguments are questionable and not fully convincing. There has been considerable research evidence suggesting that people who have been tortured or exposed to severe combat-related trauma (therefore likely to meet criteria for complex PTSD) have increased self-harm and suicidal risk (Davidson et al., 1991; Panagioti et al., 2012) and this would not distinguish them from BPD. Findings from my study suggest that the participants with adult onset personality pathology (EPCACE group) reported significantly more suicidal thoughts (increased risk of self-harm) than PD patients (68% vs. 47%). Also, there is a large body of research evidence suggesting that some patients with personality disorder have been exposed to prolonged childhood maltreatment (abuse and neglect) which can be defined as exposure to ‘prolonged stressors’ (Bandelow et al., 2005; Figueroa & Silk, 1997; Helgeland & Torgersen, 2004; Moran et al., 2011; PURTSCHER, 2008; RIGGS et al., 2007) and would overlap with ‘complex PTSD’ symptoms. Equally, in terms of the treatment differences, the research
evidence suggests that a considerable proportion of patients who had been diagnosed with PTSD (war veterans, torture victims) do not improve following the treatment with trauma-focused CBT, EMDR or other forms of psychotherapy and remain symptomatic for many years following trauma (Bisson et al., 2007; Bradley et al., 2005; Britvic et al., 2006; Kessler et al., 1995). Also, BPD patients who suffered sexual abuse in childhood frequently report having flashbacks related to the abuse but do not necessarily have avoidance and hypervigilance features related to trauma and would be misdiagnosed if given a diagnosis of ‘complex PTSD’ which could happen frequently in clinical setting. Instead, their avoidance may be related to many years of interpersonal dysfunction resulting in isolation and withdrawal from society. The above examples show that contrary to Maercker et al., (2013b) arguments, the distinction between PD and complex PTSD may not be so clear and may increase diagnostic uncertainties that could potentially affect the type of treatment patients receive and its outcome.

Although using the ‘complex PTSD’ term might be preferred by both patients and some clinicians (Lewis et al., 2009), what is more important is that the new classification provides much more specific and detailed diagnostic criteria including all relevant symptoms that would guide both clinicians and researchers investigating this clinical entity. In order to achieve this, there is a need for collaborative work between experts and researchers in both the area of trauma (PTSD) and the personality disorder field which would be a desirable and perhaps most appropriate approach. This joint approach would be particularly important in terms of developing future treatments for this complex patient group. Failing that, the danger is that experts in each field will continue with their current separate works and divisions, which might help us in classifying and diagnosing patients but not in developing the most appropriate treatments.
Current proposals for reclassifications of personality disorder in ICD11 (Beta Draft, WHO, 2014) focus more on the severity of personality pathology and propose the introduction of dimensional classification with four PD levels (Crawford et al., 2011b; Tyrer et al., 2011b; Tyrer et al., 2015). Perhaps in a similar way, personality pathology following trauma in adulthood can be looked at dimensionally according to the severity of the observed pathology and cluster domains assigned depending on presenting symptoms (as proposed for other personality disorders). The ICD-11 working group also proposes to introduce the ‘late onset’ qualifier for cases where personality disturbance originates in adulthood and there is no evidence of personality related problems before age of 25 years (Tyrer et al., 2015). This would remove the focus from the age of onset of personality related symptoms to fulfil diagnostic criteria for PD currently present in both classifications and redirect attention to the severity of presenting personality pathology, which is a crucial factor when choosing an appropriate treatment.

Most research evidence for the treatment of patients with personality disorder seems to endorse a longer-term psychological treatment of more than one session per week and group-based treatment (Stoffers et al., 2012; Omar et al., 2014). Perhaps in a similar way, patients with adult onset personality pathology who show a limited response to initial trauma focused psychological treatments would respond better to a longer-term group-based psychological therapy targeting emotional dysregulation and interpersonal dysfunction. A survey of international experts on complex PTSD suggests that phase oriented multimodal approach to treatment of complex PTSD is supported by most trauma experts, although no agreement was obtained on duration of treatment (Cloitre et al., 2011). Considering all of the above, I believe that adult onset personality pathology following exposure to catastrophic trauma
should remain under personality disorder section and be based on the severity of observed psychopathology, which should guide the appropriate treatment choice.

5.6.3. Implications for clinical practice

Despite the need for further replication in longitudinal prospective studies, the current findings have important implications for clinical practice. The central finding of this study is that people who had no previous personality pathology can develop lasting personality problems following exposure to catastrophic trauma. These findings suggest that there is no age limit for the development of personality pathology and if following a severe psychological trauma, personality problems persist and are severe enough to interfere with interpersonal functioning, a diagnosis of personality change/disorder can and should be made at any age.

As a diagnostic concept, EPCACE remains poorly defined in the current classification of disease (WHO, 1992). The findings from this study can help to increase clinicians’ awareness of the complex personality pathology in these patients, which can span across all three clusters comprising borderline, avoidant and anankastic features in addition to prominent cluster A traits. Although these would need to be replicated, scoring high on borderline traits could potentially indicate that the EPCACE patients would benefit from similar treatments used for patients with borderline personality disorder. Most research evidence for the treatment of patients with personality disorder comes from research with borderline PD, and seem to endorse a longer-term psychological treatment of more than one session per week and group-based treatment (Stoffers et al., 2012; Omar et al., 2014). However, in addition to cluster B traits, findings from my study suggest a high proportion of Cluster A and C traits were reported by this group. The complexity and implications of the observed personality
pathology for choosing appropriate treatment is demonstrated in a study which included participants more than eight years following the war trauma using twice weekly group treatment (supportive and psychodynamic approaches). Although there was an improvement in intrusion symptoms (PTSD), participants also showed significantly increased levels of hostility and psychoticism at the end of a year-long treatment which could be interpreted as a negative outcome of the treatment provided (Ljubotina et al., 2007). This finding would suggest that a greater understanding of not only of the condition itself, but also the impact of context and content of therapeutic approaches is important in developing appropriate treatment for these patients. Similar findings were reported by Britvic et al. (2006) who after five years of treatment found little or no improvement of ‘avoidance’ symptoms (cluster C symptoms). It is very likely that the complex personality pathology in these patients, which can arch across all three clusters, depicts the severity of their illness and is related to a potentially poorer response to treatment reported by several studies (Bisson et al., 2007; Bradley et al., 2005; Britvic et al., 2006; Ljubotina et al., 2007).

Findings from this study also support previous research which found high levels of comorbidity with anxiety, depression, PTSD symptoms and increased suicidal ideations. This further emphasises the importance of clinicians’ awareness of this condition in clinical practice.

Another important consideration relates to the potential financial implications these findings might have on mental health services in war-affected regions. When combined together, it is likely that the complexity of the diagnostic and clinical presentation of the EPCACE patients, duration of symptoms and necessary length of treatment, will have considerable financial consequences on mental health services in war-affected countries. If one can draw parallels
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with the treatment of personality disorders in Western countries where research evidence suggests that people with more complex personality pathology respond best to specialist treatment, it can be assumed that providing this level of care would result in a considerable burden on providers of mental health care in the affected countries.
6. CONCLUSION

This thesis makes several important contributions about personality pathology in adults. Firstly, the work done as part of this thesis includes a review of extant literature which is the first ever systematic review on personality change following trauma in adulthood (Munjiza et al., 2014). Its findings suggest that a proportion of adults who are exposed to severe trauma appear to go on to develop significant personality problems with no pre-trauma personality pathology.

It also identified the dearth of high quality studies with appropriate controls and particularly the lack of studies which investigated pre-morbid personality pathology. Without assessing the latter, the fundamental distinction between personality disorder and personality pathology that develops during adulthood cannot be made. In my thesis, special attention was paid to this crucial question which was addressed by conducting a clinical interview with the sole purpose of establishing the onset of personality-related problems in each individual.

The findings from the review (Munjiza et al., 2014) are further supported by the results from the case control study in this thesis which found that a 36% of the IPDE positive patients did not seem to have personality disorder before exposure to traumatic war-related trauma. These findings, therefore, suggest that personality pathology following severe trauma can develop in adults and the diagnosis should not be restricted only to those who experienced personality problems in childhood and adolescence, thus eliminating the age limit currently endorsed by both current classification of personality disorders (WHO, 1992; APA, 2013).
Secondly, the results of this study suggest that personality psychopathology of people exposed to catastrophic trauma in adulthood is complex with multifarious abnormal personality characteristics being much broader than the current EPCACE prototype in the ICD-10.

Another important contribution of this study relates to the severity of personality change following catastrophic trauma in adult life as findings from the present study indicate that adult-onset personality pathology patients are three times more likely than PD patients to meet diagnostic criteria for ‘complex’ PD i.e. personality traits across all three clusters (avoidant, borderline and anankastic features in addition to prominent cluster A characteristics). One hopes that these findings will increase clinicians’ awareness of the complex personality pathology that can develop in adults following exposure to severe trauma.

This study also adds a significant contribution to the growing evidence that severe war-related trauma is an important risk factor in development of personality pathology in adults. The impact of severe trauma is potentially long lasting as participants in this study had personality problems and interpersonal dysfunction 15 years after the civil war. Types of catastrophic trauma included either personally experiencing life-threatening events or witnessing others undergoing high levels of interpersonal violence.

This study also emphasise the importance of childhood neglect, even at a mild level as a potential risk factor, which combined with exposure to catastrophic trauma could make individuals more vulnerable and lead to the development of adult-onset personality pathology.
More research needs to be done to develop appropriate assessments and treatment for people who have significant personality-related problems that develop after childhood and adolescence.
7. REFERENCES


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8. APPENDIX

8.1. Appendix 1: Research Ethics Approval (Faculty of Medicine, University of Split)

MEDICINSKI FAKULTET
SVEUČILIŠTA U SPLITU
Etičko povjerenstvo

Klasa: 003-08/10-03/0005
Ur. br: 2181-198-03-04/10-10-0017

Split, 27. rujna 2010.

MIŠLJENJE

Etičko povjerenstvo povodom prijave istraživanja:
Utjecaj ratne traume na razvoj poremećaja ličnosti; studija sparnih skupina
(engleski: case control study) - provedba znanstvenog istraživanja na ljudima

I. Zaprimljen je zahtjev Jasna Munjiza, dr. med za odobrenje znanstvenog istraživanja Utjecaj ratne traume na razvoj poremećaja ličnosti: studija sparnih skupina (engleski: case control study) - provedba znanstvenog istraživanja na ljudima u svrhu izrade doktorskog rada
Istraživanje će se provoditi na Klinici za psihijatriju, Regionalnom centru za psihotrauma, KB Split i nekoliko ordinacija opće prakse u Splitu.
Istraživanje će trajati dvanaest mjeseci.
Glavni cilj ovog istraživanja je procijeniti utjecaj ratne traume na razvoj poremećaja ličnosti u ratnim veteranima i civilnom stanovništvu.

Glavni istraživač pridržavaće se s interna procedure za zaštitu osobnih podataka i čuvat će anonimnost sudionika.

III. Sukladno odredbi članka 16. Etičkog kodeksa Medicinskog fakulteta u Splitu Povjerenstvo je zauzelo stajalište kako je predmetno istraživanje u skladu s odredbama Etičkog kodeksa koje reguliraju istraživanja na ljudima u znanstvenom, istraživačkom i stručnom radu i etičkim načinima Helsinskog deklaracije.

IV. Mišljenje je doneseno jednoglasno.

Preprednik Povjerenstva:

Prof. dr. sc. Miroslav Simunić

Dostaviti:
- Jasna Munjiza, dr. med. x 2
- Arhiv Etičkog povjerenstva Fakulteta
- Arhiv Fakulteta
8.2. Appendix 2: Research Ethics Approval (Hospital)

IZVOD
IZ ZAPISNIKA SA SJEDNICE ETIČKOG POVRJERNSTVA KBC SPLIT

Doc.dr.sc. Dolores Britvić, liječnik specijalista sa Klinike za psihijatriju, uputila je Etičkom povjerenstvu KBC Split zamolbu za odobrenje provođenja istraživanja u svrhu izrade znanstvenog rada pod naslovom

«Utjecaj ratne traume na razvoj poremećaja ličnosti: studija sparenih skupina»

Cilj ovog istraživanja je procjena utjecaja ratne traume na razvoj poremećaja ličnosti u ratnih veterana i civilnom stanovništvu.

Istraživanjem će biti obuhvaćen prigodan uzorak od 140 osoba s poremećajem ličnosti uključujući i ratne veterane oboljelih od kroničnog posttraumatskog stresnog poremećaja s trajnim poremećajem ličnosti koji se liječe na Klinici za psihijatriju i na regionalnom centru za psihotraumu KBC Split.

Uz to je priloženo:
- Obrazac informiranog pristanka bolesnika
- Suglasnost predstojnika Klinike prof.dr.sc. Gorana Dodiga

Nakon razmatranja priložene dokumentacije, donijet je slijedeći

Zaključak

Etičko povjerenstvo KBC Split je suglasno s provođenjem istraživanja doc.dr.sc. Dolores Britvić na Klinici za psihijatriju, te smatra da će prilikom provođenja istraživanja biti poštivana etička načela.

Predsjednik Etičkog povjerenstva

Prof. dr. sc. Jugoslav Bagatin

KLINIČKI BOLNIČKI CENTAR SPLIT

J Munjiza
8.3. Appendix 3: Consent Form

SUGLASNOST ZA SUDJELOVANJE

1. Potvrđujem da sam (datum .........., Split) pročitao/pročitala ovu obavijest za gore navedeno znanstveno istraživanje te sam imao/imala priliku postavljati pitanja.

2. Razumijem da je moje sudjelovanje dobrovoljno te se mogu povući u bilo koje vrijeme, bez navađanja razloga i bez ikakvih posljedica po zdravstvenom ili pravnom pitanju.

3. Razumijem da mojoj medicinskoj dokumentaciji imaju pristup odgovorni pojedinci, tj. glavni istraživač i njegovi suradnici, članovi Etičkog povjerenstva ustanove u kojoj se istraživanje obavlja te članovi Etičkog povjerenstva koje je odobrilo ovo znanstveno istraživanje. Dajem dozvolu tim pojedincima za pristup mojoj medicinskoj dokumentaciji.

4. Pristajem da moj obiteljski liječnik (odnosno član obitelji) bude upoznat s mojom sudjelovanjem u navedenom znanstvenom istraživanju.

5. Želim sudjelovati u navedenom znanstvenom istraživanju.

Ime i prezime ispitanika:
Potpis: ____________________________________________
Ime i prezime (tiskanim slovima) __________________________
Datum: __________

Osoba koja je vodila postupak obavijesti za ispitanika i suglasnost za sudjelovanje:
Glavni istraživač na projektu:
Potpis: ____________________________________________
Ime i prezime (tiskanim slovima) __________________________
Datum: __________
8.4. Appendix 4: Participant Information Sheet (PIS)

OBAVIJESTI ZA ISPITANIKI I PISANA SUGLASNOSTI ZA SUDJELOVANJE U ISTRAŽIVANJU

OBAVIJEST ZA ISPITANIKI

1. NAZIV PROJEKTA: UTJECAJ RATNE TRAUME NA RAZVOJ POREMEĆAJA LIČNOSTI: STUDIJA SPARNIH SKUPINA

MIJESTO PROVOĐENJA: KLINIKA ZA PSIHIJATRIJU, REGIONALNI CENTAR ZA PSIHOTRAUMU, KBC SPLIT.


3. Dosadašnja istraživanja koja se bave istraživanjem uzroka razvoja poremećaja ličnosti ukazuju na doživljaj traumatskih iskustava u djetinjstvu i adolescenciji kao značajnijim uzročnim faktor.

4. Opća je hipoteza da osobe koje su doživjele zastrašujuća iskustva (ratni veterani i civilno stanovništvo) tokom domovinskog rata imaju veću mogućnost razvoja dugotrajnog i značajnog poremećaja ličnosti s posljedicama na njihovo šire društveno funkcioniranje i opću kvalitetu života.

5. CILJ / SVRHA ISTRAŽIVANJA

5.1. Cilj ovog istraživanja je procijeniti utjecaj ratne traume na razvoj poremećaja ličnosti u ratnih veterana i civilnom stanovništvu.

5.2. Doprinosi ovog istraživanja mogu unaprijediti razumijevanje mogućih psiholoških posljedica koje su imale značaj u utjecaju na ratne veterane, nego i civilno stanovništvo. Saznanja postignuta tokom istraživanja mogu doprinjeti boljem razumijevanju simptoma postraumatskog stresnog poremećaja, depresivnosti, zaluporabe alkohola i poboljšanju kvalitete života ispitanika.

5.3. U istraživanju će sudjelovati 140 osoba s poremećajem ličnosti koje su bile dobi od 30 do 65 godina, muškog i ženskog spola. Istraživanje će trajati za svakog ispitanika oko 35-45 minuta za koje vrijeme će ispitanici ispuniti niz upitnika. Nakon ispunjavanja upitnika, ispitanici će odgovoriti na nekoliko dodatnih pitanja u trajanju 5-10 minuta.
Kontrolna grupa je imao 70 ispitanika koji će se regitrirati u nekoliko ordinacija opće medicine na području grada Splita.

6. VAŠA ULOGA ISPITANIKI U OVOM ZNANSTVENOM ISTRAŽIVANJU
Vaša je uloga da se na temelju procjene Vašeg psihičkog stanja ispunite različite upitnike kojima će se istraživati utjecaji raznih oblika traumatskih iskustava na razvoj poremećaja licnosti.

7. KOJE SU MOGUĆE PREDNOSTI SUDJELOVANJA ZA VAS KAO ISPITANIKA?
Ne postoji jamstvo da ćete Vi imati koristi od sudjelovanja u istraživanju. Među koristi ubraja se mogućnost da Vi i ovo istraživanje doprinesete boljem razumijevanju mogućih psiholoških posljedica koje su imale značajanj utjecaj ne samo na ratne veterane, nego i civilno stanovništvo.

8. KOJI SU MOGUĆI RIZICI SUDJELOVANJA U OVOM ISTRAŽIVANJU?
Tijekom sudjelovanja u istraživanju i ispunjavanja upitnika mogu se pobuditi prisjećanja na proživljene traumatske dojave koje ćete moći izazvati prolažno pogoršanje psihičkog stanja. O tome možete razgovarati s glavnim istraživačem i ostalim suradnicima.

9. MORA LI SE SUDJELOVATI?

10. POVRJELJIVOST I UVID U DOKUMENTACIJU
Vaši će se osobni podaci obrađivati elektronički, a glavni istraživač i njegovi suradnici pridržavati će se interne procedure za zaštitu osobnih podataka. U bazu podataka bit će uneseni pomoću koda i prema inicijalima. Vašu medicinsku dokumentaciju će pregledavati glavni istraživač i njegovi suradnici. Vaše ime nikada neće biti otkriveno. Pristup dokumentaciji mogu imati predstavnici Etičkog povjerenstva u Ustanovi u kojoj se liječite (lokalno etičko povjerenstvo) i Etičkog povjerenstva Medicinskog fakulteta.

11. ZA ŠTO ĆE SE KORISTITI PODACI DOBIVENI U OVOM ZNANSTVENOM ISTRAŽIVANJU?
Podaci iz ovog znanstvenog istraživanja mogu biti od praktične koristi (sažnjanje o mogućim negativnim utjecajima doživljenih tokom traumatskih doživljaja a isto tako i utvrđivanje zaštitnih faktora), ali i znanstvene. Stoga će se objavljivati u znanstvenim publikacijama. Vaš identitet će ostati anoniman.

12. TKO ORGANIZIRA I FINANCIIRA ISPITIVANJE?
Osobno financiranje od strane podnositeljice prijave istraživanja.
13. TKO JE PREGLEDAO OVO ISPITIVANJE?
Ovo ispitivanje pregledalo je Etičko povjerenstvo Medicinskog fakulteta Sveučilišta u Splitu, koje je nakon uvida u odredene dokumentacije odobrilo istraživanje. Ispitivanje se provodi u skladu sa svim primjenljivim smjernicama, čiji je cilj osigurati pravilno provođenje i sigurnost osoba koje sudjeluju u ovom znanstvenom istraživanju, uključujući Osnove dobre kliničke prakse i Helsinku deklaraciju.

14. KOGA KONTAKTIRATI ZA DALJNJE OBAVIJESTI?
Ako trebate dodatne podatke, slobodno se obratite glavnom istraživaču ili njegovim suradnicima:

Ime i prezime glavnog istraživača: Dr. Jasna Munjiza
Adresa: Medicinski fakultet, Šoltanska 2, 21000 Split
Broj telefona: 021 557 507

Ime i prezime suradnika: Dr.sc. Dolores Britvić
Adresa: Regionalni centar za psihotraumu, Klinika za psihijatriju, KB Split, Šoltanska 1, Split
Broj telefona: 021 557 507

16. KOGA JOŠ OBAVIJESTITI O ISTRAŽIVANJU?
Vaš psihijatar kao i obiteljski liječnik bit će obaviješteni o Vašem sudjelovanju u ovom znanstvenom istraživanju.

17. O PISMENOJ SUGLASNOSTI ZA SUDJELOVANJE U ISTRAŽIVANJU
Presliku dokumenta (potpisne stranice) koji ćete potpisati ako želite sudjelovati u istraživanju, dobit ćete Vi i glavni istraživač. Originalni primjerak dokumenta će zadržati i čuvati glavni istraživač.

Hvala što ste pročitali ovaj dokument i razmotrili sudjelovanje u ovom znanstvenom istraživanju.

Ova obavijest je sastavljena u skladu sa Zakonom o zdravstvenoj zaštiti Republike Hrvatske (NN 150/08 i 155/09) i Zakonom o pravima pacijenata Republike Hrvatske (NN 169/04).
8.5. **Appendix 5 – Demographic information and Social Functioning Scale (Croatian version)**

Velika hvala što ste pristali da sudjelujete u ovome istraživanju

_Trebaće Vam oko 45-50 minuta da popunite slijedeći upitnik. Svi odgovori su povjerljivi i ostaće anonimni. Nikakve identificirajuće informacije, pod bilo kojim okolnostima, neće biti proslijedene vlastima ili bilo kome drugom van istraživačkog tima. Ove informacije ćemo koristiti isključivo u istraživačke svrhe._

**OSOBNI PODATCI**

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Datum ispunjavanja upitnika ___________________________</td>
<td>ID:</td>
</tr>
<tr>
<td>2. Molimo Vas, pogledajte slijedeći primjer koji pokazuje kako da ispravno označite odgovore:</td>
<td></td>
</tr>
<tr>
<td>3. Ja uživam u proljetnom vremenu:</td>
<td></td>
</tr>
<tr>
<td>i. Redovno</td>
<td>□</td>
</tr>
<tr>
<td>ii. Povremeno</td>
<td>□</td>
</tr>
<tr>
<td>iii. Ponekad</td>
<td>□</td>
</tr>
<tr>
<td>iv. Rijetko</td>
<td>□</td>
</tr>
<tr>
<td>v. Nikada</td>
<td>□</td>
</tr>
<tr>
<td>4. Upitnik počinjemo sa brojem općih OSOBNIH pitanja:</td>
<td></td>
</tr>
<tr>
<td>5. Da li ste:</td>
<td>□ Muško □ Žensko</td>
</tr>
<tr>
<td>6. Datum rođenja? ___________________________</td>
<td></td>
</tr>
<tr>
<td>7. Mjesto rođenja? ___________________________</td>
<td></td>
</tr>
<tr>
<td>8. Gdje ste živjeli većinu svog života prije dolaska u Split?</td>
<td></td>
</tr>
<tr>
<td>i. Navedite, molim Vas, republiku, grad ili selo ___________</td>
<td></td>
</tr>
<tr>
<td>9. Da li ste:</td>
<td></td>
</tr>
<tr>
<td>i. Samac/ica □</td>
<td>Vjenčani □</td>
</tr>
<tr>
<td>ii. Udovac/ica □</td>
<td>Rastavljeni □</td>
</tr>
</tbody>
</table>
10. Koji je stupanj Vašeg obrazovanja:
   i. Nisam nikada išao/la u školu □
   ii. 8 godina □
   iii. 8-12 godina □
   iv. Srednja stručna sprema □
   v. Fakultet □
   vi. Drugo usavršavanje (molimo navedite) □

12. Da li ste trenutno zaposleni?
   i. Da □
   ii. Ne □

13. Ako jeste, da li ste zadovoljni svojim poslom?
   i. Veoma zadovoljni □
   ii. Zadovoljni □
   iii. Donekle zadovoljni □
   iv. Nezadovoljni □
   v. Veoma nezadovoljni □

14. Da li Vaš posao odgovara Vašim kvalifikacijama (npr. Ako ste završili pedagoški smjer, da li trenutno radite kao učitelj ili imate neki sličan posao gdje koristite svoje znanje i kvalifikacije)?
   i. Da □
   ii. Ne □

17. Ako trenutno niste zaposleni, što je razlog?
   i. Primatelj socijalne pomoći □
   ii. Zdravstveni problem □
   iii. Tražite posao □
   iv. Student □
vi. Invalid □
vii. Penzioner □
viii. Na porodiljskom dopustu □
ix. Na obuci za posao □

x. Ostalo ____________________________

18. Da li je netko u Vašem domaćinstvu trenutno zaposlen?
   xi. Da □ Ne □

19. Da li trenutno živite u:
   xii. Iznajmljenom stanu □
   xiii. Iznajmljenoj sobi □
   xiv. Privremenom smještaju □
   xv. Studentskom smještaju □
   xvi. Vašem stanu/kući □
   xvii. Općinskom stanu ili kući □
   xviii. Ostalo ______________________

20. Da li ste IKADA bili primljeni u bolnicu zbog psihološkog problema?
    Da □ Ne □

21. Da li ste u proteklih DVANAEST MJESECI bili primljeni u bolnicu zbog psihološkog problema?
    Da □ Ne □

22. Da li pijete alkohol?
    Da □ Ne □

23. Navedite koje vrste alkoholnih pića pijete i koliko prosječno pijete tjedno?
    __________________________________________________

24. Da li ste u proteklih DVANAEST MJESECI uzimali ilegalne droge?
    Da □ Ne □

25. Navedite koje vrste ilegalnih droga upotrebljavate i koliku količinu prosječno uzmete u jednom tjednu?
    __________________________________________________
Slijedeća grupa pitanja se odnosi na stvari s kojima neki ljudi u Vašoj situaciji mogu imati poteškoća. Molimo Vas označite onaj odgovor koji naj bliže opisuje kako ste se Vi osjećali u proteklih godinu dana.

26. Završavam svoje zadatke na poslu i kod kuće zadovoljavajuće
   - Većinu vremena
   - Jako često
   - Ponekad
   - Nikada

27. Doživljavam svoje zadatke na poslu i kod kuće jako stresnim
   - Većinu vremena
   - Jako često
   - Ponekad
   - Nikada

28. Imam novčanih problema
   - Većinu vremena
   - Jako često
   - Ponekad
   - Nikada

29. Imam poteškoća sa osnivanjem i održavanjem bliskih odnosa
   - Većinu vremena
   - Jako često
   - Ponekad
   - Nikada

30. Imam problema u seksualnom životu
   - Većinu vremena
   - Jako često
31. **Dobro se slažem sa svojom porodicom i ostalom rodbinom**
   - Većinu vremena
   - Jako često
   - Ponekad
   - Nikada

32. **Osjećam se usamljeno i izolirano od drugih ljudi**
   - Većinu vremena
   - Jako često
   - Ponekad
   - Nikada

33. **Uživam u svom slobodnom vremenu**
   - Većinu vremena
   - Jako često
   - Ponekad
   - Nikada
### 8.6. Appendix 6a – Social Functioning Questionnaire (English version)

**Social functioning questionnaire (SFQ)**

This next set of questions also asks about things that some people in your situation may have difficulty with.

Please look at the statements on the sheet and for each one, circle the number next to the reply that comes closest to how you have been over the past year. This should only take 2-3 minutes.

<table>
<thead>
<tr>
<th></th>
<th>Statement</th>
<th>Rating Options</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>I complete my task at work and home satisfactorily</td>
<td>Most of the time 0&lt;br&gt;Quite often 1&lt;br&gt;Sometimes 2&lt;br&gt;Not at all 3</td>
</tr>
<tr>
<td>2</td>
<td>I find my tasks at work and at home very stressful</td>
<td>Most of the time 3&lt;br&gt;Quite often 2&lt;br&gt;Sometimes 1&lt;br&gt;Not at all 0</td>
</tr>
<tr>
<td>3</td>
<td>I have no money problems</td>
<td>No problems at all 0&lt;br&gt;Slight worries only 1&lt;br&gt;Definite problems 2&lt;br&gt;Very severe problems 3</td>
</tr>
<tr>
<td>4</td>
<td>I have difficulties in getting and keeping close relationships</td>
<td>Severe difficulties 3&lt;br&gt;Some problems 2&lt;br&gt;Occasional problems 1&lt;br&gt;No problems at all 0</td>
</tr>
<tr>
<td>5</td>
<td>I have problems in my sex life</td>
<td>Severe difficulties 3&lt;br&gt;Moderate problems 2&lt;br&gt;Occasional problems 1</td>
</tr>
</tbody>
</table>
### Lasting personality pathology after trauma

<table>
<thead>
<tr>
<th></th>
<th><strong>I get on well with my family and other relatives</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No problems at all</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Yes, definitely</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Yes, usually</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>No, some problems</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>No, severe problems</td>
<td>3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th><strong>I feel lonely and isolated from other people</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Almost all the time</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Much of the time</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Not usually</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Not at all</td>
<td>0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th><strong>I enjoy my spare time</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Very much</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Sometimes</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Not often</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Not at all</td>
<td>3</td>
</tr>
</tbody>
</table>

**TOTAL**
8.7. Appendix 6b – permission to include the SFQ

RE: SFQ - copyright query

Tyrer, Peter J
You replied on 02/03/2015 12:34.
Sent: 02 March 2015 12:29
To: Munjiza, Jasna

Of course I would, Jasna. I have insisted that the SFQ is not copyrighted as it should be entirely in the open public domain.

Peter

From: Munjiza, Jasna
Sent: 02 March 2015 11:56
To: Tyrer, Peter J
Subject: SFQ - copyright query

Dear Peter,

I have used the Social Functioning Questionnaire (SFQ) in my research project on personality pathology following war trauma.

SFQ was translated into Croatian language and I am wondering whether you would approve if the copies of the SFQ (Croatian and English versions) are included in the appendix of my thesis?

Kind regards

Jasna

Dr J Munjiza

ST6 in General Adult Psychiatry