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An Exploration of the Links between Trauma and Delusional Ideation in Secure Services

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Abstract. Relationships between trauma symptoms and delusional ideation were explored in a forensic sample. A between-subjects design compared low and high trauma scoring patients on measures of delusional ideation and paranoia. A within-subjects design examined associations between trauma-related cognitions, delusional ideation and paranoia. Thirty-four participants were recruited from a number of secure units. Participants' "worst trauma" was identified using a self-report analogue scale. Self-report measures of trauma symptoms, trauma-related beliefs, delusions and paranoia were completed. Thirteen patients scored above the cut-off on the trauma measure, indicating a high rate of trauma symptoms. The most frequently cited worst traumas were committing an offence and the experience of psychosis. Correlational analyses revealed positive associations between traumatization and intensity of delusional ideation and paranoia. Trauma-related negative cognitions about the self were positively associated with level of delusional ideation, associated distress, and preoccupation. Negative cognitions about the world were associated with paranoia. Findings provide some evidence for associations between traumatization and delusional ideation and paranoia in this population. Future research should aim to replicate and extend the study, using a larger sample size and diagnostic measures of post-traumatic stress disorder (PTSD).

Keywords: Trauma, PTSD, psychosis, secure services, delusional ideation, paranoia.

Introduction

Evidence from prevalence studies suggests higher rates of post-traumatic stress disorder (PTSD) in psychiatric and forensic populations than in the general population (Mueser et al., 2001; Spitzer et al., 2001). Lifetime rates of PTSD in the United States general population have been found to range between 7.8% and 9.2% (Breslau, Davis, Andreski and Peterson, 1991; Kessler, Sonnega, Bromet, Hughes and Nelson, 1995). A number of studies in psychiatric populations have reported rates of current PTSD to be between 14% and 43% (McFarlane, Bookless and Air, 2001; Mueser et al., 2001; Neria, Bromet, Sievers, Lavelle and Fochtmann,

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2002), although Frame and Morrison (2001) found a likely PTSD rate of 67% in a sample of 60 inpatients following discharge, and 50% at 4–6 month follow-up. It is suggested that PTSD rates in forensic populations may surpass these, as committing an offence has been identified as a source of trauma (Kruppa, Hickey and Hubbard, 1995). There has been limited research on forensic populations, but a small number of studies have indicated current and lifetime PTSD rates of between 22% and 56% (Gray et al., 2003; Kruppa et al., 1995; Pollock, 1999; Spitzer et al., 2001).

There is now a substantial body of literature supporting the idea that trauma and psychosis are linked through a number of possible relationships (Morrison, Frame and Larkin, 2003; Read, van Os, Morrison and Ross, 2005). In particular, cognitive models of psychosis have been instrumental in explaining how these relationships might occur. For example, people who have been through traumatic events may develop beliefs about the self, world and others, such as "I am vulnerable" and "People can't be trusted" (Morrison, 2001; Garety, Kuipers, Fowler, Freeman and Bebbington, 2001), which may leave them vulnerable to psychosis. Much of the literature has focused on the high rates of childhood sexual abuse found in psychiatric populations (Mueser et al., 1998), but most studies to date have been correlational, and do not indicate a causal relationship (Read, Goodman, Morrison, Ross and Aderhol, 2004). However, Read et al. (2004) argue that even when other possible mediating factors, such as poverty, ethnicity, substance misuse and parental mental heath were controlled for, strong relationships remained between child abuse and psychosis. Furthermore, prospective studies in the general population found that early childhood trauma increased the risk for positive psychotic symptoms, including delusions and hallucinations (Janssen et al., 2004).

Although current definitions of PTSD have evolved to include a range of stressors, some critics have argued that they fail to consider psychological threats and other psychologically traumatic events as stressors (Jung, 2001; Morrison et al., 2003). Consequently, many of the experiences suffered by psychiatric and forensic patients, such as symptoms of psychosis, may not be recognized as a source of trauma or as potentially leading to PTSD (Frame and Morrison, 2001; McGorry et al., 1991; Priebe, Broker and Gunkel, 1998). Definitions of schizophrenia and psychosis have similarly attracted criticism due to evidence suggesting similarities and overlaps with symptoms associated with other diagnoses, particularly PTSD (Jung, 2001; Morrison et al., 2003). For example, intrusions and flashbacks in PTSD have been compared to the positive symptoms of hallucinations and delusions in psychosis (Ehlers and Steil, 1995). Similarly, numbing and detachment in PTSD have been compared to the negative symptoms of psychosis, such as withdrawal and neglect (McGorry, 1991). Following these criticisms, some authors have argued for the need to deconstruct diagnostic approaches (Bentall, 1990), and have proposed alternative descriptions including traumatic psychosis (Kingdon and Turkington, 1999), and PTSD with psychotic features (Jung, 2001).

Common processes in PTSD and psychosis

Recent research has suggested several cognitive and behavioural processes that may contribute to the development and maintenance of PTSD and psychosis following trauma. For example, selective attention to threat has been shown to be similar in PTSD and paranoia (Larkin, Morrison and Frame, 2007). Furthermore, the interpretation of a post-traumatic intrusion as culturally acceptable or not might determine a diagnosis of PTSD or psychosis. For instance, if there is a clear link between an intrusive experience and recent trauma, an interpretation of

PTSD is more likely to be made by the professional and/or client; but if the link to trauma is less obvious and the interpretation made is culturally unacceptable, then a diagnosis of psychosis is more likely (Morrison et al., 2003).

Morrison et al. (2003) proposed that the similar processes involved in PTSD and psychosis might provide evidence for the notion that some psychotic symptoms are trauma-induced. Ehlers and Clark (2000) suggested traumatic events might be processed in a way that leads an individual to experience a sense of persistent threat. This threat could be external (the world is a dangerous place) or internal (I am vulnerable), and is created in part by negative appraisals of the trauma, and from poorly constructed memories of the traumatic event. This sense of threat is accompanied by intrusions (flashbacks, negative thoughts), arousal (being on edge, jumpy), and strong emotions (sadness, anger, guilt), and is maintained by a number of unhelpful cognitive and behavioural strategies (avoidance of trauma reminders, emotional numbing and negative symptoms). Steel, Fowler and Holmes (2005) highlighted the role of contextual integration and schizotypal personality traits in the development of trauma-related intrusions. They suggested that the strength of contextual integration during information processing is key to understanding the relationship between trauma and psychosis.

The role of appraisals of intrusions has also been highlighted as important in cognitive models of psychosis (Garety et al., 2001; Morrison, 2001). For example, when faced with a negative event (distressing intrusive images), individuals are more likely to attribute the event to an external cause (MI5 are trying to brainwash me) in order to protect self-esteem. This is particularly likely when there is a discrepancy between ideal and actual self (Bentall, 1994). This interpretation is likely to be distressing to the individual and would be viewed as culturally unacceptable, leading to the possible activation of unhelpful cognitive and behavioural strategies, including selective attention and the use of safety behaviours (Morrison et al., 2003).

The need to create meaning for negative life events has also been suggested in models of PTSD and persecutory delusions. In PTSD, it is suggested that previously held assumptions about the self and world are shattered following trauma (Janoff-Bulman, 1992). This has the effect of triggering a search for meaning in the trauma survivor. In models of persecutory delusions, it is suggested that delusions arise out of attempts to make sense of anomalous events (Maher, 1974; Garety et al., 2001).

Recent research

The research in this area is still in its infancy and, to date, the cognitive factors involved in PTSD and psychosis have not been extensively investigated. However, Chisholm, Freeman and Cooke (2006) investigated predictors of PTSD in patients who had experienced psychotic symptoms. They found that 61% presented with symptoms indicative of PTSD and that feelings of helplessness, losing control, a lack of social support and the content of persecutory delusions influenced the rate of traumatic stress responses, as well as having a history of previous trauma and psychotic episodes. A study by Larkin et al. (2007) assessed rates of trauma symptoms and delusional ideation in paramedics, using postal questionnaires. The findings suggested a likely PTSD rate of 51%. Highly traumatized paramedics (scoring 40 or more on the Davidson Trauma Scale) held their delusional beliefs with more conviction and preoccupation, and experienced more distress than less traumatized colleagues. Negative cognitions about the self (related to trauma) predicted the conviction,

preoccupation and distress associated with delusional ideas, and self-blame was associated with paranoia.

The findings suggest that the experience of trauma may lead to delusional interpretations of anomalous events (intrusions). Additionally, beliefs about the self as incompetent or vulnerable make it difficult to recover a sense of self-efficacy (Janoff-Bulman, 1979), leading to a persistent sense of threat. Larkin et al., (2007) suggested that if these findings were to be replicated in a sample of psychiatric inpatients, this would serve to increase our understanding of the mediating factors involved in the development and maintenance of psychosis and PTSD.

Aims of the present study

The present study aims to explore the relationships between trauma and delusional ideation in a sample of forensic inpatients, with a diagnosis of schizophrenia. This population have previously been identified as both a vulnerable and neglected group in the area of trauma research (Mueser et al., 2001; Spitzer et al., 2001). It is thought that rates of trauma and PTSD may be under-reported in psychiatric and forensic populations due to a lack of routine assessment of abuse and trauma, as well as confusion arising from the similarity of symptom presentation in PTSD and psychosis (Lothian and Read, 2002; Read and Fraser, 1998). Additionally, many offenders initially enter the legal system rather than the medical system, where trauma history may go unrecognized (Kluft, 1996).

The psychological factors that are examined include trauma-related cognitions thought to be predictive of PTSD, and the influence of these cognitions on delusional ideation and paranoia. It is hypothesized that there will be a higher rate of delusional ideation in highly traumatized patients compared to less traumatized patients, according to the trauma measure. It is also hypothesized that negative beliefs about the self, self-blame and negative beliefs about the world (related to traumatic events) will be associated with paranoia and delusional ideation.

Method

Participants

The 30 male and 4 female participants were recruited from low and medium secure units, and all had a diagnosis of schizophrenia. The most common index offence was manslaughter (17.6%), followed by malicious wounding (14.7%), and assault (14.7%). Other offences included: arson (11.8%); threat to harm (2.9%); criminal damage (2.9%); rape or attempted rape (5.9%); and armed robbery (8.8%). Seven patients (20.6%) had not committed any offence. Their mean age was 35 years ($SD = 11.06$, range 20–40). The average time that participants had been in the secure unit was 16 months ($SD = 11.70$, range .25–48). The majority of participants were single (82%) and of white British origin (76%). Inclusion criteria required the participants to be aged 18–65, and able to read and write. Participants were excluded if they were deemed too "unwell" or unable to consent to the study by their clinical team, and if they had a learning disability, a diagnosis of bipolar disorder or psychosis due to substance misuse.

Materials

A number of self-report questionnaires were used to assess trauma symptoms, trauma-related cognitions, delusional ideation and paranoia. The Worst Memories Scale (Bowe, Morrison

and Morley, 2002), a brief visual analogue scale, was used to determine which trauma caused most distress for participants. The trauma-related measures were then completed, based on participants' worst trauma. All participants were asked to complete the measures in the order given below.

The Davidson Trauma Scale (DTS). The DTS (Davidson et al., 1997) is a 17-item scale measuring each DSM-IV symptom of PTSD on a 5-point frequency and severity scale over the previous week. The total DTS score ranges from 0–136 and sub-scores can be computed for 3 symptom clusters: a) intrusions, b) avoidance/numbing, c) hyperarousal. The most clinically accurate cut-off point for presence of PTSD in this population is 40 (Davidson et al., 1997). The DTS has been shown to be sensitive to variations in symptom severity, can distinguish between those with PTSD and those without, between treatment-responders and treatment non-responders, and demonstrates a lowering of scores over time with clinical improvement. The DTS also possesses good reliability ($r = 0.86$) and internal consistency ($r = 0.99$). Concurrent validity was obtained against the Structured Clinical Interview for DSM-III-R (SCID), with a diagnostic accuracy of 83% at a DTS score of over 40 (Davidson et al., 1997).

Posttraumatic Cognitions Inventory (PTCI). The PTCI (Foa, Ehlers, Clark, Tolin and Orsillo, 1999) is a 36-item scale measuring trauma-related thoughts and beliefs during the previous month. For each item, the participant indicates their agreement with each statement on a 7-point scale. The PTCI is thought to compare favourably with other trauma-related measures and is able to discriminate between traumatized individuals with and without PTSD, even after controlling for depression and anxiety. Foa et al. (1999) found high internal consistency of the three subscales (Cronbach's alpha: Negative cognitions about the self = 0.97; Negative cognitions about the world = 0.88; Self-blame = 0.86). The scale also showed good test-retest reliability (Negative cognitions about the self = 0.86; Negative cognitions about the world = 0.81; Self-blame = 0.80).

Peters Delusion Inventory (PDI). The PDI-21 (Peters, Joseph and Garety, 1999) was derived from the 40-item version and is designed to measure delusional ideation in the normal population, but has also been used with psychiatric inpatients. The multidimensionality of delusions is incorporated by including measures of distress, preoccupation and conviction. For each item, the participant scores "1" if the belief is endorsed and "0" if the belief if not endorsed. If the belief is endorsed, the participant is asked to rate on a scale of 1–5 the degree of distress, preoccupation and conviction with which the belief is held. The range of possible scores is 0–336, where higher scores are associated with greater delusional ideation. The PDI-21 has been found to have good internal consistency (Cronbach's alpha = 0.82) and correlations revealed good test-retest reliability (PDI Yes/No: $r = 0.78$; Distress: $r = 0.81$; Preoccupation: $r = 0.81$; Conviction: 0.78). Construct validity was also established.

Paranoia Scale (PS). The Paranoia Scale (Fenigstein and Vanable, 1992) is a 20-item scale designed to measure paranoid thought in the general population, but has also been validated on patients with a diagnosis of schizophrenia. The scale consists of 20 statements about paranoia that can be agreed with on a 5-point scale. The scale has demonstrated internal consistency (Cronbach's alpha = .84), test-retest reliability (correlation = .70), and construct validity. It was included in the present study to provide a more robust measure of paranoia (in addition to the paranoia items on the PDI).

Procedure

Approval for the study was granted by the multi-site research ethics committee and by the research and development departments at each of the five secure service sites. A total of 108 forensic patients were invited to take part in the research. Of those, 36 provided written informed consent, and two patients withdrew prematurely, providing a final sample of 34 (31% response rate). Patients meeting the inclusion criteria were identified via their clinical team[1] and were given written information about the study, including purpose, requirements of participants, confidentiality arrangements and the complaints procedure. All those approached were given information about the support systems put in place (speaking to the researcher, a member of their clinical team or the psychology department), should they wish to discuss any issues, such as distress. Patients were followed up one week later by the researcher to invite them to participate and to ask any questions about the study. If patients agreed, they were seen on the ward and asked to sign an informed consent form. Participants were asked to look at a list of traumatic events (see Table 1) and tick any that they had ever experienced. The list was comprised of traumatic events identified in DSM-IV, and other events reported to be traumatic in the literature. Participants then completed the range of measures.

Data analysis

Data were screened for approximation to a normal distribution by the use of Kolmorgorov-Smirnov (K-S) tests, followed by visual inspection and calculation of skewness and kurtosis. K-S tests indicated that four variables required statistical transformation, since they were marginally outside the range of -2 and $+2$. The DTS total score and PDI subscale "preoccupation" were square root transformed. The PTCI subscale "negative cognitions about the self" and the PDI subscale "distress" were normalized using logarithmic transformation. Consequently, parametric statistics were used for all data analyses.

Results

Worst traumatic event

All participants in the sample identified experiencing at least one traumatic event in their lifetime and the mean number of traumas experienced was four ($SD = 2.63$, range 1–12). Table 1 shows the percentages and variety of traumatic events experienced by participants. The most common traumatic events experienced by participants included being physically assaulted as an adult, committing an offence, being sent to prison or a secure hospital, witnessing traumatic events, and being bereaved.

The most frequently reported worst traumatic event was committing an offence (17.6%), followed by the experience of psychosis (14.7%), particularly paranoia and hearing voices. The category "witnessing a traumatic event" was cited by 11.8% of the sample, and included witnessing car accidents, physical and sexual assaults, and the death of someone close. The

[1]Clinical team members included the consultant psychiatrist, named nurse, occupational therapist, clinical psychologist and social worker.

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Table 1. Variety and % of all traumatic events experienced by participants ($N = 34$)

	%
Physical assault – as adult	15
Committing an offence	13
Other: Being sent to prison/secure hospital and treatment whilst there	11
Witnessing traumatic events	11
Bereavements	11
Child physical abuse	9
Other: Experience of psychosis	9
Child sexual abuse	5
Severe emotional neglect	5
Serious vehicle accident	4
Being raped	4
Military combat	1
Natural disaster	1
Torture	1

Table 2. Worst traumatic event reported by patients ($N = 34$)

Worst trauma	Frequency *n* (%)	Worst trauma cont.	Frequency n (%)
Committing an offence	6 (17.6%)	Other: Being sectioned	2 (5.9%)
Experience of psychosis	5 (14.7%)	Child physical abuse	1 (2.9%)
Being sent to prison/secure hospital	4 (11.8%)	Other: Being shot	1 (2.9%)
Witnessing traumatic events	4 (11.8%)	Other: Being physically abused as adult	1 (2.9%)
Physical assault – as adult	3 (8.8%)	Bereavements	1 (2.9%)
Child sexual abuse	2 (5.9%)	Being bullied	1 (2.9%)
Other: Treatment experiences in hospital	2 (5.9%)	Being raped	1 (2.9%)

types of reported worst traumatic events are displayed in Table 2. It should be noted that numbers in some of the categories, such as those involving acts of child abuse, may seem lower due to them being separated out for the purposes of specificity. For example, some people may have included being raped as child sexual assault and would have recorded it as such.

Thirteen patients (38%) scored 40 or more on the DTS, indicating likely PTSD. Of this sub-sample, 3 patients cited the experience of psychosis as their "worst traumatic event". Although a score of 40 or more is thought to be the most clinically accurate cut-off point for likely PTSD, scores of 20 or more indicate moderate levels of PTSD symptomatology (Davidson et al., 1997). The number of patients scoring 20 or above was 28 (82%). The most frequently reported worst trauma in this sub-sample was the patient's offence (17.9%), followed by the experience of psychosis (14.3%), and witnessing traumatic events (14.3%).

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Table 3. Correlations between traumatization (DTS scores) and delusional ideation and paranoia (PDI and PS scores)

	DTS total	PDI distress	PDI preoccupation	PDI conviction	Paranoia scale
DTS total	–				
PDI distress	.424*	–			
PDI preoccupation	.341*	–	–		
PDI conviction	.236	–	–	–	
Paranoia scale	.375	.364*	.359*	.388*	–

* $p < .05$

Associations between trauma, delusional ideation, and paranoia

In order to determine if mean scores on delusional ideation and paranoia were different according to the level of trauma symptoms as determined by DTS scores, an independent *t*-test was performed. The DTS total score (cut-off of 40) was used as the grouping factor and PS total, PDI distress, PDI preoccupation and PDI conviction subscales were the dependent variables. There was a significant difference between the two groups on PDI distress (t (32) = 2.77, $p < .01$), PDI preoccupation (t (32) = 2.27, $p < .05$) and paranoia (t (32) = 2.54, $p < .05$). A non-significant trend was revealed for the variable PDI conviction (t (32) = 1.68, n.s.). The findings suggest that more traumatized participants experienced more distress from their delusional ideas, and were more preoccupied with them than less traumatized participants. More traumatized participants also had greater levels of paranoia than less traumatized participants.

Associations between traumatization (DTS total), delusional ideation (PDI subscales: distress, preoccupation and conviction), and paranoia (PS total) were examined using Pearson's correlations (see Table 3). With an alpha level of .05, there were significant and positive correlations between DTS total score and PDI distress ($r = .424$, $N = 34$, $p < .05$), preoccupation ($r = .341$, $N = 34$, $p < .05$) and paranoia total score ($r = .375$, $N = 34$, $p < .05$). PDI conviction was not significantly associated with DTS score. The findings suggest that as the level of traumatization increases, distress and preoccupation associated with delusional ideation increase. Additionally, paranoia appears to increase with level of traumatization.

Association between trauma-related cognitions, delusional ideation, and paranoia

Associations between trauma-related cognitions (PTCI subscales: negative cognitions about the self, world and self-blame) and delusional ideation (PDI subscales: distress, preoccupation, conviction) and paranoia (PS) were examined using Pearson's correlations (see Table 4). A significance level of $p < .01$ was adopted due to a large number of correlations being conducted. Negative cognitions about the self were positively and significantly correlated with PDI distress ($r = .610$, $N = 34$, $p < .01$) and PDI preoccupation ($r = .496$, $N = 34$, $p < .01$). Negative cognitions about the world were positively and significantly correlated with paranoia ($r = .624$, $N = 34$, $p < .01$). Self-blame was not significantly correlated with any aspect of delusional ideation or paranoia. The findings suggest that patients holding negative cognitions about the self experienced high distress levels from their delusional ideas, and were highly preoccupied

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Table 4. Correlations between post-trauma cognitions (PTCI subscales) and delusional ideation (PDI) and paranoia (PS)

	PDI distress	PDI preoccupation	PDI conviction	Paranoia scale
Negative cognitions about the self	.610**	.496**	.376	.369
Negative cognitions about the world	.261	.304	.343	.624**
Self blame	.063	.089	.105	.275

** $p < .01$

with them. Patients with negative cognitions about the world following trauma had high levels of paranoia.

Discussion

Prevalence of trauma symptoms

This study found that 38% of forensic inpatients scored 40 or more on the DTS, suggesting a level of traumatic reaction likely to be indicative of PTSD (Davidson et al., 1997). This finding is consistent with previous studies that have found lifetime PTSD rates in adult forensic patients of between 32% and 36% (Gray et al., 2003; Kruppa et al., 1995; Pollock, 1999; Spitzer et al., 2001). Papanastassiou, Waldron**,** Boyle and Chesterman (2004) found a lifetime rate of 58%, although the total sample in that study was comprised of perpetrators of homicide, and a different measure was used to assess PTSD. Furthermore, 82% of patients scored 20 or more on the DTS, suggesting a high level of traumatic stress symptoms that may not have been high enough to indicate PTSD.

The finding that all 34 participants in the sample had experienced at least one traumatic event in their lifetime exceeds rates reported by other studies, which range from 64% to 93% in forensic inpatients (Barnard, Hankins and Robbins, 1992; Gray et al., 2003; Mueser et al., 1998; Spitzer et al., 2001). The higher rate found in the present study may be due to sampling biases. Although prior experience of trauma was not highlighted in the inclusion criteria, consultant psychiatrists may have suggested patients with a known trauma history. Furthermore, patients were given a comprehensive list of traumatic events, including the experience of psychosis and being sent to prison or a secure hospital. Breslau (2002) suggests using a list of events compared to a single question increases the prevalence estimates of trauma and the number of traumas reported per person.

The number of women in the study was small due to the population in secure services being predominantly male (Department of Health, 2002), but many of the women approached declined to participate in the study. Previous research on rape and domestic abuse suggests that women may feel ashamed, guilty or fearful; may want to protect their perpetrators, especially if they have ongoing relationships with them; are reluctant to discuss unpleasant memories; or fear negative responses, such as disbelief, horror or blame (Della Femina, Yaeger and Lewis, 1990; Dill, Chu and Grob, 1991; Symonds, 1979). This has been found to be the case more so for males (Briere, 1992) although the population in secure services was much larger to begin with, and not all men had experienced or at least disclosed experiencing sexual abuse.

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Worst traumatic events

The finding that committing an offence was the most frequently reported worst trauma fits with previous studies that found the offence to be a major contributor to PTSD symptomatology (Kruppa et al., 1995; Pollock. 1999; Spitzer et al., 2001). The experience of psychosis as a highly traumatic event is also supported by a number of studies (Frame and Morrison, 2001; Kennedy et al., 2002; Shaw, McFarlane and Bookless, 1997). Experiences of child sexual abuse were rated as the worst trauma by only 6%, with child physical abuse being rated by only 3% of participants, but previous studies have reported between 34% and 53% of people with psychosis have experienced childhood sexual or physical abuse (Greenfield, Strakowski, Tohen, Batson and Kolbrener, 1994; Mueser et al., 1998; Ross, Anderson and Clark, 1994). It could be argued that recency effects accounted for this finding; that is, participants may have been more concerned with being sent to prison, or their psychotic symptoms than their past experiences of child abuse. Alternatively, the rate of childhood trauma could be said to be higher if the separated categories of child sexual abuse are combined. For example, combining the categories of "being raped", "being bullied", "child physical abuse" and "child sexual abuse" bring the figure to just under 15%, which places it in the top three worst traumas. It should be noted that rates of childhood sexual abuse in males may be highly underreported (Mendel, 1995) due to feelings of shame and embarrassment.

Relationships between trauma and delusional ideation

The positive and significant association between rate of trauma symptoms and delusional ideation (specifically distress and preoccupation), including paranoia, is consistent with findings from a study by Larkin et al. (2007) on paramedics. This suggests that the more traumatized a person is, the more likely they are to be distressed and preoccupied with their delusional ideas. It is not clear whether high levels of traumatization may lead to the development of delusional ideation and paranoia, since this study was exploratory in nature and does not propose a causal relationship. A number of studies, however, have pointed towards traumatic events preceding psychotic symptoms in psychiatric patients (Honig et al., 1998; Romme and Escher, 1989).

The finding that a higher rate of trauma symptoms was associated with paranoia suggests that highly traumatized participants have attempted to make sense of their experiences by attributing culturally unacceptable explanations to them. It is likely, therefore, that following trauma, a strong sense of threat leads to high levels of paranoia (Freeman and Garety, 2000), which may serve as a safety behaviour (Larkin et al., 2007).

Relationships between trauma-related cognitions and delusional ideation

The finding that negative cognitions about the self were associated with high rates of distress and preoccupation on the PDI is also consistent with findings from Larkin et al.'s (2007) study on paramedics. It is possible that patients in the sample had negative views about themselves (related to trauma) because many had committed an offence. They may have had lower self-esteem or feelings of guilt and shame resulting from their offence, especially in the case of sexual offenders against children (Proeve and Howells, 2002). Since committing an offence was reported as the worst trauma in the majority of cases, this suggestion is

plausible. Furthermore, Ehlers and Clark (2000) suggest that individuals who do not recover from traumatic events tend to negatively appraise them. For example, patients who may have committed an offence and found this to be traumatic appear to have made internal attributions for this event. Subsequent intrusions, such as memories of the offence, may have been avoided, leading to a sense of ongoing threat, reinforcing negative beliefs about the self as inadequate or vulnerable. It is therefore possible that delusional interpretations were made of the intrusions in an attempt to distance them from the self (Ehlers and Steil, 1995; McFarlane, 1992; Spurell and McFarlane, 1995).

The finding that negative cognitions about the world were associated with paranoia suggests that some patients perceived an external threat, leading them to become paranoid about others and the world. It seems plausible that paranoia was functional for those patients as a safety behaviour, particularly given that they were in secure services. Freeman, Garety, Kuipers, Fowler and Bebbington (2002) suggested that persecutory delusions are attempts to make sense of anomalous experiences, such as intrusions. In their search for meaning, individuals draw on pre-existing beliefs about the self, world and others. It is possible that participants in the present study may have held pre-existing beliefs about the world as a dangerous place. This suggestion would make sense, given that participants were inpatients in secure services, and may have experienced negative events in the psychiatric and forensic systems.

Study limitations and implications for future research

The findings indicate significant associations between particular trauma-related cognitions and delusional ideation and paranoia; however, generalization of the findings is limited due to a number of methodological issues. The sample size restricted the type of analyses that were possible, so that it was not feasible to ascertain the post-trauma factors that predicted distress, preoccupation, conviction or paranoia. This would have required a multiple regression analysis with a much larger sample size (Tabachnick and Fidell, 1996). The sample was also highly selected, since all participants were volunteers and had been referred via their clinical team. Most of the participants were considered to be relatively well at that time so did not score highly on the delusion and paranoia measures. If patients that were considered less well had participated, it is possible that scores on these two measures might have been higher. Alternatively, those that did not participate may not have been distressed by their experiences, so the selected sample may have been unusual in their presentation. It is also important to note that this was a cross-sectional study, so findings cannot be generalized to other populations.

Approximately two-thirds of patients asked declined to participate in the study. The most common reason for not participating was that many patients had previously taken part in research that had been either too time consuming or had resulted in negative experiences for them. Some patients stated they did not want to discuss events that had happened a long time ago and wanted to move on. Other patients wanted to be paid for participation, which was not possible. The implication of these factors is that some of those patients who were not suggested by the clinical teams or did not consent could potentially be suffering with PTSD symptomatology, which could go unrecognized (Weisaeth, 1989).

The measures used in the current study were chosen for their demonstrated reliability and validity with particular populations, but they nevertheless presented some difficulties. Some of the symptoms included in the DTS could arguably have occurred due to other factors; for example, sleep problems could be due to medication, and not considering oneself to have future

goals and aspirations could be due to being in forensic services. Furthermore, the DTS does not consider multiple traumas, therefore it was not possible to estimate lifetime PTSD. Given that people with psychosis have usually experienced multiple or cumulative traumas (Mueser et al., 1998; Resnick, Bond and Mueser., 2003), a measure such as the Clinician-Administered PTSD Scale (CAPS: Blake et al., 1990) may have been more appropriate, but would have been much more time-consuming. The DTS cannot provide a diagnosis of PTSD, so the present findings can only suggest likely rates of PTSD or high rates of PTSD symptomatology. The sole use of self-report measures may also have led to social desirability biases or an exaggeration or minimization of symptoms for personal gain (Briere, 1992). It is suggested that future research uses a combination of self-report and clinician-administered measures in order to overcome some of these issues. Furthermore, a brief measure of psychotic symptoms would have been useful.

Clinical implications

The findings highlight the need for routine screening upon admission to hospital or prison, in order to identify trauma histories. Ideally, this would be done at the initial stages of admission, so that trauma symptomatology could be identified as early as possible. A range of treatment options could then be offered to patients to exist alongside treatment related to the patient's offence, or psychotic symptoms. Read, Hammersley and Rudegeair (2006) recommend that professionals are given the opportunity to access training programmes covering why, how, and when to ask about trauma. They state that although the introduction of policies and guidelines is a move in the right direction, research shows that change is unlikely to occur without training. The identification of trauma is also important for assessing risk. For example, Read, Agar, Barker-Collo, Davies and Moskowitz (2001) indicated that child sexual abuse was a better predictor of suicidality than depression. Rogers, Gray, Williams and Kitchiner (2000) suggested that PTSD could act as a stressor to relapse when it occurs with another serious mental health problem such as psychosis. The identification of trauma histories in forensic populations would seem to be particularly important for the safety of patients and others.

The association between trauma and delusional ideation and paranoia indicates that symptoms may overlap with each other and that trauma symptoms could potentially be diagnosed as psychotic symptoms. There needs to be further recognition of these issues rather than categorization of symptoms into one diagnosis or another (Bentall, 1990; Jung, 2001; Morrison, Renton, Dunn, Williams and Bentall, 2004).

Conclusions

This study found high rates of trauma exposure in a sample of secure service inpatients, but it was not possible to determine the true prevalence of PTSD in this population. Committing an offence appeared to be the worst trauma for a majority of patients, followed by the experience of psychosis. Participants scoring 40 or more on the DTS were found to experience more distress and were more preoccupied with their delusional ideas than participants scoring below 40. Participants holding negative views about the self following trauma were more distressed and preoccupied about their delusional ideas, and participants with negative cognitions about the world held higher levels of paranoia than other participants. Although the findings may not be generalizable due to the reasons outlined above, they provide some support for the suggestion that trauma is associated with a tendency to make delusional interpretations of anomalous or

negative events. This evidence provides further support for common cognitive factors involved in the development and maintenance of PTSD or psychosis, following traumatic events. It is possible that for some individuals, traumatic events make them more likely to experience psychotic symptoms. For others, the experience of psychosis or committing an offence may be traumatic in itself. PTSD and psychotic symptoms may also interact to exacerbate an individual's symptoms (Morrison et al., 2003; Mueser et al., 2002). Much more research needs to be carried out in order to discover more about the relationships between trauma and psychosis and to draw out the common development and maintenance processes.

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