

ORIGINAL PAPER

Nicholas Tarrier · Lynsey Gregg

Suicide risk in civilian PTSD patients

Predictors of suicidal ideation, planning and attempts

Accepted: 4 March 2004

Abstract *Background* There appears to be a strong connection between suicidality and the experience of trauma. The study investigated suicidality in chronic civilian post-traumatic stress disorder (PTSD). *Method* Ninety-four participants suffering from chronic PTSD were assessed for suicidal ideation, plans and attempts since the index trauma as part of a comprehensive assessment. The prevalence of these was assessed and characteristics of those reporting suicide-related thoughts and behaviour were investigated through logistic and multinomial regression analyses. *Results* Over half of the sample (56.4%) reported some aspect of suicidality with 38.3% reporting ideation, 8.5% reporting suicide plans and 9.6% having made suicide attempts since the trauma. Of the nine participants who reported suicide attempts, six had made more than one attempt. The proportions of participants who reported suicidality in this sample were significantly greater than reported within the general population, when comparisons were made with an epidemiological study. Logistic regression analysis indicated that a unit increase in life impairment ($OR = 3.1$) and depression ($OR = 1.14$) scores were independently and significantly associated with suicidality. Multinomial regression indicated that life impairment ($OR = 2.71$) and depression ($OR = 1.13$) scores were associated with the presence of suicidal ideation compared to no ideation, and life impairment ($OR = 5.75$), depression ($OR = 1.2$) scores and receiving psychotropic medication ($OR = 10.6$) were associated with the presence of plans and attempts compared to no suicidal behaviour. *Conclusions* Suicide risk is elevated

in those suffering from chronic PTSD and is associated with impaired functioning in combination with depression.

Key words PTSD – suicide-related thoughts and behaviour – suicide risk – suicidality

Introduction

Suicide attempts are one of the strongest predictors of successful suicide (Nordstrom et al. 1995; Johnsson-Fridell et al. 1996) and are themselves predicted by suicidal ideation and planning (Weissman et al. 1989). Epidemiological studies estimate that between 1.1% and 4.6% of the population attempt suicide at some time in their life (Paykel et al. 1974; Moscicki et al. 1988; Kessler et al. 1999; Dube et al. 2001) and 13.5% report suicidal ideation and 3.9% a plan (Kessler et al. 1999). In a large UK survey of psychiatric morbidity, 80 participants, just less than 1% of the overall sample, reported having had thoughts of killing themselves in the 7 days prior to interview, although people with suicidal thoughts in the absence of significant depressive symptoms were not included (Meltzer et al. 1995).

There appears to be a strong connection between suicide-related thoughts and behaviour (suicidality: van Heeringen 2001) and the experience of trauma. Studies have investigated this association by examining suicide rates or attempts in particular populations who have suffered trauma. For example, there is a significant association between adverse childhood experience or abuse and risk of attempted suicide throughout the lifespan (Dube et al. 2001; Gould et al. 1994). War veterans appear at high risk of suicide, with well-established findings on combat soldiers who served in Vietnam (Farberow et al. 1990; Freeman et al. 1995; Fontana and Rosenheck 1995; Adams et al. 1998). Suicide attempts are higher in women who have suffered sexual assault and rape (Steketee and Foa 1987; Davidson et al. 1996). Other studies have compared those who have attempted or

Prof. N. Tarrier (✉) · L. Gregg
Academic Division of Clinical Psychology
Education and Research Building (2nd Floor)
University of Manchester
Wythenshawe Hospital
Manchester M23 9LT, UK
Tel.: +44-161/291-5881
Fax: +44-161/291-5882
E-Mail: nicholas.tarrier@man.ac.uk

successfully completed suicide with control groups who have not. Studies making comparisons between suicide attempters and controls have frequently reported higher levels of PTSD amongst the attempters group. For example, PTSD was found to be a risk factor in low-income inner-city women (Thompson et al. 1999). In those who have suffered trauma and subsequent post-traumatic stress disorder (PTSD), risk of suicide is also elevated. In war veterans, psychiatric disorders including PTSD were more prevalent in substance-abusing suicidal patients (Anderson et al. 1995). Fontana and Rosenheck (1995) reported that psychiatric symptoms (including PTSD) were the sole factors contributing directly to attempted suicide in Vietnam veterans, with traumatic military experiences playing a substantial, but only indirect, role (Fontana and Rosenheck 1995). Lastly, studies have investigated suicide or suicide-related behaviour in patients suffering from PTSD. Kotler et al. (2001) reported that PTSD patients had an increased risk of suicide compared to non-PTSD anxiety patients and normal controls, and risk was related to high levels of impulsivity and poor social support, although not with anger (Kotler et al. 2001). In a study of 100 Vietnam War veterans suffering from PTSD, 19 had made post-war suicide attempts with a further 15 suffering strong ideation or preoccupation (Hendin and Haas 1991). Five factors were significantly associated with suicide attempts; these were guilt about combat actions, survivor guilt, depression, anxiety and severe PTSD. Logistic regression showed that combat guilt was the most significant predictor of both suicide attempts and preoccupation. Davidson and colleagues conducted an epidemiological study to investigate the prevalence of PTSD and found that 19.8% of the PTSD sample had attempted suicide compared to 3.9% of the sample with other psychological disorders and 0.8% of the non-psychiatric case group. PTSD cases were 14.9 times more likely to have attempted suicide than the non-PTSD subjects and 8.2 times more likely once depression was controlled for (Davidson et al. 1991). In a review of suicide behaviour and anxiety disorders, Allgulander (2000) concluded that anxiety plays an important role in suicidal behaviour, independently and as a co-morbid symptom, with an increased risk of suicidal behaviour associated with pathological anxiety disorders, including PTSD. Suicide risk is also associated with a poorer response to cognitive-behavioural treatment (Tarrier et al. 2000).

Clearly, there are many factors that contribute to suicidality following trauma, including co-morbid disorders, especially depression, guilt, shame, substance abuse and impulsivity. Much of the research has been carried out on war veterans in whom there appears to be a complex interaction between subsequent psychiatric disorder, including PTSD, and combat exposure, exposure to atrocities and pre-war trauma. Much less appears to be known about suicidality in civilian populations suffering from PTSD. The aim of this study was to: 1) investigate the prevalence of suicide risk, defined as suicide ideation, suicide planning and suicide attempts in a

civilian population of PTSD clinic attenders; 2) investigate factors that predicted suicide risk in this population.

Subjects and methods

Sample

Participants were recruited as part of a screening process to take part in a clinical trial of cognitive behavioural treatments of PTSD (Tarrier, Pilgrim et al. 1999; Tarrier, Sommerfield et al. 1999). Possibly suitable patients were referred from primary and secondary health services and appropriate voluntary services, such as Victim Support, in the north west of England. Once referred, patients underwent an initial screening interview to assess the likelihood of them meeting the project entry criteria. If they were assessed as potentially suitable for entry into the study at this point, they then underwent the full assessment procedure. Patients who fulfilled the following entry criteria were entered into the study: a DSM-III-R diagnosis of PTSD elicited by the Clinician Administered PTSD Scale (CAPS) (Blake et al. 1990) (retrospective analysis indicated all patients would also have met DSM-IV criteria), duration of PTSD of at least 6 months, but not more than 10 years (a maximum duration of 10 years was used to prevent the inclusion of a small number of outliers with a very long duration); childhood sexual abuse was not the index trauma; not suffering from a psychotic or organic brain illness; not suffering from alcohol or substance abuse as the primary problem; if receiving psychotropic medication, then medication must have been constant for 3 months prior to the study; not receiving any concurrent psychological or psychosocial intervention and not having received any type of cognitive-behavioural intervention in the 6 months preceding referral.

Assessment

Suicide risk

Questions on suicide behaviour were included in the assessment interview and generally followed the format of Kessler et al. (1999) in that separate questions were asked about ideation ("Have you seriously thought about suicide?"), planning ("Have you ever made plans to commit suicide?") and attempts ("Have you ever attempted suicide or attempted to end your life?"), except that each question was asked "since the (index) trauma?". Account was also taken of information provided by the participant at other times during the assessment procedure.

Clinical assessments

Interview. The Clinician Administered PTSD Scale (CAPS) (Blake et al. 1990) was used, from which a total severity score was computed by adding the severity and frequency score for each symptom; similar scores were computed for each symptom category (intrusions, avoidance and arousal). Social functioning was also assessed. To assess co-morbid disorders, the Structured Clinical Interview for DSM-III-R (SCID-R) (Spitzer et al. 1987) was also completed at initial assessment.

Questionnaires. The following measures were used: Penn Inventory (Hammarberg 1992), a 26-item measure of the severity of PTSD (range 0–78); Impact of Events Scale (IES) (Horowitz et al. 1979), a 15-item measure which provides individual scores for intrusions (IES-I, 7 items, range 0–35) and avoidance (IES-A, 8 items, 0–40); Beck Depression Inventory (BDI) (Beck 1988), a 21-item measure of the severity of depression (range 0–63); Beck Anxiety Inventory (BAI) (Beck 1990), a 21-item measure of the severity of anxiety (range 0–63); General Health Questionnaire 28 (GHQ) (Goldberg and Williams 1988), a 28-item measure of general distress which can be scored using the conventional bi-modal GHQ-scoring method to give a total score (range 0–28), with above a threshold of 4/5 regarded as indicative of psychiatric 'caseness'.

Demographic information and information on the nature of the trauma was also obtained at assessment.

Statistical analyses

Initially, a dichotomous variable was created of those participants who had experienced suicide behaviour (ideation, plans or attempts) and those who had no such behaviour. Comparisons were made between patients who showed suicide behaviour and those who did not on relevant variables, using appropriate parametric tests where data were normally distributed, and distribution-free statistical tests where data were not normally distributed or with categorical data. All tests were 2-tailed and the convention of 0.05 significance was adhered to.

Logistic regression was performed to investigate which factors were significantly and independently associated with suicide behaviour. A further multinomial regression was carried out with the dependent variable being the following three categories: no suicidal behaviour, ideation, and plans and attempts. The separate groups of plans and attempts were considered too small in numbers and were thus combined. In these multiple regressions analyses, univariate comparisons were initially conducted and then variables with a $p < 0.1$ (10% significance level) were included in the multivariate analyses.

Results

Presence of ideation, plan and attempts in chronic PTSD sample

Information was obtained on 94 participants. Of this sample, 41 (43.6%) did not report ideation, plans or attempts, 36 (38.3%) reported ideation, 8 (8.5%) reported definite plans and 9 (9.6%) reported that they had made actual attempts to kill themselves. Thus, 53 (54.4%) of the PTSD participants exhibited some level of suicidal risk after the trauma. Of the 9 subjects who had attempted suicide, 3 had made one attempt only and 6 multiple attempts.

Comparison with normal population

To investigate whether the PTSD sample had significantly greater suicide risk than the normal population, a comparison was made with the data presented by Kessler et al. (1999) from a sample of 5877 of 13.5% reporting ideation (compared to 38.3% in the PTSD sample), 3.9% a plan (8.5% in the PTSD sample) and 4.6% an attempt (9.6% in the PTSD sample). There was a significant difference between the two samples ($\chi^2 = 64.9$, $df = 3$, $p < 0.001$) indicating higher prevalence in the PTSD sample, especially of suicidal ideation which was three times greater in the PTSD sample, with plans and attempts being twice as prevalent.

Comparisons between suicide risk and no risk patients within the PTSD sample

Comparisons and descriptive statistics between suicide behaviour (ideation, and plans and attempts) and

no-suicide behaviour participants are presented in Table 1.

Logistic regression identified two significant independent predictors of the presence of suicidal behaviour: life impairment [$B = 1.132$, $SE = 0.48$, $p = 0.018$, $Exp(B) = 3.103$] and BDI depression [$B = 0.129$, $SE = 0.059$, $p = 0.029$, $Exp(B) = 1.138$]. The odds of suicidal behaviour compared to no suicidal behaviour were 3.1 times higher for each unit increase in life impairment score and 1.14 times higher for each unit increase in BDI score.

In a multinomial regression, life impairment [$B = 0.998$, $SE = 0.489$, $p = 0.04$, $Exp(B) = 2.71$] and BDI [$B = 0.12$, $SE = 0.06$, $p = 0.05$, $Exp(B) = 1.127$] were significantly associated with an increase in thoughts over no ideation. The odds of having suicidal ideation over no ideation were 2.71 times higher for each unit increase in life impairment score and 1.13 times higher for each unit increase in BDI score. In plans and attempts compared to no ideation, life impairment [$B = 1.75$, $SE = 0.861$, $p = 0.04$, $Exp(B) = 5.75$], BDI [$B = 0.18$, $SE = 0.085$, $p = 0.032$, $Exp(B) = 1.2$] and receiving psychotropic medication [$B = 2.37$, $SE = 1.098$, $p = 0.031$, $Exp(B) = 10.64$] were significantly predictive of planned or attempted suicide. The odds of having plans or attempts to commit suicide compared to no suicidal ideation were 5.75 times higher for each unit increase in life impairment score, 1.2 times higher for each unit increase in BDI score and 10.6 times higher for those taking psychotropic medication compared to those not taking medication.

Discussion

These results confirm the reports of previous studies that PTSD patients show high levels of suicide-related thoughts and behaviour and, thus, increased risk of suicide. The prevalence of suicidality within this population of PTSD clinic attenders is considerable, with only just under 44% reporting no suicide-related thoughts or behaviour at all. The majority reported suicidal ideation only (38%), with 18% having progressed further to having made plans or attempts. Although this is a convenience sample of clinic attenders, comparisons with the epidemiological sample of Kessler et al. (1999), which provides similar data on the normal population, indicate that suicidal ideation, planning and attempts are significantly higher in the PTSD population compared to what might be expected within the general population. However, the percentage of the present sample reporting previous suicide attempts (9.8%) is only half of that (19.8%) reported in an epidemiological study (Davidson et al. 1991) and in Vietnam War veterans (Hendin and Haas 1991).

In the univariate analyses, the type of trauma, whether the trauma was simple (a discrete event) or complex, life impairment, co-morbid panic disorder and measures of symptomatology except avoidance were

Table 1 Characteristics and comparison of PTSD patients without suicide behaviour, with suicide ideation, and with suicide plans and/or attempts

	No suicide ideation (n = 41)	Thoughts/ideas of suicide (n = 36)	Definite plans or suicide attempts (n = 17)	Statistics
Demographics				
Age				
Mean (SD)	37.4 (13.30)	34.6 (10.51)	36.0 (10.60)	F = 0.53, p = 0.591
Gender				
Male	23 (56.1 %)	21 (58.3 %)	10 (58.8 %)	$\chi^2 = 0.06, p = 0.973$
Female	18 (43.9 %)	15 (41.7 %)	7 (41.2 %)	
Marital status				
Single	15 (36.6 %)	13 (36.1 %)	3 (17.6 %)	$\chi^2 = 3.24, p = 0.519$
Married	24 (58.5 %)	19 (52.8 %)	12 (70.6 %)	
Divorced/separated	2 (4.9 %)	4 (11.1 %)	2 (11.8 %)	
Living arrangements				
Living alone	8 (19.5 %)	10 (27.8 %)	5 (29.4 %)	$\chi^2 = 2.17, p = 0.904$
Living with spouse	24 (58.5 %)	19 (52.8 %)	10 (58.8 %)	
Living with parents/family	9 (22.0 %)	7 (19.4 %)	2 (11.8 %)	
Employment status				
Employed	10 (24.4 %)	5 (13.9 %)	1 (5.9 %)	$\chi^2 = 5.60, p = 0.469$
Unemployed	31 (75.6 %)	31 (86.1 %)	16 (94.1 %)	
Age completed full-time education				
Median (range)	16 (14–36)	16 (13–25)	16 (14–27)	$\chi^2 = 0.70, p = 0.704$
Current religion				
No religion	30 (73.2 %)	28 (77.8 %)	13 (76.5 %)	$\chi^2 = 4.99, p = 0.892$
Religion	11 (26.8 %)	8 (22.2 %)	4 (23.5 %)	
Dependent children				
No dependent children	27 (65.9 %)	17 (47.2 %)	12 (70.6 %)	$\chi^2 = 3.81, p = 0.149$
One or more dependent child	14 (34.1 %)	19 (52.8 %)	5 (29.4 %)	
History of psychological disorders				
No history	33 (80.5 %)	28 (77.8 %)	10 (58.8 %)	$\chi^2 = 3.21, p = 0.201$
History	8 (19.5 %)	8 (22.2 %)	7 (41.2 %)	
Trauma details				
Trauma type				
Victim of crime	18 (43.9 %)	23 (63.9 %)	5 (29.4 %)	$\chi^2 = 10.68, p = 0.03$
Accident	17 (41.5 %)	11 (30.6 %)	6 (35.3 %)	
Other	6 (14.6 %)	2 (5.6 %)	6 (35.3 %)	
Simple/complex trauma				
Simple	34 (82.9 %)	27 (75 %)	5 (29.4 %)	$\chi^2 = 17.10, p = 0.001$
Complex	7 (17.1 %)	9 (25 %)	12 (70.6 %)	
Symptoms				
Onset of symptoms				
Immediate	39 (95.1 %)	34 (94.4 %)	14 (82.4 %)	$\chi^2 = 3.15, p = 0.207$
Delayed	2 (4.9 %)	2 (5.6 %)	3 (17.6 %)	
Duration of symptoms				
Less than 1 year	14 (34.1 %)	11 (30.6 %)	5 (29.4 %)	$\chi^2 = 8.38, p = 0.755$
1–5 years	25 (61 %)	22 (61.1 %)	9 (52.9 %)	
More than 5 years	2 (4.9 %)	3 (8.3 %)	3 (17.7 %)	
Pain				
No pain	22 (91.7 %)	22 (95.7 %)	11 (78.6 %)	$\chi^2 = 2.96, p = 0.227$
Chronic pain	2 (8.3 %)	1 (4.3 %)	3 (21.4 %)	
Life Impairment				
Some	4 (2.4 %)	0	0	$\chi^2 = 22.5, p = 0.001$
Moderate	22 (53.7 %)	11 (30.6 %)	3 (17.6 %)	
Severe	13 (31.7 %)	24 (66.7 %)	10 (58.8 %)	
Extreme	2 (4.9 %)	1 (2.8 %)	4 (23.5 %)	
Current depression (% meeting SCID threshold)	10 (41.7 %)	12 (52.2 %)	11 (78.6 %)	$\chi^2 = 4.91, p = 0.086$
Past depression (% meeting SCID threshold)	2 (8.3 %)	5 (21.7 %)	4 (28.6 %)	$\chi^2 = 2.79, p = 0.247$

Table 1 *continued*

	No suicide ideation (n = 41)	Thoughts/ideas of suicide (n = 36)	Definite plans or suicide attempts (n = 17)	Statistics
Symptoms				
Alcohol abuse (% meeting SCID threshold)	2 (8.3 %)	0	2 (14.3 %)	$\chi^2 = 3.10, p = 0.212$
Panic (% meeting SCID threshold)	4 (16.7 %)	3 (13 %)	7 (50 %)	$\chi^2 = 7.61, p = 0.022$
AWOPD (% meeting SCID threshold)	0	1 (4.3 %)	1 (7.1 %)	$\chi^2 = 1.56, p = 0.459$
Social phobia (% meeting SCID threshold)	0	2 (8.7 %)	0	$\chi^2 = 3.42, p = 0.181$
Simple phobia (% meeting SCID threshold)	1 (4.2 %)	3 (13 %)	2 (14.3 %)	$\chi^2 = 1.45, p = 0.485$
OCD (% meeting SCID threshold)	0	1 (4.3 %)	0	$\chi^2 = 1.68, p = 0.432$
GAD (% meeting SCID threshold)	11 (45.8 %)	9 (39.1 %)	6 (42.9 %)	$\chi^2 = 0.22, p = 0.898$
Somatization (% meeting SCID threshold)	1 (4.2 %)	1 (4.3 %)	0	$\chi^2 = 0.62, p = 0.734$
Hypochondriasis (% meeting SCID threshold)	0	1 (4.3 %)	0	$\chi^2 = 1.68, p = 0.432$
CAPS intrusions Mean (SD)	13.93 (5.61)	16.67 (6.09)	19.24 (5.90)	$F = 5.41, p = 0.006$
CAPS avoidance/numbing Mean (SD)	24.59 (9.89)	28.56 (7.47)	28.82 (7.84)	$F = 2.53, p = 0.085$
CAPS arousal Mean (SD)	24.05 (7.89)	28.11 (6.58)	29.94 (5.19)	$F = 5.52, p = 0.005$
CAPS total symptoms Mean (SD)	62.56 (18.59)	73.33 (16.21)	78.00 (13.75)	$F = 6.52, p = 0.002$
Penn Scores Mean (SD)	41.68 (9.92)	48.60 (13.72)	51.47 (9.32)	$F = 5.43, p = 0.006$
IES avoidance Mean (SD)	23.57 (9.86)	24.63 (7.45)	27.71 (5.55)	$F = 1.47, p = 0.236$
IES intrusions Mean (SD)	22.95 (9.17)	25.11 (7.87)	30.82 (4.81)	$F = 5.67, p = 0.005$
BDI depression Mean (SD)	20.41 (9.38)	28.11 (12.41)	33.76 (8.89)	$F = 10.4, p = 0.001$
BAI anxiety Mean (SD)	21.57 (10.74)	26.97 (12.45)	30.00 (11.53)	$F = 3.68, p = 0.029$
GHQ 28 Mean (SD)	15.19 (7.88)	14.06 (8.61)	20.00 (6.30)	$F = 3.34, p = 0.04$
Treatment				
Psychotropic medication No medication	29 (70.7 %)	21 (58.3 %)	3 (17.6 %)	$\chi^2 = 13.9, p = 0.001$
Taking medication	12 (29.3 %)	15 (41.7 %)	14 (82.4 %)	
Patient status Inpatient	0	0	3 (17.6 %)	$\chi^2 = 14.0, p = 0.001$
Outpatient	41 (100 %)	36 (100 %)	14 (82.4 %)	
Compensation				
Compensation claim No claim	12 (37.5 %)	7 (21.9 %)	5 (31.2 %)	$\chi^2 = 3.82, p = 0.431$
Claim settled	1 (3.1 %)	3 (9.4 %)	0	
Claim on-going	19 (60.1 %)	22 (68.7 %)	11 (68.8 %)	

significantly associated with suicide behaviour. In the multivariate analyses, the distinction between those exhibiting suicide behaviour or not is significantly associated with greater life impairment and higher scores on the Beck Depression Inventory. Increased life impairment results in a threefold increase in suicide risk, whereas an increase in BDI scores results in a 13% increase in risk. In the multinomial regression, these two factors are again significant when suicidal ideation is compared to no ideation, although a unit increase in life impairment results in a fivefold increase in ideation. When plans and attempts are compared to no ideation, life impairment and BDI scores are again significant, but added to the equation is the use of psychotropic medication which increases the risk of a suicidal plan or attempt by ten times. Examination of Table 1 indicates a considerably larger percentage (82.4) of subjects were taking medication in the plans and attempts group, whereas in the no ideation group just over 70% were not taking medication. It is probable that taking medication indicates a greater severity of disorder and perhaps also co-morbid depression. It is noteworthy that the entry criteria to the study required that medication be stable; thus, this group does not represent patients in some type of acute crisis or sudden mood instability, but rather reflects the existence of a chronic and severe problem.

It appears that it is the level of life impairment, which presumably reflects the level of disability and impairment to functioning, that is most strongly associated with the translation from no suicidal ideation through to risk. Of the no ideation group, 36.6% have a severe or extreme life impairment rating compared to 69.5% of the suicidal ideation group and 82.3% of the plans or attempts group. This most probably summates measures of symptoms and disorder severity into one single outcome that has an impact on the subject's life. Depression also, not surprisingly, is further associated with suicidality.

This study has a number of weaknesses. It is a convenience sample recruited from clinic attenders being recruited into a clinical trial. We did not collect any information concerning the presence of suicidal ideation prior to the trauma. The vast majority of participants were referred from primary or secondary care; thus, those obviously actively suicidal may have been screened out. This may explain the lower percentage of those reporting previous suicide attempts compared to the population-based sample reported by Davidson et al. (1991a,b). It has also been assumed that the trauma and resulting disorder are responsible for the higher levels of suicidal behaviour compared to the general population reported by Kessler et al. (1999), whereas the difference in the demographic make-up or other characteristics of the two populations may be responsible. We must be cautious in comparing population-based epidemiological samples with clinic-attending convenience samples. The method of recruitment and the characteristics of the samples may result in important differences. For instance, in the present study, we ex-

cluded those who identified childhood sexual abuse as the index trauma because it was considered potentially different from traumas occurring during adult life. Given that childhood abuse is associated with later prevalence of suicide attempts (Dube et al. 2001; Gould et al. 1994), the exclusion of this group may have eliminated a factor influential in population studies. Moreover, the inclusion of those taking stable psychotropic medication rather than those more recently prescribed most probably excludes those in acute crises and suggests that this population includes those who are a chronic rather than acute suicide risk. A distinction has previously been made between acute and chronic suicide risk and it was suggested that psychotropic medication would reduce imminent suicide risk by reducing anxiety and agitation (Fawcett et al. 1998).

The clinical implications of these results are that suicide risk in PTSD patients needs to be carefully assessed especially in those who have greater levels of psychiatric disability and co-morbidity. Furthermore, those who remain on medication may also have persistent elevated risk, possibly related to the underlying severity of their condition, even if symptoms are being managed appropriately and, to some extent, successfully.

Acknowledgement This work was part of a research project funded by a project grant from The Wellcome Trust. Thanks are expressed to Claire Sommerfield for assistance with data collection and management and to Dr Julie Morris for advice on statistical analysis.

References

1. Adams DP, Barton C, Mitchell GL, Moore AL, Einagel V (1998) Hearts and minds: suicide among United States combat troops in Vietnam. *Soc Sci Med* 47:1687–1694
2. Allgulander C (2000) Psychiatric aspects of suicidal behaviour: Anxiety disorders. In: Hawton K, van Heeringen K (eds) *The International Handbook of Suicide and Attempted Suicide*. Chichester: Wiley, p 179–192
3. Anderson BA, Howard MO, Walker RD, Suchinsky RT (1995) Characteristics of substance-abusing veterans attempting suicide: a national study. *Psychol Rep* 77:1231–1242
4. Beck AT (1988) *Beck depression inventory*. New York: The Psychological Corporation
5. Beck AT (1990) *Beck anxiety inventory*. New York: The Psychological Corporation
6. Blake D, Weathers F, Nogu F, Kaloupek D, Klauminzer G, Charney D, Keane T (1990) A clinician rating scale for assessing current and lifetime PTSD: the CAPS-1. *The Behavior Therapist*, pp 187–188
7. Davidson JRT, Hughes DC, Blazer DG, George LK (1991) Post-traumatic stress disorder in the community: an epidemiological study. *Psychol Med* 21:713–721
8. Davidson JRT, Hughes DC, George LK, Blazer DG (1996) The association of sexual assault and attempted suicide within the community. *Arch Gen Psychiatry* 53:550–555
9. Dube SR, Anda RF, Felitti VJ, Chapman DP, Williamson DF, Giles W (2001) Childhood abuse, household dysfunction and the risk of attempted suicide throughout the life span: findings from the adverse childhood experiences study. *J Am Med Assoc* 286: 3089–3096
10. Farberow NL, Kang HK, Bullman TA (1990) Combat experience and postservice psychosocial status as predictors of suicide in Vietnam veterans. *J Nerv Ment Dis* 178:32–37

11. Fawcett J, Busch KA, Jacobs D, Kravitz HM, Fogg L (1998) Suicide: a four-pathway clinical-biochemical model. *Ann N Y Acad Sci* 836:288–301
12. Fontana A, Rosenheck RA (1995) An etiological model of attempted suicide among Vietnam theatre veterans: prospective generalization to a treatment-seeking sample. *J Nerv Mental Dis* 183:377–383
13. Freeman TW, Keesee N, Thornton C, Gillette GM, Young K (1995) Dissociative symptoms in posttraumatic stress disorder subjects and a history of suicide attempts. *J Nerv Mental Dis* 183:664–666
14. Goldberg D, Williams P (1988) A user's guide to the General Health Questionnaire. Windsor, Berks: NFER-Nelson
15. Gould DA, Stevens NG, Ward NG, Carlin AS, Sowell HE, Gustafson B (1994) Self-reported childhood abuse in an adult population in a primary care setting: prevalence, correlates, and associated suicide attempts. *Arch Fam Med* 3:252–256
16. Hammarberg M (1992) Penn Inventory for posttraumatic stress disorder: psychometric properties. *Psychol Assess* 4:67–76
17. Hendin H, Haas AP (1991) Suicide and guilt as manifestations of PTSD in Vietnam combat veterans. *Am J Psychiatry* 148:586–591
18. Horowitz MJ, Wilner N, Alvarez W (1979) Impact of events scale: A measure of subjective stress. *Psychosom Med* 41:209–218
19. Johnsson-Fridell E, Ojehagen A, Traskman-Bendz L (1996) A 5-year follow-up study of suicide attempts. *Acta Psychiatr Scand* 93:151–157
20. Kessler RC, Borges G, Walters EE (1999) Prevalence of and risk factors for lifetime suicide attempts in the national comorbidity survey. *Arch Gen Psychiatry* 56:617–626
21. Kotler M, Iancu I, Efroni R, Amir M (2001) Anger, impulsivity, social support and suicide risk in patients with posttraumatic stress disorder. *J Nerv Mental Dis* 189:162–167
22. Meltzer H, Gill B, Petticrew M, Hinds K (1995) Adults with suicidal thoughts (Chapter 6). Physical complaint, service use and treatment of adults with psychiatric disorders. OPCS Surveys of Psychiatric Morbidity in Great Britain. Report 2. London: HMSO
23. Moscicki EK, O'Carroll P, Rae DS, Locke BZ, Roy A, Regier DA (1988) Suicide attempts in the Epidemiological Catchment Area Study. *Yale J Biol Med* 61:259–268
24. Nordstrom P, Samuelsson M, Asberg M (1995) Survival analysis of suicide risk after attempted suicide. *Acta Psychiatr Scand* 91: 336–340
25. Paykel ES, Myers JK, Lindenthal JJ, Tanner J (1974) Suicidal feelings in the general population: a prevalence study. *Br J Psychiatry* 124:460–469
26. Spitzer RL, Williams JB, Gibbon M (1987) Structured Clinical Interview for DSM IIIR. New York: New York State Psychiatric Institution, Biometrics Research Department
27. Steketee G, Foa EB (1987) Rape victims: post-traumatic stress responses and their treatment: a review of the literature. *J Anxiety Disord* 1:69–86
28. Tarrier N, Pilgrim H, Sommerfield C, Faragher B, Reynolds M, Graham EA, Barrowclough C (1999) A randomised controlled trial of cognitive therapy and imaginal exposure in the treatment of chronic post traumatic stress disorder. *J Consult Clin Psychol* 67:13–18
29. Tarrier N, Sommerfield C, Pilgrim H, Humphreys L (1999) Twelve month follow-up of a trial of cognitive therapy or imaginal exposure in the treatment of PTSD. *Br J Psychiatry* 175: 571–575
30. Tarrier N, Sommerfield C, Pilgrim H, Faragher B (2000) Factors associated with outcome of cognitive-behavioural treatment of chronic stress disorder. *Behav Res Ther* 38:191–202
31. Thompson MP, Kaslow NJ, Kingree JB, Puett R, Thompson N, Meadows LA (1999) Partner abuse and posttraumatic stress disorder as a risk factor for suicide attempts in a sample of low-income, inner-city women. *J Traum Stress* 12:59–72
32. van Heeringen K (2001) The suicidal process and related concepts. In: van Heeringen K (ed) Understanding suicidal behaviour: the suicidal process approach to research, treatment and prevention. Chichester: Wiley
33. Weissman MM, Gerald LK, Markowitz JS, Ouellette R (1989) Suicidal ideation and suicide attempts in panic disorder and attacks. *N Engl J Med* 321:1209–1214