



The nature and course of subthreshold PTSD

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ABSTRACT

This study investigated rates of subthreshold PTSD and associated impairment in comparison to no PTSD and full PTSD and prospectively followed the course of subthreshold symptoms over 3 years. 3360 workers dispatched to the WTC site following 9/11 completed clinician interviews and self-report measures at three time points each one year apart. At Time 1, 9.7% of individuals met criteria for subthreshold PTSD. The no PTSD, subthreshold PTSD, and full PTSD groups exhibited significantly different levels of impairment, rates of current MDD diagnosis, and self-reported symptoms of depression. At Time 2, 29% of the initial sample with subthreshold PTSD continued to meet criteria for subthreshold or full PTSD; at Time 3, this was true for 24.5% of the initial sample. The study lends credence to the clinical significance of subthreshold PTSD and emphasizes that associated impairment may be significant and longstanding. It also confirms clinical differences between subthreshold and full PTSD.

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1. Introduction

Validity of the concept of subthreshold posttraumatic stress disorder (PTSD) has been debated since it was first applied to the Vietnam veteran population (Schnurr, Friedman, & Rosenberg, 1993; Weiss et al., 1992). In one respect, creating a subthreshold diagnosis may pathologize a normative response to trauma and create a disorder where there is not one (Breslau, Lucia, & Davis, 2004; McNally, 2003). Conversely, rejecting classification of subthreshold PTSD may result in the neglect of a segment of the population who fall short of the diagnosis for the full syndrome but nonetheless display significant distress and functional impairment and may be at risk for full PTSD (Jakupcak et al., 2007; Mylle & Maes, 2004).

Rates of subthreshold PTSD have been reported in diverse populations (Grubaugh et al., 2005) and cited ranging from 3.7% in a community sample (Stein, Walker, Hazen, & Forde, 1997) to as high as 44% in a sample of motor vehicle accident survivors (Blanchard, Hickling, Taylor, & Loos, 1994). Some of the disparity in prevalence may be explained by the lack of a uniform definition of subthreshold PTSD. Subthreshold PTSD, also referred to as subsyndromal PTSD and partial PTSD, refers to the presence of some symptoms of posttraumatic stress disorder, but with too few to meet the criteria for PTSD. According to the DSM-IV (1994), the diagnosis of PTSD requires that in reaction to a traumatic event, the individual experiences at least 1 of 5 reexperiencing symptoms (cluster B), a

minimum of 3 of 7 avoidance/numbing symptoms (cluster C), and at least 2 of 5 hyperarousal symptoms (cluster D). Proponents of the concept of subthreshold PTSD suggest that an individual may still display significant impairment while not meeting criteria for all of the symptoms required in clusters B, C, and D. Blanchard et al. (1996) define subthreshold PTSD as meeting criteria for reexperiencing symptoms (cluster B) and either avoidance (cluster C) or hyperarousal (cluster D) symptoms. Stein et al. (1997) characterize partial PTSD as having a minimum of 1 symptom in each of clusters B, C and D. A third classification includes having 1 symptom in cluster B, 2 symptoms in cluster C (instead of 3), and 2 symptoms in cluster D (Kilpatrick & Resnick, 1993).

In an attempt to understand utility of the concept, researchers have sought to identify the degree of impairment associated with subthreshold PTSD. Most studies have cited increased levels of impairment in individuals with subthreshold PTSD when compared to those with no PTSD, though not at levels comparable to those with full PTSD (Grubaugh et al., 2005; Jakupcak et al., 2007; Marshall et al., 2001; Schutzwohl & Maercker, 1999; Stein et al., 1997; Zlotnick, Franklin, & Zimmerman, 2002). Associations have been found between subthreshold PTSD and higher rates of suicidal ideation (Marshall et al., 2001), alcohol use (Adams, Boscarino, & Galea, 2006), withdrawal from loved ones (Breslau et al., 2004), increased anger and aggression (Jakupcak et al., 2007), increased healthcare utilization and more work absences (Breslau et al., 2004).

Methodological challenges of assessing subthreshold PTSD are evident in early studies. Examining only current symptomatology (Stein et al., 1997) may actually lead to the measurement of symptoms of full PTSD that have partially remitted to subthreshold PTSD, while employing retrospective reporting (Breslau et al., 2004) relies

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on the individual's memory and may therefore fall prey to information bias. Reliance on treatment-seeking samples (Zlotnick et al., 2002), abridged symptom assessments (Marshall et al., 2001), and small sample size (Spitzer et al., 2001) may also limit generalizability. Despite methodological difficulties, these preliminary studies have established the need for further research on the presentation of subthreshold PTSD. To our knowledge, there is no prospective data available on the course of subthreshold PTSD and its associated impairment.

The goals of this study were (1) to describe the prevalence and longitudinal course of subthreshold PTSD and (2) to identify symptom presentation and variables associated with symptomatology among those with subthreshold PTSD as compared to individuals with full PTSD and those with no PTSD, in order to determine whether they constitute a distinct diagnostic group.

2. Methods

2.1. Participants

Participants were 3523 disaster recovery workers who worked at the site of the World Trade Center towers (Ground Zero) on or following September 11, 2001. In the aftermath of the terror attacks of 9/11, thousands of disaster recovery workers were deployed to Ground Zero to begin the process of cleaning up and restoring services to the area. These workers worked amidst the rubble of the towers, often witnessing the excavation of bodies or body parts. Furthermore, they worked in an atmosphere of threat to their own lives, not only for fear of another attack, but in the awareness of the instability of nearby buildings for which alarms were sounded numerous times to alert the workers to evacuate urgently. Workers were chosen for deployment to the area by their employers based on characteristics such as skill set and availability so the population was notably not self-selected.

As described in full detail in other reports on this dataset (Cukor et al., in press), participants were interviewed at their place of employment in conjunction with annual fitness-for-duty evaluations arranged by their employers for all workers who had been deployed to Ground Zero in the aftermath of the attacks. Workers were initially scheduled for their first appointments between July 2002 and June 2006 (Time 1), with 95% of workers interviewed in the initial 22 months. They were then scheduled for a second assessment one year after their first evaluation (Time 2) and a third appointment one year following (Time 3). Participants completed a packet of self-report measures and were then interviewed by a doctoral level psychologist. At Time 1, 3523 disaster workers were interviewed with a refusal rate of 2%. Use of this information for research purposes was approved by our Institutional Review Board.

2.2. Measures

2.2.1. Clinician-Administered PTSD Scale (CAPS)

To evaluate criteria for PTSD and subthreshold PTSD, the CAPS was utilized and subjects were instructed to report level of symptomatology for the past month. The CAPS is a structured measure for PTSD that assesses each symptom delineated by the DSM-IV on a frequency scale and an intensity scale. Two separate scores of 0–4 are assigned for the frequency and intensity of each of the 17 potential symptoms of PTSD. For diagnosis of PTSD, we utilized the F1/I2 scoring method whereby having a minimum score of 1 on the frequency scale (i.e., the symptom is present to some extent) and a minimum score of 2 on the intensity scale (i.e., at least moderate intensity) qualified as a symptom toward a diagnosis of PTSD. As per diagnostic criteria, having a minimum of one reexperiencing symp-

tom, at least three avoidance symptoms, and a minimum of two hyperarousal symptoms, as well as duration of one month and causing impairment yielded a diagnosis of PTSD. The CAPS has excellent psychometric properties and is a widely accepted criterion measure of PTSD (Weathers, Keane, & Davidson, 2001).

We utilized the definition of subthreshold PTSD employed by Blanchard et al. (1996) which requires that an individual meet criteria for cluster B (reexperiencing symptoms) and for either cluster C (avoidance/numbing) or cluster D (hyperarousal symptoms), as well as duration of one month and reported impairment. This definition was chosen because of its conservative definition of subthreshold PTSD requiring at least 2 clusters to be met, while remaining distinct from full PTSD by more than one symptom.

Clinicians were trained to use the CAPS in a three-step process with a period of instruction followed by observation of a senior psychologist administering the measure and then administration of the measure with feedback from a senior psychologist. To calculate interrater reliability, a psychologist with 10 years experience using the CAPS made independent ratings while observing interviews. Intraclass correlations (Shrout & Fleiss, 1979) ranged from .98 to .99 for the three symptom cluster severity scores and CAPS total severity.

2.2.2. Structured Clinical Interview for DSM-IV (SCID)

Comorbid psychopathology was assessed with the major depression, panic disorder, and generalized anxiety disorder modules of the SCID DSM-IV. Participants were questioned about current and past symptomatology and were given a diagnosis based upon the DSM-IV criteria. The SCID has been shown to be reliable and valid in the diagnosis of depression and anxiety (First, Spitzer, Gibbon, & Williams, 1995).

2.2.3. Beck Depression Inventory (BDI)

Symptoms and diagnosis of depression were also evaluated with the Beck Depression Inventory (BDI), a widely used self-report measure of depression. The BDI assesses symptoms of depression with 21 questions on a 4-point scale. Scores are summed for a total depression score. Psychometric properties of the BDI are well established (Beck, Steer, & Brown, 1996).

2.2.4. Demographic and Exposure Questionnaire

Basic demographic information was elicited through a questionnaire which also inquired regarding previous mental health treatment. A WTC Exposure Questionnaire was developed by a panel of trauma experts to assess degree of exposure to the attacks. Initially, questions were generated based upon variables that have been established in the disaster literature to predict PTSD. As interviews were conducted during the pilot phase, the questionnaire was revised to include questions that emerged as unique to working at the WTC site (e.g., working on the "bucket brigade"). Aspects of occupational exposure included duration of work on the site, perceived danger at the site, and witness to body bags, bodies, body parts or people jumping. Personal exposure included presence of loved one in the WTC vicinity or injury or death to family or friend.

2.2.5. Traumatic Events Interview (TEI)

Prior trauma history was assessed with the Traumatic Events Interview (TEI). This instrument elicits information regarding several types of trauma ranging from natural disasters to physical and sexual abuse (Green, 1993).

2.2.6. Sheehan Disability Scale

The Sheehan Disability Scale consists of 3 questions asking how much symptoms have interfered with social functioning, occupational functioning, and family functioning. Answers are elicited on

Table 1
Demographic characteristics of the sample.

Characteristics of sample (<i>n</i> = 3360)		
Age, <i>M</i> (<i>SD</i>)	43.77	(9.56)
Gender	Male	97%
	Female	3%
Race	Caucasian	66%
	African American	18%
	Hispanic	13%
	Asian	1%
	Other	2%
Education	Some or no high-school	2%
	High-school graduate	46%
	Some college or training	35%
	College graduate	13%
	More than college	4%
Marital status	Cohabiting	3%
	Separated or divorced	7%
	Married	80%
	Widowed	1%
	Single	9%

a 10-point likert scale ranging from 0 to 10. The Sheehan Disability Scale has been shown to be reliable and valid in previous literature (Sheehan, 1983).

2.3. Data analysis

General descriptive statistics (frequencies and percentages) were used to describe the prevalence of full, subthreshold, and no PTSD at each of the three time points and to assess changes in diagnosis in the subthreshold group. In order to describe and distinguish subthreshold PTSD symptom presentation, individuals with no PTSD, subthreshold PTSD and full PTSD at Time 1 were compared with respect to symptom frequency and intensity as well as cluster configuration using one-way ANOVAs with Tukey post hoc tests and 3×2 chi-square tests. A second series of one-way ANOVAs with Tukey post hoc tests and $3 \times$ chi-square tests were run to evaluate which variables were associated with baseline PTSD diagnosis. Since subthreshold PTSD is collapsed into the no PTSD group in current literature, the no PTSD group was included in the analyses to determine any qualitative differences between these groups as well.

To evaluate course of symptomatology for those with subthreshold PTSD at baseline, multinomial logistic regressions were used. Baseline demographic, psychiatric, and exposure measures were considered while controlling for baseline PTSD severity and analyses were adjusted for missing data between time points (1 and 2, as well as 2 and 3).

3. Results

3.1. Rates of subthreshold PTSD

Analyses at Time 1 were carried out for participants with complete data which totaled 3360 disaster recovery workers. Demographic data of the participants are presented in Table 1. At Time 1, 9.7% (*n* = 326) of individuals met study criteria for subthreshold PTSD while the rate for full PTSD at Time 1 was 8.2% (*n* = 274). At Time 2, there were 83 new cases of subthreshold PTSD (cases which at Time 1 did not meet criteria for subthreshold or full PTSD) and at Time 3 there were an additional 27 new cases of sub-

threshold PTSD (cases which did not meet criteria for subthreshold or full PTSD at either Time 1 or Time 2).

3.2. Symptom severity, comorbid depression and impairment in subthreshold PTSD

Symptom frequency and intensity were compared across all groups to determine if subthreshold PTSD differs only in symptom pattern or also in intensity. All groups differed significantly on baseline CAPS frequency and intensity ($F[2,3352] = 3338, p < .001$ and $F[2,3352] = 4250, p < .001$, respectively), as well as average number of symptoms met for cluster B ($F[2,3359] = 2358, p < .001$), cluster C ($F[2,3352] = 3496, p < .001$), and cluster D ($F[2,3357] = 2453, p < .001$) (see Table 2).

All three groups exhibited significantly different rates of current MDD diagnosis as measured by the SCID ($\chi^2[2,3360] = 575.93, p < .001$). Rates of diagnosis of MDD were 2.3% (*n* = 64) for the no PTSD group, 15.0% (*n* = 49) for the subthreshold PTSD group and 38.3% (*n* = 105) for the full PTSD group. Groups also differed on self-reported symptoms of depression on the BDI ($F[2,3357] = 770, p < .001$; see Table 2).

Overall level of impairment differed significantly between the full, subthreshold and no PTSD groups as reported on the Sheehan Disability Scale (ANOVA = $F[2,1041] = 188, p < .001$). Post hoc analyses revealed that the full PTSD group had more disability than the subthreshold group and the subthreshold group reported greater impairment than the no PTSD group. Differences existed for each of the three subscales for occupational, social and family functioning, as well ($F[2,1043] = 117, p < .001$; $F[2,1042] = 192, p < .001$; $F[2,1043] = 147, p < .001$, respectively) (see Table 2).

3.3. Correlates of PTSD status at Time 1

Demographic variables and known predictors of PTSD were examined for each of the diagnostic groups at Time 1 to identify patterns of characteristics associated with each group. The three groups differed on gender and marital status ($\chi^2[2,3331] = 9.86, p < .007$ and $\chi^2[2,3237] = 12.04, p < .001$, respectively). The full PTSD group had significantly more women than the subthreshold PTSD (6.2% vs. 1.9%) group and no PTSD group (6.2% vs. 3.1%). Those with subthreshold PTSD were significantly more likely to be married as compared to participants with no PTSD (83.3% vs. 74.9%) and participants with full PTSD (83.3% vs. 72.6%).

Significant group differences also emerged on trauma history and past psychiatric history variables ($\chi^2[2,3358] = 68.93, p < .001$ and $\chi^2[2,3360] = 165.74, p < .001$, respectively). The subsyndromal group reported significantly more lifetime trauma and past psychiatric history than the no PTSD group (55.2% vs. 37.6% and 23.6% vs. 9.5%, respectively) but significantly less past psychiatric history than the full PTSD group (23.6% vs. 36.1%). The subthreshold group had significantly more exposure to the index trauma than the no PTSD group ($M = 2.43, SD = 2.12$ vs. $M = 2.07, SD = 1.93$) but reported similar levels of exposure to the full PTSD group ($M = 2.43, SD = 2.12$ vs. $M = 2.80, SD = 2.15$) (see Table 3).

3.4. Course of subthreshold PTSD and predictors of course

To identify course of subthreshold PTSD symptomatology, diagnoses at Times 2 and 3 were reviewed for the 326 individuals who met criteria for subthreshold PTSD at Time 1. Complete follow-up data was available on 86.8% of individuals (*n* = 283) from the baseline sample at Time 2; 94% of those missing data did not attend their evaluation the second year while 6% of those missing data attended the interview but had missing data and were therefore excluded from the analyses. At Time 3, complete data were available for 66.3% (*n* = 216) of the original sample; 60.9% of those

Table 2
Symptom severity and presentation in no PTSD, subthreshold PTSD and full PTSD groups.

	No PTSD		Subthreshold PTSD		Full PTSD		Analysis of variance		
	Mean	SD	Mean	SD	Mean	SD	F	df	p ^a
Overall CAPS	7.25	8.05	30.39	9.92	53.18	14.89	3899	2, 3351	<.001
CAPS frequency	3.99	4.56	16.34	6.06	28.30	8.60	3338	2, 3352	<.001
CAPS intensity	3.26	3.62	14.17	4.41	24.89	6.82	4250	2, 3352	<.001
CAPS Cluster B	0.16	0.46	1.62	0.81	2.25	1.08	2358	2, 3359	<.001
CAPS Cluster C	0.26	0.67	1.46	1.02	4.12	1.07	3496	2, 3352	<.001
CAPS cluster D	0.49	0.78	2.61	1.04	3.61	1.05	2453	2, 3357	<.001
Overall impairment in functioning	2.13	4.31	8.61	7.74	12.14	6.77	188	2, 1041	<.001
Occupational functioning impairment subscale	0.63	1.46	2.31	2.85	3.37	2.57	117	2, 1043	<.001
Social functioning impairment subscale	0.71	1.56	2.91	1.04	4.23	2.87	192	2, 1042	<.001
Family functioning impairment subscale	0.82	1.73	3.39	3.05	4.23	2.87	147	2, 1043	<.001
BDI	3.25	4.85	9.72	6.84	15.60	8.84	770	2, 3357	<.001

^a All pairwise comparisons significant at $p < .001$

Table 3
Variables associated with PTSD diagnosis at Time 1^a.

	No PTSD		Subthreshold PTSD		Full PTSD		Statistic	df	p-value
Gender, female (n, %)	85	(3) ^a	6	(2) ^a	17	(6) ^c	$\chi^2 = 9.86$	2, 3331	<.007
Marital status (n, %) (married and cohab vs. other)	1994	(75) ^a	26	(83) ^b	191	(73) ^a	$\chi^2 = 12.04$	2, 3237	<.001
Lifetime trauma (n, %)	1038	(38) ^a	180	(55) ^b	156	(57) ^b	$\chi^2 = 68.93$	2, 3358	<.001
Past psych (n, %) (MDD, GAD, panic Dx)	290	(10) ^a	77	(24) ^b	99	(36) ^c	$\chi^2 = 165.74$	2, 3360	<.001
WTC exposure (M, SD)	2.07	(1.93) ^a	2.43	(2.12) ^b	2.80	(2.15) ^b	$F = 20.19$	2, 3358	<.001

^a Numbers vary due to missing data. Pairwise comparisons with different alphabetical subscripts differ significantly, $p < .05$.

missing did not return for an interview while 39.1% attended but had incomplete data. To account for possible differences between those with and without missing data, participants were compared on demographic, psychiatric and exposure variables. Participants with missing data at Time 2 were older ($M = 50.44$, $SD = 8.06$ vs. $M = 43.35$, $SD = 8.00$, $t(270) = 4.71$, $p < .001$), which may be due to older individuals retiring and therefore not being scheduled for evaluations, and less educated (68% with high school diploma or less vs. 45% with some college or more, $\chi^2(1248) = 5.42$, $p < .05$). At both time points, participants with missing data reported more

WTC exposure (Time 2: $M = 3.31$, $SD = 2.49$ vs. $M = 2.15$, $SD = 2.01$, $t(273) = 3.07$, $p < .005$ and Time 3: $M = 3.3$, $SD = 2.18$ vs. $M = 1.83$, $SD = 1.87$, $t(240) = 4.99$, $p < .001$). These variables were controlled for in subsequent analyses.

At Time 2, 29% of the initial sample with subthreshold PTSD continued to have symptoms significant enough to qualify for subthreshold or full PTSD. Specifically, one year after initial presentation 14.8% of individuals ($n = 42$) still had subthreshold PTSD and 14.1% of individuals ($n = 40$) with subthreshold PTSD at Time 1 had symptoms which progressed sufficiently to meet a diagnosis of

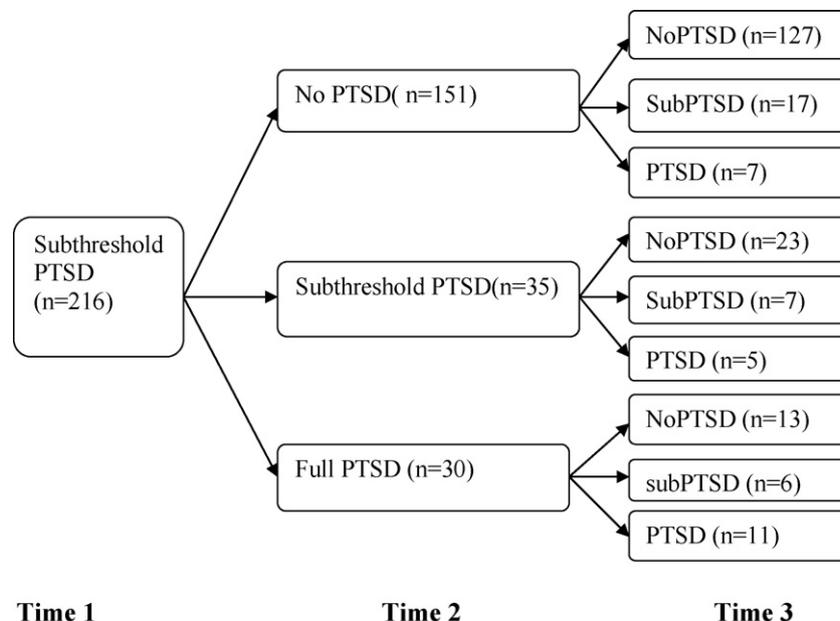


Fig. 1. Course of subthreshold PTSD for participants with complete data at Time 3.

Table 4
Baseline predictors of PTSD status at Times 2 and 3 for those with subsyndromal PTSD at baseline in comparison to other diagnostic groups^a.

	No PTSD			Full PTSD				
	Beta	Standard error	OR (95% CI)	p-value	Beta	Standard error	OR (95% CI)	p-value
Time 2^b								
Lifetime trauma	−0.341	0.379	0.711 (.339, 1.494)	.368	−0.439	0.498	0.645 (.243, 1.710)	.378
Past psychiatric Hx (MDD, GAD, panic disorder)	0.075	0.425	1.078 (.469, 2.478)	.860	0.575	0.580	1.778 (.570, 5.546)	.332
BDI	−0.054	0.027	0.947 (.898, .999)	.045	0.008	0.034	1.008 (.943, 1.077)	.820
Time 3^c								
Lifetime trauma	0.046	0.433	1.047 (.448, 2.448)	.916	−0.463	0.600	0.629 (.194, 2.040)	.440
Past psychiatric Hx (MDD, GAD, panic disorder)	−0.601	0.544	.548 (.189, 1.593)	0.270	−0.049	0.743	0.953 (.222, 4.089)	.948
BDI	−0.026	0.031	0.975 (.918, 1.035)	.405	0.025	0.039	1.025 (.949, 1.108)	.528

^a Note: Numbers vary due to missing data.

^b Multinomial logistic regressions adjusted for baseline PTSD symptoms severity, age, education level and exposure level; reference category: subsyndromal PTSD.

^c Multinomial logistic regressions adjusted for baseline PTSD symptoms severity and exposure level; reference category: subsyndromal PTSD.

full PTSD. Seventy-one percent of those with subthreshold PTSD at Time 1 no longer met criteria for subthreshold or full PTSD at Time 2.

At Time 3, 13.9% ($n = 30$) still met criteria for subthreshold PTSD and 10.6% ($n = 23$) met criteria for full PTSD, while 75.5% ($n = 163$) of the sample did not meet criteria for subthreshold PTSD.

The complete data available for Time 2 and Time 3 ($n = 216$) were assessed to identify trends of subthreshold PTSD (see Fig. 1). The largest percentage of individuals (58.8%, $n = 127$) had subthreshold PTSD in Time 1 and then no longer met criteria for subthreshold or full PTSD at Times 2 or 3. However, nineteen percent (19.4%, $n = 42$) of individuals with subthreshold PTSD at Time 1 had symptoms that progressed to a diagnosis of PTSD at one or both time points over the next 2 years.

Assessment of demographic variables, psychiatric and trauma history, degree of exposure to current trauma, and current psychiatric comorbidity revealed that, controlling for baseline subthreshold PTSD symptom severity, BDI score at baseline was the only variable that predicted PTSD diagnosis at Time 2. Level of BDI scores at Time 1 predicted remission of subthreshold PTSD symptoms at Time 2 ($p < .05$) but was not related to whether the symptoms would progress to full PTSD or be maintained at subthreshold PTSD ($p > .05$) (see Table 4). No variables emerged as significant predictors for Time 3.

4. Discussion

This study of the posttraumatic sequelae of 3523 disaster recovery workers deployed to Ground Zero lends credence to the clinical significance of subthreshold PTSD and emphasizes that the associated impairment may be significant and longstanding. Among those with subthreshold PTSD at baseline, almost 30% met criteria for subthreshold or full PTSD one year following initial assessment and 25% still met criteria 2 years post-baseline.

This study has strong implications for both the nosology of PTSD and the clinical treatment of posttraumatic symptomatology. It confirms a clinically significant difference between those with criterion and those with a sub-criterion level of symptomatology, in that the PTSD group evidenced 40% greater symptom severity and 30% greater overall impairment as compared to the subthreshold group. Yet, the subsyndromal group cannot be labeled non-pathological, as their impairment was substantial and roughly 4 times greater than those without PTSD. The appropriate diagnosis for these subthreshold patients remains unclear. While they do not meet criteria for PTSD, a diagnosis of Adjustment Disorder is not appropriate. An adjustment disorder diagnosis does not fully encapsulate the hallmark traumatic elements of the symptom presentation as reflected by the reexperiencing and avoidance and/or

hyperarousal clusters. Furthermore, symptoms tend to persist past 6 months in a significant minority of patients. While the expansion of the criteria of PTSD may not be indicated, this subgroup of patients should not be excluded from the research and treatment opportunities that are afforded to identified groups of patients. The question of taxonomy is significant as noted by Mylle and Maes (2004), as diagnosis also defines the medico-legal positions of the subjects and the position of individuals with subthreshold PTSD is unclear. Public health implications are great as well, as indicated by Marshall et al. (2001), as findings like these reveal that larger numbers of individuals have impairment in functioning following a trauma than one would assume by simply considering rates of full PTSD.

Despite not having a clear diagnostic category, subthreshold PTSD may not be part of a normative reaction to a trauma as it can cause significant impairment and be chronic in a substantial minority. These results call for the routine screening of all patients following a trauma, not only for posttraumatic stress disorder, but also for substantial symptomatology that does not meet criteria. In a healthcare system that tries to provide cost-effective and targeted intervention, we must be careful not to exclude a group of patients that have a likelihood of maintaining their symptoms and impairment simply because they have not crossed the diagnostic threshold. While differences between PTSD and subthreshold PTSD were clear, the need for treatment for subthreshold PTSD appears to be warranted. This is especially true in light of previous findings, including the high rates of suicidal ideation, even when controlling for depression (Marshall et al., 2001), and significant impairment (Jeon et al., 2007; Zlotnick et al., 2002). There is a strong evidence base for the successful treatment of PTSD (Foa, Davidson, & Frances, 1999); however the degree to which these techniques may be applied to a subthreshold population has yet to be determined.

Particular attention should be given to individuals with subthreshold PTSD and comorbid depression as this presentation is marked by a lack of spontaneous recovery from PTSD symptoms. It is unclear from these results if the depressive symptomatology is directly related to the trauma or indicative of premorbid functioning, but the presence of depression at the time of assessment seems to combine synergistically with subthreshold PTSD to form a symptom profile that is much less likely to remit. It is interesting to note that, while controlling for subthreshold PTSD severity, depression at Time 1 was the only predictor of course of subthreshold PTSD, and that demographic variables did not predict course. This may be due to the restricted sample in the current study (i.e., 97% male) or it may imply that while demographic variables influence development of symptoms, they have less effect on their course.

This study addresses a deficiency in the literature by utilizing a conservative definition of subsyndromal PTSD diagnosed through gold-standard clinician-administered measures in a longitudinal design over three time points. Limitations reflect the challenges of data collection in real-life settings following large-scale traumas. Time 1 assessment was conducted over a wide range of months, due to the availability of data regarding who was deployed to Ground Zero, and the employer's ability to schedule the screening. Though this is not unusual in post-trauma studies, it limits the inferences being drawn from the data, as initial assessment at times occurred months or even years after the trauma, which calls into question pre-assessment levels of symptomatology. Logistic regression indicated that those assessed within the first 12 months following September 11 had no significant differences in likelihood of developing subthreshold or full PTSD as compared to those assessed after the first 12 months; however this large time span is a methodological weakness. Limitations also include the high attrition rates at Time 3; however differences between groups were controlled for throughout the analyses. In addition, the population consisted largely of middle-aged, male subjects exposed to one type of trauma, which may not be representative of a PTSD population as a whole. Also, while assessment measures were chosen to glean all information that might potentially impact the development and especially course of subthreshold PTSD, relevant variables may have been omitted. Answers to questions regarding psychiatric treatment were found to be too vague to draw conclusions and were not included in analyses. Finally, there is always a risk with clinical interview that clinician error may contribute to misrepresentation of symptoms and diagnosis. We attempted to address this potential for error by using a well-validated, structured instrument (CAPS) in the clinical interview and having doctorate level psychologists who received intensive training in the administration of this interview serve as assessors. Interrater reliability ratings were performed to ensure objective validity of scoring and resulted in rates of .98–.99.

5. Conclusions

There have been significant scientific advancements in the understanding of the neurobiological, psychiatric and emotional sequelae of exposure to trauma and disaster. The degree to which people with subsyndromal symptomatology are comparable to the identified presentations is unclear. This study highlights legitimacy of including those with subsyndromal PTSD into our scientific evidence base due to their substantial impairment and lack of spontaneous recovery. Future large-scale epidemiologic and intervention PTSD studies should consider subjects who do not meet strict PTSD criteria.

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