The Effectiveness of Cognitive Behavioral Therapy for PTSD in New York City Transit Workers: A Preliminary Evaluation

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The most popular psychological treatment for post-traumatic stress disorder, cognitive behavioral therapy, generally focuses on reduction of PTSD symptoms and improvement of quality of life in spite of often chronic symptoms (Rademaker, Vermetten, & Kleber, 2009). While there are several studies indicating the efficacy of cognitive behavior therapy in the clinical treatment of post-traumatic stress disorder (see Mendes, Mello, Ventura, Passarela, & Mari, 2008), this study is distinguished in that it explores the usefulness of CBT in a population of transit workers who experienced a traumatic incident on the job. Although a number of studies have looked at the medical and psychological impact of trauma on transit workers (e.g., Cothereau, Beaurepaire, Payan, Cambou, Rouilloin, & Conso, 2004), we were unable to identify any published studies on the use of CBT for treating PTSD in this population. This is a particularly important population to assess relative to treatment efficacy due to the large volume of traumatic incidents that transit workers are exposed to over the course of their entire employment, the high relatively incidence of PTSD in this population, as well as the high motivation of this population to overcome the symptoms of PTSD so they are able to return to work. (Cothereau, Beaurepaire, Payan, Cambou, Rouilloin, & Conso, 2004; Limosin et al, 2005; Yum et al, 2006).

Existing studies of CBT treatment efficacy are based on an experimental paradigm in which cognitive behavioral treatment is compared with alternative treatments or a control group receiving no treatment in order to demonstrate efficacy (e.g., Anderson & Grunert, 1997; Davis & Wright, 2007; Foa et. al, 2005). Such studies reduce the influence of confounding variables; allow for comparison with other treatment modalities by the use of suitable control groups; as well as utilize standardized measures of treatment outcome. However, studies of the efficacy of CBT individual therapy typically employ manualized treatments of relatively short duration (less than six months) (e.g., e.g., Anderson & Grunert, 1997; Davis & Wright, 2007; Foa et. al, 2005) in order to provide for standardization and reduce study costs; although studies assessing the efficacy of group modalities (e.g., Alvarez, McClean, Harris, Rosen, Ruzek, & Kimerling, 201; Rademaker, Vermetten, & Kleber; 2009) might employ treatments of longer duration. Furthermore, these studies depend on the administration of a battery of standardized measures which are commonly administered only at the beginning

and end of treatment disregarding any measurement of client progress during the course of the treatment.

While experimental studies have much to offer in terms of scientific validity, they may not be representative of a good deal of clinical practice in which treatment protocols, the duration of treatment, as well as the assessment of client progress are often based on a combination of clinical and informal client judgment. The present study explores the efficacy of cognitive behavioral therapy conducted in a large outpatient behavioral medicine psychological practice. In this setting, psychologists use cognitive behavioral therapy more eclectically than in a manualized approach (for example, sometimes using exposure techniques and sometimes not) depending upon clinical judgment as to what might or might not be helpful for a particular client in a particular session; treatment duration is highly variable based upon the client's decision to terminate in consultation with the treating psychologist; and measures of treatment efficacy are often limited to the clinical judgment of the treating therapist's assessment of client progress on a comprehensive list of relevant symptoms rather than on standardized measures with demonstrated psychometric characteristics. In addition, although most of the experimental studies referred to above employ a pre-post test design assessing progress only at the end of treatment, this study also attempts to assess treatment progress over time.

Treatment Issues

The New York City Transit Association (NYCTA) workers involved in the incidents which brought them to the treatment program evaluated in this study experienced fear and feelings of helplessness during the traumatic event, which then persisted after the initial trauma. Consistent with the Diagnostic and Statistical Manual of Psychiatric Disorders (DSM-IV) criteria for Acute Stress Disorder (ASD) and Post-Traumatic Stress Disorder (PTSD), these events resulted in psychological/behavioral problems which impacted and interfered with their lives, not only at work, but across the entire range of daily functioning. Typically, workers reported repeated, disturbing memories thoughts and images of the event. They often felt compelled to re-play the event in their minds, constantly thinking of what they could have done differently to avoid the situation.

These recurrent and intrusive recollections were most frequently experienced by workers involved in 12-9 incidents (this is the term used to indicate a "death incident" on the tracks), particularly those involving a suicide. Workers often felt responsible and guilty, as well as angry with the person for involving them as the means of his/her death. Many experienced a misplaced and illogical sense of control, believing they were somehow at fault. This intense guilt tended to last for only a brief period, as they began to realize the incident was unavoidable; they were powerless to stop it.

In addition to these recurring thoughts, many workers experienced a feeling of literally reliving the event, with flashbacks as well as distressing, recurrent dreams. Many workers experienced some physiological symptoms including sleep disturbance, loss of appetite, and tension, which sometimes manifested as headaches, stomach aches and fatigue. Often these vivid recollections/feelings were brought on by something that reminded them of the event. Workers experiencing classic PTSD symptoms such as hyper vigilance, irritability, and an exaggerated startle response, are highly sensitized to the circumstances of the incident and a variety of environmental cues could trigger episodes of psychological anguish.

In efforts to avoid these reminders of the trauma, workers would often stay away from places or activities that reminded them of the incident. They would steer away from people, such as co-workers, and even avoid conversation that somehow related to the incident. Additionally, they often distanced themselves from friends and family. Workers sometimes felt as though the incident separated them from others; they experienced feelings of detachment, as if they were "alone." They remained socially isolated because they believed that the other people in their lives could not understand or relate to what they had experienced or what they were feeling. This sense of isolation is a hallmark of ASD/PTSD.

It should be noted that the symptoms reported in this study were all within the range expected; there were no reports of psychotic reactions, "nervous breakdowns," or other sequelae that would indicate a more serious psychiatric disturbance.

Description of the Treatment Program

This study evaluated a sample of NYCTA who were patients with a PTSD diagnosis. All of these patients were part of a treatment program conducted at a large behavioral medicine treatment facility specializing in the treatment of PTSD; (Behavioral Medicine Associates; www.behavmed.com) cognitive-behavioral therapy (CBT) is the cornerstone of the treatment program. The psychological staff developed treatment plans specific to the individual needs of the worker. With a foundation in CBT, a variety of skills and techniques were used to ensure that the problems the workers presented could be treated effectively. The psychologists provided relaxation training, self-instructional skills, desensitization training, and behavioral assignments. Support, empathy, and concern were also key aspects of the treatment program. Perhaps most pertinent to the long-term goals of treatment were techniques in cognitive restructuring and Rational-Emotive Therapy (RET). Cognitive restructuring (RET is one method) enabling workers to view the incident and their response in a manner which enables them to adjust, accept and move forward. Many workers define themselves as psychologically "impaired" following a trauma. CBT allows

workers to re-define the experience and to adjust their perspectives to foster recovery and coping.

The treatment maintained a critical focus on the social aspect of workers' responses; this is a key element in a successful recovery. Workers often have trouble discussing the event with others; they fear others will not or cannot understand what they are going through. It is a critical part of recovery to help workers to share their feelings with others, and to normalize their interactions and reintegrate into their social networks.

The psycho-educational component of treatment was essential for these workers. The treatment goals were multi-faceted; it is not sufficient to merely desensitize a worker from the traumatic aspects of the incident. The goal is to equip them with the psychological skills to cope and manage effectively should future events occur. Helping workers to 'get better" is not the only goal of the treatment program. The program provides a systematic method of dealing with the trauma, its aftermath, and the social/occupational ramifications workers experience. The skills the workers learned during treatment can also be used in the event they experience another 12-9 or work-related trauma. They were given systematic, concrete methods to deal with the countless challenges of everyday life. Our clinical experience suggests that workers who have been exposed to a subsequent trauma are able to cope with the second incident more effectively, efficiently and with less emotional/behavioral/social upheaval.

The program also worked closely with occupational health physicians, coordinating care for injured and traumatized workers. The observations of these physicians are critical in identifying problems and in referring for psychological evaluation and treatment. The team approach to the management of this group of workers is fundamental to the success of the program.

As part of the evaluation process, most of these workers were given a series of brief psychological measures described below to fully assess their condition and to provide information for both diagnostic certainty and treatment planning.

Method

Subjects and Procedures. Data were collected from a retrospective evaluation of the psychological records for 96 New York City transit workers who were diagnosed with PTSD and were seen for psychological treatment at the outpatient behavioral medicine psychological practice specializing in the treatment of this population referred to above. All records which met the following criteria were selected: (1) cases that were terminated for a minimum of one year within the past ten years; (2) cases that were not the result of a documented physical injury; (3) cases where patients had at least three therapy sessions with complete progress notes including therapist ratings on a rating scale of symptom severity. The first therapy session with a record in the file was selected as the beginning session

record; the last session with a record in the file was selected as the ending session record. The middle session was determined by counting the number of sessions and dividing by two; in cases where there were an odd number of sessions, resulting in two candidate records, the middle session record was selected randomly. Relevant information from the records in the database was extracted by treatment facility employees and a stripped data file without identifying information was provided to the researchers.

Measures. At the beginning of treatment a variety of self report measures were collected from each client. In addition, progress session notes from the beginning, middle, and final session were also collected. This information was available from the patient records and the following information was extracted for this study.

1. Basic demographic information reported by the client on the intake form including gender, age, marital status, number of children, and education.
2. Diagnostic information including the DSM IV multiaxial diagnosis provided by the treating psychologist.
3. Total Score on the PCL-C checklist (PCL; Weathers, 1993) which is a 17 item self-report measure of the 17 DSM IV symptoms of PTSD designed to be used with a general population. Total scores vary from 5 to 85.
4. Total score on the PTSD scale (Prins, Ouimette, & Kimerling, 2003) which is a 4 item screen for PTSD used in general medical settings. Total score on the 4 items range from 0 to 4.
5. Total score on the Beck Anxiety Inventory (BAI; Beck & Steer, 1993) which is a 21 item multiple choice scale measuring common symptoms of anxiety. Total scores range from 0 to 63.
6. Total score on the Beck Depression Inventory (BDI II; Beck, Brown, & Steer 1996) which is a 21 item multiple choice scale measuring current depressive symptoms based on the DSM IV. Total scores range from 0 to 63.
7. Response to the Health Status Questionnaire (Q1) (HSQ2; Health Outcomes Institute). This question requires the respondent to assess their health on a 1 to 5 scale ranging from excellent (1) to poor (5).
8. Response to the Health Status Questionnaire (Q2) (HSQ2; Health Outcomes Institute). This question requires the respondent to assess their health compared to one year ago. It ranges from 1 'Much better now' to 5 'Much worse now'.
9. The following information from the first, middle, and last Session progress notes:
    a. Patients' current functioning in 24 areas (e.g. distress to persistent physical pain) on 1-10 clinician rated scales.
    b. Clinical interventions provided using 36 measures on a yes, no scale
10. Total number of treatment sessions

Results

Descriptive Statistical Analysis. 70.8% of the sample were males; 29.2% were females. The average age was 43.81 (SD=8.20) years old. 62.5% were married and 37.5% were unmarried; 70.8% had children and 29.2% did not. In terms of education, 6.1% had some high school education, 32.9% were high school graduates, 40.2% had some college, 13.4% had an associates degree and 7.3% had a bachelor's degree or higher.

The mean DSM Axis V level of functioning was 54.46 (SD=11.47). On the PCLC, the mean score was 41.75 (SD=24.47); on the PTSD the mean score was 1.24 (SD=1.23). The mean BAI score was 18.31 (SD=12.17); the mean BDI score was 19.55 (SD=11.56). The mean HSQ score for Q1 was 2.77 (SD=1.07); the mean score for Q2 was 2.92 (SD=1.08). Of the 24 symptoms which were assessed by the treating psychologist, the mean number of symptoms with a positive rating reported at the beginning of treatment was 6.43 (SD=3.13).

The number of treatment sessions varied across patients from a minimum of three to a maximum of 145 treatment sessions. The mean number of treatment sessions was 19.55 (SD=22.33). The three most commonly used treatment interventions were supportive psychotherapy (96%), developing the therapeutic alliance (71%), and cognitive restructuring (63%). The number and percentage of patients receiving each treatment intervention is indicated in Table 1 below.

Repeated Measures ANCOVA's for the Individual Symptoms. As most patients had only a relatively small combination of the symptoms, it was not feasible to conduct any multivariate analyses which considered the symptoms in combination; rather, effectiveness had to be considered on a symptom by symptom basis. Those symptoms for which the prevalence was too low to make valid generalizations were eliminated from the analysis: only those symptoms with non-zero ratings at the initial session for 25 or more of the patients in the sample were included. There were ten symptoms which met this criterion: these symptoms were flashbacks, fears, hypervigilance, avoidance, depression, distress, disability, sleep problems, concentration difficulty, and fatigue. A series of repeated measures ANCOVA's were performed to determine the effect of the treatment on each of the ten symptoms. The within subject factor was time represented by the beginning, middle, and ending of treatment. Because the number of sessions represented by the end of treatment varied for the various patients, the number of sessions was used as a covariate in the analysis. Gender, age, marital status, and whether or not the client had children were the other covariates used in the analysis. The significance of between subjects effects for the variables used as covariates and their interactions varied by symptom (detailed tables are available from the author).

Results indicate improvement in nine of the ten symptoms from the first to last treatment session; the only symptom not to show any statistically significant

improvement was fatigue. The largest treatment gains in order of the partial eta-squared were for the symptoms of flashbacks ($F=29.09, p=.00, \eta^2=.63$), sleep problems ($F=37.65, p=.00, \eta^2=.44$), and concentration difficulty ($F=10.03, p=.00, \eta^2=.38$). Moreover, eight of the ten symptoms showed significant improvement from the first session to the middle of treatment; only distress and disability failed to show significant improvement. There was also significant improvement in six of the ten symptoms – flashbacks, depression, distress, disability, and sleep problems from the middle session to the last session; however, symptoms of fear, hypervigilance, avoidance, and concentration difficulty failed to show additional significant improvement from the middle to last sessions. Complete results for all ten symptoms are presented in Table 2 below.

Discussion and Conclusions

This study seems to provide at least some support for the efficacy of individual cognitive behavioral therapy which lasts over a relatively long period of time in a context in which treatment is not manualized for a population of transit workers who experience PTSD as a result of job-related trauma. It should be noted that transit workers are generally highly motivated to return to work, value their jobs, enjoy their employment and are eager to get back to work as soon as possible. This high level of motivation was helpful in getting compliance with treatment requests. The results also suggest that different symptoms might show improvement in different stages of therapy; therefore, it is important to assess efficacy over time rather than just at pretest-posttest intervals.

Results indicated that flashbacks, fears, hypervigilance, avoidance, depression, sleep problems and concentration difficulties improved from the first session to the middle session. Improvement continued for these symptoms throughout treatment. The symptoms that improved from the middle to the last session were those of distress and disability. The only symptom that did not improve over time was fatigue.

This can be explained in the following manner. Patients seek psychological care to help them overcome their difficulties so they can return to premorbid levels of psychological functioning. The specific concerns discussed in earlier treatment sessions (flashbacks, sleep difficulty and depression, hypervigilance and avoidance) all were the most compelling symptoms which brought the patients to treatment. These specific behavioral difficulties were the first problems discussed and treated during psychological care. When patients begin to notice improvement in these areas they are then able to feel better in a global sense and focus on issues of disability and distress. Concentration problems, which improved as well, were due to the patient's focus on their emotional distress and their concerns about the future and being able to return to work.

The continuing improvement of the flashbacks, depression and sleep problems is indicative of the power of the psychological treatment; patients continued to

improve on a behavioral continuum which reached its conclusion at the end of treatment. The reduction and elimination of symptoms by the end of treatment is the stated goal of psychological care and was effective. Although the symptom of fatigue never improved, this may be an artifact of the patient's lifestyle.

In summary, the results of the study indicate that the success of psychological care moved from helping patients overcome specific symptoms during the first and middle sessions and then helping them cope with the more global concerns of stress and disability. Behavioral symptoms improved throughout treatment; the resolution of these behavioral and global concerns enabled patients to return to premorbid levels of functioning.

This study has a number of limitations. The sample was limited to just under one hundred patients from one treatment facility. There were no psychometrically validated post-test measures with which to assess treatment gains. Nor were there procedures in place for inter-rater reliability which would help establish the validity and reliability of the clinical symptom ratings which were assigned by the different treating psychologists. The lack of an experimental control is also problematic although outcome evaluations with only one group are quite commonly employed and can yield valuable information (Prosovac, 2010). Therefore, there is a legitimate concern that psychologists might have tended to overestimate ratings in the later sessions in order to show improvement; however, this concern is somewhat mitigated by the fact that at least one symptom (e.g., fatigue) did not show any significant overall improvement; several symptoms did not show improvement from the first to middle session (e.g., distress, disability, fatigue); and half of the symptoms did not show significant improvement from the middle to last session (e.g., fears, hypervigilance, avoidance, concentration difficulty, fatigue**).** Treatment success should presumably be defined by the ability of the worker to return to his/her job and to continue working without further discomfort; anecdotally it is known that most of the workers did in fact return to work; workers who did not return to work desired to retire regardless of their psychological condition.

In spite of significant limitations this study provides a clear indication that CBT can be an effective treatment for PTSD in transit workers and it is hoped that this study will encourage further research using more robust measures of treatment gains in order to determine the efficacy of CBT for the non-manualized treatment of PTSD in transit workers lasting over an indeterminate period of time.

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TABLES

TABLE 1: TOTAL PATIENTS RECEIVING EACH TREATMENT INTERVENTION

Treatment Intervention	N	Percentage
Supportive Psychotherapy	92	96
Therapeutic Alliance	68	71
Cognitive Restructuring	60	63
Reinforced Coping	39	41
Graded Exposure	28	29
Taught Coping	22	23
Emotional Reprocessing	21	22
Monitored Gains	21	22
Affect Identification	19	20
Activity Scheduling	16	17
Past Gains	16	17
Educational Materials	13	14
Self-Control	13	14
Decision Making	12	13
Examined Evidence	12	13
Habit Modification	12	13
Mood Control	11	11

Rehearsed Coping	10	10
Assertiveness Training	8	8
Relaxation Training	8	8
Resources	7	7
Blocks	6	6
Critical Incidence	4	4
Distraction Training	4	4
Parent Counseling	3	3
Discrimination Training	2	2
Stress Triggers	2	2
Hypnotherapy	1	1
Memory Loss	1	1
Mood Elevation	1	1
Therapeutic Modeling	1	1
Thought Stopping	1	1
Suicide Contract	1	1
Test Feedback	1	1
Therapeutic Imagery	1	1
Biofeedback	0	0
Conflict Resolution	0	0
Contingency Management	0	0
Play Therapy	0	0

TABLE 2: MULTIVARIATE REPEATED MEASURES ANALYSIS OF COVARIANCE

Symptom	**%**	**T1 vs. T2 Adjusted Mean Difference[a,b]**	**T1 vs. T2 F Ratio [c]**	**T2 vs. T3 Adjusted Mean Difference[a,b]**	**T2 vs. T3 F Ratio [c]**	**Overall F Ratio [c]**	**η^2**
Flashbacks	32	5.00 (.78)	16.02 (p=.00)	1.71 (.70)	6.56 (p=.02)	29.09 (p=.00)	**.63**
Fears	30	3.40 (.93)	6.65 (p=.02)	2.04 (1.24)	.96 (n.s.)	6.95 (p=.00)	**.30**
Hypervigilence	28	4.02 (1.00)	6.96 (p=.02)	1.32 (1.14)	.15 (n.s.)	4.40 (p=.02)	**.24**
Avoidance	34	3.67 (.86)	5.82 (p=.02)	2.01 (.98)	1.87 (n.s.)	8.50 (p=.00)	**.29**
Depression	75	2.53 (.41)	12.18 (p=.00)	1.98 (.58)	8.65 (p=.01)	18.61 (p=.00)	**.25**
Distress	95	0.94 (.34)	2.05 (n.s)	2.52 (.49)	19.73 (p=.00)	21.62 (p=.00)	**.22**
Disability	75	.90 (.44)	.30 (n.s.)	3.21 (.53)	31.92 (p=.00)	25.86 (p=.00)	**.31**
Sleep Problems	66	3.01 (.54)	14.65 (p=.00)	2.63 (.65)	19.62 (p=.00)	37.65 (p=.00)	**.44**
Concentration difficulty	27	4.22 (.76)	9.03 (p=.01)	1.42 (.65)	.25 (n.s.)	10.03 (p=.00)	**.38**
Fatigue	**100**	**N.A.**	**N.A.**	**N.A.**	**N.A.**	**1.84 (n.s.)**	**N.A.**

Note. [a] Numbers represent the reduction in symptom severity from the earlier session until the latter session on a ten point scale with gender, age, marital status, and whether or not the client had children as covariates. [b] Numbers in parentheses are the standard error of the mean. [c] n.s. denotes a non-significant p-value at the .05 level of significance.