Posttraumatic Stress Disorder Among Hospital Surgical Physicians Exposed to Victims of Terror: A Prospective, Controlled Questionnaire Survey

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Background and Objective: Surgical physicians often treat victims of terror-related multiple-casualty incidents. This may cause secondary posttraumatic stress disorder (PTSD), impairing their ability to care for patients. The objective of this study was to determine whether professional exposure to victims of terror caused PTSD in Israeli physicians from surgical disciplines.

Method: This was a validated questionnaire survey of physicians (November 2002 through March 2003) from 2 Jerusalem hospitals (a tertiary trauma center and a secondary regional hospital) divided into study (physicians from surgical disciplines regularly exposed to victims of terror) and control (physicians not regularly exposed) groups. Questionnaires included the PTSD Symptom Scale–Self-Report to diagnose PTSD (DSM-IV criteria) and allowed exclusion of other causes of similar symptoms. The main outcome measure was the difference in the prevalence of PTSD between groups.

Results: Included were 212 (102 study, 110 control) participants. The study group experienced a significantly higher level of exposure to terror victims at work, validating prospective group definitions. The prevalence of PTSD was similar in both groups (study group = 16%, control group = 15%; p = 1.00). The study and control groups were similar in all predicting variables except for number of years in medical practice, occupational status, and workplace. The groups had similar levels of exposure to terror outside work (p = .24). The probability that a physician would have PTSD was related to use of nonadaptive coping strategies (OR = 5.1; p = .009) and a higher level of exposure to terror out of work (OR = 3.5; p = .013).

Conclusion: Hospital physicians from surgical disciplines who were professionally exposed to victims of terror did not demonstrate a higher incidence of PTSD than their less exposed counterparts.

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The probability that a physician working in a surgical discipline will be exposed to the medical implications of terror assaults on a civilian population is rising in parallel to the rising incidence of such occurrences. When called upon to treat victims of such events in chaotic emergency departments, the physician may be instantly exposed to a mass of injured and traumatized patients. Such events not only disrupt routine medical practice but may also cut into personal daily life.

Secondary posttraumatic stress disorder (PTSD) can develop when caregivers who have no direct contact with the traumatic event have contact with trauma victims. This phenomenon has been described in doctors involved in the 1998 bombing in Omagh, Northern Ireland,[1] as well as among other health care providers.[2–6] The negative responses resulting from PTSD may impair a physician's ability to care for patients. The recognition and treatment of secondary PTSD have therefore been previously emphasized as an important aspect of medical health care management.[7]

The relatively frequent occurrence of bombings among the civilian population in Israel provided the opportunity to study the psychological implications of professional exposure to victims of terror for hospital physicians. The current study examined the hypothesis that hospital surgical physicians who are frequently exposed to terror at work have a greater tendency to develop PTSD than those physicians who have little or no contact with victims of terror at work.

MATERIALS AND METHOD

The study was conducted during a 5-month period (November 2002 through March 2003). Participants comprised physicians living in Israel who work in the Hadassah Medical Organization hospitals in Jerusalem (a tertiary trauma center and a secondary regional hospital). Together, these hospitals administered care to approximately 2000 victims of terror during the 22 months prior to the study.

The study received institutional review board approval and was conducted in accordance with the Declaration of Helsinki and all applicable Israeli regulations and standards. Permission for the physicians' participation was first received from the Hadassah Medical Organization director and the individual department directors. Willingness to participate was indicated by completing a consent form and a study questionnaire.

Participants were prospectively assigned to study and control groups based on assessment of the degree of departmental involvement in treatment of victims of terror. Sample size considerations were based on previous literature describing the incidence of PTSD among medical personnel.[8,9] Inclusion of at least 100 physicians per group would allow a statistical test to have a power of 88% with a 2-sided 5% significance level to detect a difference of at least 20% in the prevalence of PTSD between the 2 groups, assuming that these groups represent the 2 extreme values of this range. The study group was drawn from surgical departments where physicians were regularly exposed to trauma victims. The control group was drawn from departments where physicians did not regularly treat the victims of terror and whose exposure was therefore comparable to that of any Israeli citizen during the time of the study (Table 1).

Comprehensive, standardized, previously validated questionnaires (including translational validation) were used (Table 2) in order to encompass the multiple aspects relating to both the appearance and symptomatology of PTSD. To eliminate comprehension problems, participants were offered a choice of questionnaires in more than one language. PTSD was diagnosed according to the PTSD Symptom Scale–Self-Report (PSS-SR) questionnaire[10] based on the DSM-IV criteria.

Questionnaires also elicited information on demographic and professional characteristics (e.g., age, medical specialty, academic rank, experience, social details, prior traumatic experiences). The degree of exposure to terror and military aggression in daily living and work was evaluated by questionnaires formulated by the research team: the Exposure to Stressful Events Questionnaire[11] and the Exposure to Stressful Events at Work Questionnaire (developed for this study) (Table 2).

Two variables (frequency and duration) were created in order to assign numeric values to the level of exposure to terror at work for each participant. The frequency of exposure of each participant to a situation was multiplied by the mean level of distress experienced by participants in general in that same situation. The overall frequency of exposure was a summation of all multiplications (exposure at work [frequency] = frequency [situation 1] × mean [situation 1] + frequency [situation 2] × mean [situation 2] + . . .). The duration of exposure of each participant to a situation was multiplied by the mean level of distress participants experienced in these situations. The overall duration of exposure was a summation of all multiplications (exposure at work [duration] = duration [situation 1] × mean [situation 1] + duration [situation 2] × mean [situation 2] + . . .).

A similar method was used to assign numeric values to exposure out of work which included 2 variables (frequency of exposure and the level of fear reaction). The sum of the frequency of exposure of each participant to terror-related situations in everyday life was multiplied by the mean level of distress participants have experienced in these situations (exposure out of work [frequency] = frequency [situation 1] × mean [situation 1] + frequency [situation 2] × mean [situation 2] + . . .). The level of fear reaction was defined as the sum of the participants' replies concerning their level of fear in reaction to different terror-related situations in everyday life based on the Fear Reaction Scale.[11]

The questionnaires were completed anonymously. Identification was made optional through addition of a

Table 1. Division of Departments Into Study and Control Groups

Study Group	Control Group
General surgery	Internal medicine
Orthopedic surgery	Pediatrics
Neurosurgery	Ophthalmology
Thoracic surgery	Cardiology
Urology	Gynecology
Maxillofacial surgery	Administration
Pediatric surgery	
Vascular surgery	
Anesthesiology	

Table 2. Questionnaires Included in the Study

Demographic and professional characteristics questionnaire
PTSD Symptom Scale–Self-Report[10]
Maslach Burnout Inventory[12]
Brief Symptom Inventory[13]
Brief COPE[14]
Mastery Scale[15]
Cognitive Emotion Regulation Questionnaire (new version by Garnefsky et al, based on their original publication)[16]
General Well-Being Schedule[17]
Life-Orientation Test[18]
Multidimensional Scale of Perceived Social Support[19]
Exposure to Stressful Events Questionnaire[11]
Exposure to Stressful Events at Work Questionnaire (developed for this study)
Fear Reaction Scale[11]

separate coded identification sheet. This sheet was available only to an independent psychologist who offered an assessment followed by cognitive-behavioral therapy in cases in which such therapy was found to be necessary and the physician had elected to identify himself or herself.

Questionnaires were distributed and completed over a 40-minute period allotted during departmental staff meetings. Questionnaires with more than 10% of the items unfilled were excluded.

Statistical Analysis

Data were analyzed using SPSS 10.0 (SPSS Inc., Chicago, Ill.). Factor analysis was performed for 3 study variables: level of the exposure to terror, coping strategies (from the Brief COPE), and degree of burnout (from the Maslach Burnout Inventory) (Appendix 1). This statistical method builds models parsimonious in the number of variables. Factors found to account for the majority of the variance were computed for each subject.

The level of exposure to terror was compared separately for exposure in and out of work in order to validate subjects' distribution to control and study groups. For each variable (exposure to terror at work and outside of work), the measures selected provided a unique addition to the variable to which it belonged.

The groups' demographic details were compared using χ^2 for categorical variables, Fisher exact test for dichotomies, and, based on the appropriateness of parametric methods found in the inspection of the distributions, multivariate analysis of variance (MANOVA) for interval variables. The χ^2 test was also used to examine the difference in the prevalence of PTSD and prior trauma and participants' compliance in submitting their personal details.

MANOVA was used to examine differences between the groups (control and study) in the following variables:

1. Exposure to terror altogether (in and out of work; calculated as the total score in the exposure questionnaires).
2. The various possible reactions to trauma: functioning scale score, stress induced symptoms (based on the total Brief Symptom Inventory score), and the components of criterion F of the DSM-IV: that the disturbance causes clinically significant impairment in functioning (the fear, dread, or helplessness reaction; based on PSS-SR question 18), that there is a decrease in functioning due to the situation (based on PSS-SR question 19), and that there is suffering as a result of the situation (based on PSS-SR question 20).
3. Facial expression of feeling concerning the situation (based on the scale from 0 to 6 of the 27-item General Well-Being Schedule).
4. Burnout (based on the Maslach Burnout Index).
5. Coping strategies.

For exposure, burnout, and coping, MANOVA was performed on the factors that emerged in the factor analysis.

Logistic regression analysis was used to examine the contribution of the various examined components to the appearance of PTSD. The predicting variables that were examined included the participants' demographic details (gender, age, years of experience in medical practice, number of children and marital status, and political tendency), personality traits (coping strategy [adaptive, nonadaptive, cognitive, and religion], emotion regulation traits [control over emotions, the influence of cognitive reappraisal over emotions, and suppression of emotions], and life orientation attitude), the societal network support of the participant, and the existence or absence of prior trauma.

RESULTS

Level of Exposure to Terror

The study group of physicians from the surgical disciplines was significantly more exposed to victims of terror at work compared with the control group, validating prospective group definitions ($p < .0001$). No significant difference was found between the groups in the level of exposure to terror outside work ($p = .24$).

Demographic Data

Two hundred eighty-one questionnaires were distributed, 219 were returned, and 212 were included in the final study analysis, yielding an overall response rate of 75%. Seven questionnaires (5 study, 2 control) were excluded due to poor data quality. The study group included 102 physicians (48.1% of study participants). The control group comprised 110 physicians (51.9%). The 2 groups were similar in response rate (study, 72%; control, 79%).

The demographic details are presented in Table 3. The 2 groups were similar in all but the number of years in medical practice (approximately 3 years more in the study group), occupational status (more senior physicians in the study group), and workplace (Table 3). The prevalence of prior exposure to traumatic experiences was similar in the study (43/102, 42%) and control (45/110, 41%) groups ($p = 1.00$).

Prevalence of PTSD

The prevalence of PTSD was similar in the 2 groups—16% (16/102) in the study group and 15% (17/110) in the control group ($p = 1.00$)—despite differences in the level of exposure to terror at work.

Reactions to Trauma

The study and control groups did not differ significantly in the various possible reactions to trauma, including burnout and general well-being as a measure of stress unrelated to terror events ($p = .48$).

Table 3. Demographic Details of Physicians With (study physicians) and Without (control physicians) Regular Exposure to Victims of Terror[a]

Demographic Characteristic	Study Physicians (N = 102)	Control Physicians (N = 110)	p Value
Male	86 (84.3)	80 (75.5)	.15
Age, mean ± SD, y	42.17 ± 9.96	39.44 ± 10.14	.056
Religion			.51
Jewish	86 (85.1)	94 (90.4)	
Christian	10 (9.9)	6 (5.8)	
Moslem	4 (4.0)	4 (3.8)	
Other	1 (1.0)	0 (0)	
Religious orientation			.29
Secular	73 (71.6)	66 (63.5)	
Traditional	13 (12.7)	24 (23.1)	
Orthodox	15 (14.7)	13 (12.5)	
Ultra-Orthodox	1 (1.0)	1 (1.0)	
Marital status			.51
Married	87 (85.3)	85 (81.7)	
Single	14 (13.7)	17 (16.3)	
Divorced	1 (1.0)	1 (1.0)	
Separated	0 (0)	1 (1.0)	
Place of residence			.09
Jerusalem	60 (65.9)	73 (76.0)	
Other region in Israel	28 (30.8)	23 (24.0)	
Occupied territories	3 (3.3)	0 (0)	
Home ownership status			.95
Own	70 (69.3)	71 (68.9)	
Rent	31 (30.7)	32 (31.1)	
Income			.40
Above average	75 (75.8)	69 (67.7)	
Average	14 (14.1)	25 (24.5)	
Below average	10 (10.1)	8 (7.8)	
Prior army service in the Israeli Defense Force	71 (69.6)	85 (81.0)	.29
Political orientation			.30
Center	45 (45.9)	43 (43.0)	
Left	31 (31.6)	41 (41.0)	
Right	22 (22.4)	16 (16.0)	
Workplace			.04
Ein-Kerem (tertiary care)	65 (65.0)	47 (48.0)	
Mt-Scopus (secondary care)	9 (9.0)	19 (19.4)	
Both	26 (26.0)	32 (32.7)	
Occupational status			.02
Attending > 5 y	45 (44.6)	44 (42.7)	
Attending ≤ 5 y	19 (18.8)	7 (6.8)	
Resident	35 (34.7)	46 (44.7)	
Intern	2 (2.0)	6 (5.8)	
Time in medical practice, mean ± SD, y	15.7 ± 10.4	12.6 ± 10.2	.03
No. of children, mean ± SD	2.3 ± 1.8	2.1 ± 1.7	.50
Time living in Israel, mean ± SD, y	20.5 ± 16.3	22.0 ± 14.4	.67

[a]Values shown as N (%) unless otherwise noted. Ns for some individual demographic categories do not add up to the total Ns listed in the column heads because data on those variables were not available for some patients; percentages are of those patients for whom data on a given variable were available.

Compliance With Possible Need for Therapy

Physicians in both groups disclosed their identities in order to facilitate psychological intervention (study, 44/102 [43%]; control, 59/110 [54%]; p = .16). Three participants from the control group but none from the study group affirmed receipt of professional support or guidance at some time since the beginning of the current wave of terror (September 2000).

Coping

No significant differences were found between the study group and the control group with regard to the 15 coping strategies (p = .51).

Predicting Appearance of PTSD

The independent variables predicting appearance of PTSD are presented in Table 4. Multivariate analysis disclosed 2 variables that were clearly related to the probability that a physician would have PTSD: use of nonadaptive coping strategies (such as substance abuse, behavioral detachment, and self-blaming) (OR = 5.1; p = .009) and a higher level of exposure to terror out of work (OR = 3.5; p = .013).

DISCUSSION

This study examined the prevalence of PTSD among hospital physicians in surgical disciplines who were professionally exposed to terror victims over a 2-year period compared with their hospital physician colleagues who did not treat terror victims. The study population was prospectively divided into study and control groups based on the level of exposure to terror victims at work, and it was assumed that PTSD would be higher among the physicians exposed to terror victims. Surprisingly, although 1 in every 6 hospital physicians (16%) was found to suffer from PTSD, this was unrelated to exposure to terror victims at work. Two variables were found to be related to the appearance of PTSD in the study population: the coping mechanism used by the physician and the level of their exposure to terror outside of work.

Studies examining secondary PTSD in medical personnel have typically looked at either a precise department (e.g., intensive care units)[9] or a situation (e.g., a specific terror attack)[2,8] distinctively assumed to be causative of PTSD symptoms. These studies described the incidence of PTSD within the population identified as having been exposed. Studies examining a group of hospital staff with similar work experiences (e.g., oncology physicians)[20] typically do not report the baseline prevalence of PTSD, thereby limiting the interpretation of the results.

The prevalence of PTSD ascribed previously to physicians when exposed to trauma victims (15%–25%)[2,8,21] is similar to that seen in the current study. However, in the current study, the 16% level of prevalence of PTSD was seen among all hospital physicians, regardless of the exposure to terror at work. Since baseline or reference PTSD data are not usually included, previous studies may have described a representative sample of all hospital physicians, as opposed to a unique group of physicians whose PTSD may be attributed to specific exposure. That the presence of PTSD was unrelated to exposure to victims of terror at work in the current study

Table 4. Variables Predicting Appearance of Posttraumatic Stress Disorder After Various Levels of Exposure to Terror[a]

	Univariate Analysis		Multivariate Analysis	
Predicting Variable	Odds Ratio (95% CI)	p Value	Odds Ratio (95% CI)	p Value
Exposure at work	0.9 (0.6 to 1.4)	.639		
Exposure outside work	2.5 (1.5 to 4.0)	< .001*	3.5 (1.3 to 9.4)	.013*
Prior trauma	1.3 (0.6 to 2.7)	.499		
Gender	0.5 (0.2 to 1.1)	.095		
Religious vs secular	0.9 (0.4 to 1.9)	.703		
Income: average or below vs above average	2.6 (1.2 to 5.8)	.018*	3.4 (0.6 to 20.7)	.183
Political tendency				
Left vs right	2.4 (0.7 to 8.8)	.189		
Left vs center	2.6 (0.7 to 9.7)	.162		
Prior army service in Israel	4.3 (1.9 to 9.5)	< .001*	4.1 (0.6 to 26.5)	.137
Native Israeli	0.8 (0.4 to 1.6)	.483		
Resident vs attending physician	2.3 (1.0 to 5.1)	.034*	1.0 (0.1 to 7.1)	.979
Physician with academic career (lecturer or higher degree) vs not	3.1 (1.0 to 9.3)	.041*	3.4 (0.3 to 44.1)	.342
Parenthood	4.1 (1.8 to 9.4)	.001*	1.0 (0.0 to 66.4)	.991
Marital status (married vs other)	2.9 (1.2 to 6.8)	.017*	1.5 (0.0 to 94.2)	.841
Coping strategy				
Adaptive	1.2 (0.8 to 1.7)	.494		
Nonadaptive	2.1 (1.4 to 3.0)	< .001*	5.1 (1.5 to 17.5)	.009*
Cognitive	1.2 (0.8 to 1.9)	.388		
Religion	1.304 (0.906 to 1.877)	.153		
Emotion regulation				
Control	1.4 (1.1 to 1.7)	.003*	1.1 (0.6 to 1.8)	.792
Reappraisal	1.0 (0.9 to 1.0)	.159		
Suppression	1.0 (0.9 to 1.1)	.243		
Life orientation (tendency toward optimism vs pessimism)	0.9 (0.8 to 1.0)	.002*	0.9 (0.8 to 1.1)	.311
Societal support	1.0 (0.9 to 1.0)	.100		

[a]A univariate analysis was performed to identify the factors to be included in the multivariate analysis. Three methods (enter, stepwise forward, and stepwise backward) were used for multivariate analysis, all of which yielded similar results. For the sake of presenting the odds ratio and degree of significance of all the examined factors, only the results of the enter methodology for the multivariate analysis are presented, despite being slightly less significant. Age was found to be significant but was not included in the final analysis because of its clear association with the physician's professional experience.
*Significant variable.

supports previous work demonstrating that emergency room staff are resilient to stress when exposed to trauma at work.[22]

The physicians found to be suffering from PTSD in this study were those who had been exposed to terror during daily life rather than at work. Similar results have been observed in family practitioners in Bosnia-Herzegovina, where the incidence of practitioners meeting the criteria for PTSD was 18%. The likelihood of meeting these criteria was related to personal traumatic events experienced during the same period[23] and not previous work in a field hospital during the war. Seniority and academic success modified the finding of PTSD in the current study, as has been shown previously.[24]

The traumatic event in PTSD (DSM-IV) is defined as a direct threat to the physical integrity of oneself or others. The concept of secondary PTSD is not included in the formal psychiatric nosology, but PTSD symptoms are assumed to occur as a result of indirect exposure to a traumatic event.[7] The PTSD found in the current study was not secondary. Physicians who manifested PTSD symptoms in the current study may have perceived the situation in Israel to be a direct threat to themselves and/or their loved ones. For these reasons, the PSS-SR questionnaire,[10] which comprises an integral part of the DSM-IV criteria, was elected to make the diagnosis of PTSD in this study. Exposure to traumatic experiences has previously been associated with a higher incidence of PTSD among physicians,[21] but this was not demonstrated in the current study. This finding may be explained by accommodation—a consequence of repetitive exposure to previous trauma, which has been described in medical personnel and rescue workers as being protective against PTSD.[25] Alternatively, physicians encountering victims of terror in their professional capacity may demonstrate resilience towards the development of PTSD. Previous data suggest that up to 90% of people exposed directly to trauma are resilient to PTSD.[26]

Chronic PTSD results in difficulties in many areas of daily functioning. Symptoms such as anger and poor concentration may impact on abilities to function at work. Burnout is defined by exhaustion, cynicism, and inefficacy, and it is possible that symptoms of PTSD put physicians at greater risk of burnout as a result. The incidence of burnout among specific groups of medical personnel is high (30%–76%),[20,22,27–29] and high stress levels have been described among the staff of specific departments (e.g., critical care).[30,31] Studies of burnout have not examined concurrent PTSD levels, and the relationship between the 2 warrants further investigation, as this may carry impli-

cations for physician-patient relationships and patient therapy.[27,32] Burnout as an alternative cause of work-related stress was excluded as a cause of PTSD using standardized questionnaires.

The control and study groups differed in terms of medical specialty. Therefore, differences may also have existed between the groups in personality and cognitive styles as well as qualitative measures of professional exposure. Although these issues are pertinent, the current study was not designed to examine the relationship between personality and selection of medical specialty. Nor did it attempt to examine the long-term effects of physician exposure to terror and revival of memories associated with the event by the victim. These results cannot necessarily be extrapolated to other populations of medical personnel outside of Israel since the study was conceived as a result of the current situation in Israel and the baseline rate of PTSD among Israeli hospital physicians prior to these events is unknown.

The current study shows that PTSD may be prevalent within the entire hospital physician population. Secondary PTSD should be less of a concern for hospital management and physicians working in an environment that includes exposure to victims of terror at work. However, exposure to terror outside of work remains a pertinent concern, possibly in other countries as well as in Israel. Periodic screening for exposure to terror outside of work, including interview techniques, may be indicated for physicians working in countries that sustain terror attacks regardless of frequency. Further research should be performed to validate these findings and to examine the value of treatment modalities designed to modify the PTSD response of at-risk physicians.

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Appendix 1 appears on page 896.

Appendix 1. Results of the Factor Analysis for 3 of the Main Study Variables

Factors that emerge usually comprise more than 1 variable. After variables are grouped into factors, the common denominator underlying the variables that predominate in those factors is defined, allowing identification of each factor by its components. Factors are labeled only after identification is performed.

A. Study Variable I: Brief COPE (N = 181). The following 4 factors were found to account for 57.7% of the variance: (1) adaptive coping strategies (30.4% of variance), comprising distraction, active coping, emotional and instrumental support, emotional expression, planning, and political activity; (2) nonadaptive coping strategies (11.6%), comprising denial, alcohol and drugs, behavioral detachment, and self-blaming; (3) cognitive coping strategies (8.7%), comprising positive reappraisal, humor, and acceptance; and (4) religion (7.1%).

Coping Strategy	Factor 1	Factor 2	Factor 3	Factor 4
Distraction	0.42	0.35	0.33	0.06
Active coping	0.66	–0.13	0.25	–0.02
Denial	0.23	0.69	–0.14	0.20
Alcohol and drugs	–0.01	0.74	–0.10	–0.00
Emotional support	0.79	0.11	0.14	0.16
Instrumental support	0.82	0.18	0.01	0.19
Behavioral detachment	–0.01	0.69	0.27	–0.04
Emotional expression	0.62	0.20	0.32	–0.19
Positive reappraisal	0.45	0.03	0.50	0.23
Planning	0.64	0.03	0.31	–0.13
Humor	0.14	0.38	0.62	–0.22
Acceptance	0.09	–0.15	0.81	0.10
Religion	0.02	0.06	0.04	0.93
Self-blaming	0.37	0.42	0.32	–0.07
Political activity	0.52	0.06	–0.10	–0.01

B. Study Variable II: Maslach Burnout Inventory (N = 181). The following 2 factors were found to account for 79.6% of the variance: (1) the work satisfaction factor (50.3% of variance), comprising personal accomplishment and involvement factors; and (2) the burnout factor (29.3%), comprising emotional exhaustion and the depersonalization scales.

Maslach Scale	Factor 1	Factor 2
Emotional exhaustion	–0.32	0.89
Depersonalization	–0.20	0.84
Personal accomplishment	0.86	–0.22
Involvement	0.90	–0.02

C. Study Variable III: Exposure to Terror Scale (N = 137). The following 2 factors were found to account for 75.7% of the variance: (1) exposure to terror at work (48.9% of variance), comprising the frequency scale and the duration scale; and (2) exposure to terror out of work (26.8%), comprising the exposure to terror threats and exposure in everyday life.

Exposure to Terror Scales	Factor 1	Factor 2
Exposure to terror threats	–0.24	0.77
Exposure in everyday life	0.29	0.69
Exposure at work—frequency	0.95	0.01
Exposure at work—duration	0.94	0.00