

Post-traumatic stress disorder among bank employee victims of robbery

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Background	Post-traumatic stress disorder (PTSD) in the occupational context, especially following workplace robbery, is still under-investigated.
Aims	To evaluate PTSD incidence and risk factors among bank employee victims of robbery voluntarily joining an employer-sponsored post-robbery support programme.
Methods	The programme entailed a structured support interview with robbery victims within 15 days of the robbery and a follow-up psychological assessment 45 days after. A self-reported questionnaire on personal variables and robbery characteristics was administered to participants at the first support session (T1). Interviews on employees' psychophysical health and their opinion about the support programme were administered individually at follow-up (T2). The Impact of Event Scale (IES) was administered both at T1 and T2.
Results	There were 383 participants. At T2, 13% of subjects had an IES score >34, a cut-off suggestive of PTSD. In a multi-variate model, feelings of helplessness and terror during the robbery and the number of previous robberies were associated with a PTSD diagnosis. After including IES score at T1, other variables lost statistical significance.
Conclusions	Our findings showed that PTSD is common among employee victims of workplace robbery. Our results also suggest the importance of subjective variables, such as personal perception of robbery severity and early emotional reaction, in identifying people at higher risk of developing PTSD.
Key words	Crisis management programme; PTSD bank robbery; violence; workplace trauma.

Introduction

The literature on post-traumatic stress disorder (PTSD) has mainly focused on victims of specific traumas such as sexual violence, natural disaster and military combat. PTSD in the occupational context is still under-investigated and researchers have focused on specific occupational groups such as emergency service personnel, police officers, firefighters and healthcare workers [1]. Studies of the psychological consequences of bank robberies are limited and vary substantially in outcome measures and design, making comparisons difficult. However, data clearly show that bank robberies have an important impact on employees' mental health [2].

Hansen and Elklit [3] observed a 14% prevalence of acute stress disorder among bank employees who

reported hopelessness, life threat and feelings of unsafety after the event. Kamphuis and Emmelkamp [4] found that 310 victims of bank robbery experienced more psychological distress than a control group and that subjective factors (such as depressive or avoidant coping, significant life threat perception and fear of being killed during the robbery) and additional life events were positively and strongly associated with post-traumatic stress. Miller-Burke *et al.* [5] found that psychological, physical and work performance and personal functioning were affected by the robbery; the most common symptoms were increased awareness of their surroundings, sleep disorders, difficulty concentrating, headaches, exaggerated startle response, anger, stress, worse physical health, being more aware and suspicious of customers, feeling unsafe and having less desire to continue working for the

current employer. Other studies have observed clinically significant symptoms of post-traumatic stress immediately after an armed robbery [6], as well as co-morbid major depressive disorder, increased absenteeism, work impairment, poorer physical health and increased use of medical services [7].

In order to manage the consequences of workplace robberies and other workplace traumatic events, organizations have developed multi-component crisis intervention approaches, which offer support during the pre-crisis phase (e.g. education and preparation), immediately after trauma (e.g. individual or collective emotional support with structured discussions) and in the post-crisis period (e.g. follow-up and referral services) [1]. Since only a minority of subjects experiencing a critical event in the workplace develop long-term clinically important symptoms and functional impairment, understanding the antecedents of occupational PTSD is a key goal of research. It has been shown that pre-trauma factors such as previous traumatic life events [4], repeated exposures to robberies [8] and co-existent psychological and psychiatric disorders [9] increase the risk of post-robbery PTSD. Peri-traumatic risk factors include trauma severity [6,10], dissociative response and negative emotions during the critical event [1,11], perceived life threat [4], perceived helplessness and proximity to the robber [5,6], the presence of customers witnessing the robbery and the use of weapons [4]. Additionally, it has been suggested that victims' perception and emotional reactions (e.g. intense fear, horror and helplessness) may be more predictive of the subsequent clinical course than the objective circumstances of the critical event [4,6]. Finally, post-traumatic factors such as lack of social and emotional support from family, friends, colleagues and organizations may play an important role in the development of PTSD [1,2].

In this study, we sought to assess the incidence and correlates of PTSD following robbery in a large sample of Italian bank employees, all involved in a post-robbery support programme provided by the company itself.

Methods

We selected employees of a large Italian bank group who were victims of robberies and who had voluntarily joined an employer-sponsored post-robbery support programme. Robberies took place from February 2010 to December 2012 in 144 different bank branches throughout Italy. The programme was designed by a multi-disciplinary team including psychologists, occupational physicians and the health and safety managers of the bank. Within 7–15 days of the robbery, an occupational physician conducted a structured group support interview with robbery victims, in which the employee recalled what happened during the traumatic event, expressed and shared thoughts, emotion and symptoms

related to the trauma and effective strategies to deal with stress were then identified. Interviews took place at the bank branch during regular working hours. Victims could request both an individual interview with the occupational physician and referral to a certified psychologist. A follow-up psychological assessment (through structured individual interviews) was conducted 45 days after the first session. All company employees participated in training programmes on traumatic stress management. All occupational physicians were trained in conducting assessment interviews and offering support to victims of robbery and supervised by expert psychologists.

A self-reported questionnaire ('baseline questionnaire') was prepared and administered to each participant before the beginning of the group interview session (T1). At follow-up (T2), individual interviews ('follow-up interviews') were administered to participants. The Impact of Event Scale (IES), for the assessment of post-traumatic stress reactions and PTSD, was also administered at both T1 and T2. Each participant chose a personal secret code in order to allow researchers to match T1 and T2 data. As all research measurement instruments were conducted within a voluntary post-robbery support programme and anonymous to the research team, independent ethical approval was not sought.

At T1, we collected socio-demographic information (gender, age, work seniority and job title), the number of bank robberies during participants' working life and a detailed description of the last robbery with closed and open-ended questions. Descriptors included the duration, number of robbers, direct interaction with robbers, the number of victims involved, weapons used, if robbers appeared to be upset and out of control, physical contact or aggression, hostages, physical injuries experienced by the victim or others and whether the victim was frightened and felt hopeless during the robbery. Additionally, we included an open-ended question in which subjects were asked to mention further traumatic features that were not listed in the questionnaire.

At T2, the semi-structured interview explored four aspects of victims' experiences: (i) general health and self-reported course of post-traumatic symptoms after the robbery; (ii) evaluation of the intervention focusing on relief of post-traumatic reactions; (iii) assessment of key efficacy factors of the support programme and (iv) assessment of critical factors and adverse effects of the support programme. We categorized subjects' answers based on content analysis.

The IES [12] is a 15-item self-reported measure of post-traumatic symptoms. Scores range from 0 to 75 and higher scores indicate more severe symptoms. The IES shows strong agreement with a PTSD clinical diagnosis and it is sensitive to clinical changes [13]. Although it has been suggested that the IES should not be used as a measure of PTSD because it does not measure hyper-arousal symptoms, results summarized by Sundin and Horowitz [13]

support its reliability and validity. They conclude that the number of studies showing high correlation between the IES score and PTSD diagnosis validates its use as a screening tool for PTSD. Neal *et al.* [14] also found the IES to be the most useful dichotomous measure, compared with the Clinician-Administered PTSD Scale-1 (CAPS-1) [15] and the Minnesota Multiphasic Personality Inventory-PTSD scale (MMPI-PTSD) [16]. We adopted a cut-off point of 35 to identify PTSD cases [14,17].

We computed means and standard deviations or absolute and relative frequencies for continuous or categorical variables, respectively. We estimated the association of each subject covariate with the likelihood of PTSD using logistic regression. Additionally, we modelled a series of random intercept mixed-effect logistic regression models to account for subjects' clustering within robberies; subject-level factors were entered as fixed effects. For each specification, the significance of unmeasured centre-related factors has been assessed with the residual pseudo-likelihood test ($H_0: \sigma^2 = 0$). The portion of variance in the outcome measure explained by unmeasured centre-related factors was calculated using the variance partition coefficient. We adopted a latent variable threshold model [18] approach for the calculation of the variance partition

coefficient [19]: $\frac{\sigma_u^2}{\sigma_e^2 + \sigma_u^2}$, where σ_e^2 is level 1 residual

variance ($\sigma_e^2 = 3.29$ for logit models) and σ_u^2 is level 2 residual variance (estimated).

As the initial reaction to the traumatic event might mediate subsequent development of PTSD, we specified two hierarchical models excluding and including IES score at T1 as a covariate.

Results

There were 610 employees, victims of 150 different robberies, who had voluntarily joined the employer-sponsored post-robbery support programme and were eligible for inclusion in the study. We excluded 217 subjects from the analysis because they were absent at either T1 or T2, and 10 due to incomplete data collection. The final sample consisted of 383 victims of 135 different robberies; 52% (198) of subjects were women, mean age was 43 years (standard deviation [SD] = 9), and mean work seniority was 17 years [10], whereas the mean number of bank robberies experienced during participants' working life was 2.5 (SD = 2.0).

The mean duration of the critical event was 20 min (SD = 26 min). For 78% (296) of subjects, the robbery was perpetrated by two or more robbers; 61% (233) were directly involved in interaction with the robbers; 88% (337) were not alone at the bank branch during the assault; 80% (307) reported the presence of at least one weapon (knives, 53% of subjects; guns, 35% and other kinds of weapons, 12%). About 50% (193) of subjects

perceived that robbers were upset and out of control. About 16% took part in or were witness to fights with robbers, 76% were injured during the robbery and 6% were witness to another person's injury. About 52% reported the presence of hostages during the robbery. About 19% (74) of participants felt fear and hopelessness during the robbery, 45% (173) replied 'partly true' and 33% (126) 'false'. About 46% (175) of subjects reported the presence of other traumatic features of the robbery not included in the previous question. About 4% [16] of victims requested a post-debriefing individual support session.

The IES mean score of the total sample at T1 was 30.5 (SD = 18.4). Correlates of the baseline IES score are shown in Table 1. Age, female sex, being a cashier, being alone during the robbery and feelings of fear, terror and hopelessness during the robbery were statistically significant.

About 24% (91) of subjects reported no symptoms throughout the follow-up; 37% (140) completely recovered, 32% (121) partially recovered, 6% [20] reported no changes in symptom severity and 1% worsened. IES scores decreased during the follow-up ($\Delta_{T1-T2} = 15.8$; $P < 0.001$). Fifty-two subjects (14%) reached the IES cut-off point for PTSD at T2. Table 2 summarizes

Table 1. Correlates of IES score at T1

	Estimate	P
Age	0.32	*
Elapsed time from robbery to support session	0.01	NS
Robbery duration	0.07	NS
Number of robbers involved	-0.29	NS
Number of victims involved	-0.18	NS
Work seniority	-0.15	NS
Number of robberies during working life	0.63	NS
Being female	4.36	*
Being cashier	8.20	**
No arms	0	
Cutter	3.52	NS
Guns	4.26	NS
Other arms	3.41	NS
Robbers appeared out of control	1.17	NS
Direct interaction with robbers	1.04	NS
Presence of hostages	0.86	NS
Other victims involved	6.01	*
Physical contact with robbers	2.59	NS
Scuffle (taking part or being present)	3.10	NS
Witnessing others' injury during the robbery	5.77	NS
Being injured during the robbery	3.16	NS
Worried by other issues related to robbery	6.09	**
Feeling terror and hopelessness		
No	-11.45	***
True	13.23	***
Partly true	0	

* $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

significant correlates of PTSD diagnoses, namely number of previous robberies experienced, physical contact with robbers, fighting, physical injuries, reporting further traumatic features of robbery and having felt fear, terror and hopelessness during the robbery.

In the multi-variate model (Table 3), the number of previous robberies experienced, reporting further traumatic features of the robbery and having felt fear, terror and hopelessness during the robbery were statistically significant (Model 1). After including the IES score at T1, all other variables entered in the model lost statistical significance (Model 2).

Unmeasured robbery-related factors explained a significant portion of the variance in PTSD likelihood: the robbery-related variance in the intercept-only model was $\sigma^2 = 0.99$ (standard error [SE] = 0.42, $P < 0.01$); after adjustment for covariates (Models 3 and 4), the

centre-related variance remained significantly >0 (Model 3: $\sigma^2 = 1.16$, SE = 0.57, $P < 0.01$; Model 4: $\sigma^2 = 0.88$, SE = 0.60, $P < 0.05$). The variance partition coefficient in PTSD likelihood approximated 26% in Model 3 ($P < 0.01$) and 21% in the fully adjusted model (not significant [NS]).

About 79% (304) of subjects felt that the programme provided emotional support and mitigated post-traumatic reactions. The opportunity to share feelings and reactions with colleagues (60%), expressing their feelings with someone who encouraged them to do so (42%), learning from the healthcare specialist the physiological basis of their symptoms (26%) and provision of social support by the company (14%) were considered the most useful features of the programme. However, 12 subjects (3%) reported discomfort related to re-experiencing trauma.

Table 2. Correlates of PTSD diagnoses

	PTSD, $n = 52$, n (%)	No PTSD, $n = 331$, n (%)	P
Physical contact with robbers	26 (18)	118 (82)	0.05
Scuffle (taking part or being present)	13 (22)	46 (78)	0.05
Being injured during the robbery	8 (32)	17 (68)	0.01
Worried by other issues related to robbery	39 (22)	136 (78)	0.001
Feeling terror and hopelessness			0.001
No	22 (30)	52 (70)	
True	23 (13)	150 (87)	
Partly true	5 (4)	121 (96)	
Number of robberies during working life, mean (SD)	3.26 (2.73)	2.40 (1.82)	0.001

Table 3. Multi-variable models: correlates of PTSD incidence at T2

	Model 1	Model 2	Model 3	Model 4
	OR (95% CI)	OR (95% CI)	OR (95% CI)	OR (95% CI)
Number of robberies during working life	1.25 (1.07–1.44)*	1.15 (0.97–1.36)	1.27 (1.07–1.51)*	1.18 (0.97–1.44)
Gender	0.63 (0.31–1.29)	0.72 (0.33–1.58)	0.77 (0.34–1.78)	0.85 (0.33–2.13)
Being cashier	0.52 (0.22–1.22)	0.94 (0.36–2.42)	0.40 (0.14–1.07)	0.76 (0.25–2.25)
Physical contacts with robbers	1.21 (0.58–2.54)	0.83 (0.36–1.87)	1.23 (0.50–2.98)	0.86 (0.32–2.28)
Scuffle (taking part or being present)	1.41 (0.61–3.27)	1.64 (0.64–4.20)	1.72 (0.62–4.78)	1.92 (0.63–5.79)
Being injured during the robbery	1.69 (0.58–4.89)	1.44 (0.44–4.73)	1.81 (0.49–6.61)	1.28 (0.31–5.21)
Worried by other issues related to robbery	2.47 (1.16–5.27)*	2.11 (0.91–4.91)	2.88 (1.16–7.19)*	2.64 (0.95–7.36)
Feeling terror and hopelessness				
True	6.96 (2.25–21.53)*	1.19 (0.32–4.36)	8.64 (2.19–34.10)*	1.59 (0.33–7.58)
Partly true	2.82 (0.98–8.10)	1.10 (0.33–3.65)	3.48 (1.00–12.12)*	1.45 (0.35–6.02)
Post-session individual interview requested	1.09 (0.29–4.09)	0.41 (0.09–1.81)	0.75 (0.14–4.07)	0.35 (0.06–2.07)
IES score at T1	–	1.11 (1.07–1.15)*	–	1.11 (1.07–1.16)*

CI, confidence interval.

* $P < 0.05$.

Discussion

This study confirmed that experiencing a bank robbery is a traumatic event for employees, in line with previous research [5]. IES scores at 1 week after the event are similar to those found at the same stage in victims of serious injuries [21], natural disasters [22] and technological disasters [23]. Although most subjects partially or fully recovered during the follow-up period compared with the first days after the robbery, 13% of our sample reached the IES cut-off point for PTSD diagnosis about 2 months after the traumatic event. This percentage is higher than in prevalence studies in the general population (4%) [24] and is the same as that found by Robinson *et al.* [20] in police officers exposed to duty-related stressors. Although comparison with other studies is hampered by differences in study design and source populations, it is interesting to note that victims of bank robberies seem to be at similar risk of PTSD as members of occupations traditionally regarded as high risk. By returning to the place where the event took place, victims of workplace robbery experience continuous exposure to triggers for distressing memories, fear, intrusive thoughts and hypervigilant behaviour, and a continuing threat of violence is inherent to their job.

Correlates of PTSD diagnoses observed in this study were similar to those found in previous studies on work-related post-traumatic symptoms, including PTSD. Consistent with Rothbaum *et al.* [25], we found that previous experiences of robbery can be an important risk factor, possibly by affecting employees' perception of safety. Like Ozer *et al.* [26], we found in the univariate analysis that peri-traumatic risk factors such as physical injuries and feelings of fear, terror and hopelessness during the event may increase the likelihood of developing PTSD. Additionally, we found that fights and physical contact without injuries are associated with increased rates of PTSD. However, in the multi-variate model, feelings of fear, terror and hopelessness during the robbery were the only significant peri-traumatic correlates of PTSD. Authors agree that victims' perception of the seriousness of the threat is more significant than the objective circumstances [1,27] and our findings are consistent with this.

Theories on the pathophysiology of PTSD consider the key role of early emotional reactions in predicting long-term consequences. In particular, Harvey and Briant [28] state that acute symptoms following the trauma may increase cognitive avoidance and suppression of thoughts about the event that can lead to psychiatric disorders. In this study, the IES score 7 days after the robbery remained the only significant correlate of PTSD incidence at 2 months in the fully adjusted multi-variate model. Socio-demographical correlates of early post-traumatic reactions (baseline IES scores) were female sex and older age in line with the findings of Tolin and Foa [29] and Elklit [6].

In addition being a cashier was associated with risk of PTSD, possibly due to the frequency with which these workers are directly involved in interactions with robbers compared with other workers. A further correlate was being alone during the robbery, possibly due to an increased feeling of threat during the event and lack of social support immediately after. Finally, similarly to PTSD risk factors, terror and hopelessness during the robbery were strong correlates for early post-traumatic reaction.

We also found that 21% of the variance in the outcome measures was explained by unmeasured group-related factors after adjustment for a number of observed robbery-related characteristics. None of them were associated with the risk of PTSD in the fully adjusted model. This finding suggests that group factors might affect the risk of PTSD, an often overlooked dimension in post-traumatic stress research. Organizational culture and identity can also affect the way in which stress is experienced, leading to differential expression of personal difficulties and vulnerabilities after the event, emulation of colleagues, perceived social stigma, responsiveness to treatment and feelings of responsibility, guilt or failure. Additionally, group cohesion in the workplace and supportive leadership may provide an important buffer: epidemiological evidence in other therapeutic areas suggests that perceived social support might result in reduced stress-related neuroendocrine responses, enhanced health and better quality of life [30]. Future research should evaluate the role of support networks, as well as other contextual-group factors, in robbery-related PTSD prevention.

Ethical considerations prevented us from conducting a two-arm parallel trial. As such, the evaluation of programme efficacy is beyond the scope of this study. However, most literature supports early intervention to prevent or reduce post-traumatic psychological impairment, although studies in specific occupational settings are limited and evidence is mostly based on civilian and military settings [8]. Structured assistance programmes for victims of workplace traumatic events have reported positive and satisfactory feedback from employees, although there is a lack of robust studies on efficacy and effectiveness [1]. Consistent with the existing evidence [5], most subjects partially or fully recovered and the majority of them (80%) expressed satisfaction with the intervention during the follow-up period.

This study has a number of limitations. First, we cannot rule out selection bias due to voluntary participation in the intervention programme. For this reason, we may have overestimated the prevalence of post-robbery PTSD. However, similarities in PTSD rates and risk factors observed in this study and previous studies support the internal validity of our results. Secondly, we could not collect information on non-occupational traumatic events and pre-existing psychiatric disorders, which may affect workers' susceptibility to post-robbery PTSD.

Finally, the PTSD diagnostic procedure relies on self-reporting without a clinical examination. Nevertheless, diagnosis based on self-reported IES score has been shown to have good accuracy compared with structured clinical interview in studies showing a high correlation between IES score and PTSD diagnosis [13].

In conclusion, we observed modifiable susceptibility factors associated with PTSD after workplace robbery in a large cohort study. Our results provide important implications for supporting workers at risk of bank robbery. Management and supervisors should pay particular attention to cashiers who have already been exposed to several workplace robberies because of their potential vulnerability. Moreover, our findings may help management and occupational physicians to identify people at higher risk of developing PTSD, by the intensity of early reactions. Supervisors should be trained to recognize manifestations of post-traumatic stress reaction and encourage employees to seek support from occupational health services. The results strongly suggest not only focusing on objective indices of robbery severity in establishing intervention priority but also considering the subjective perception of threat by affected workers. Finally, the efficacy of support programmes should ideally be assessed with a randomized controlled trial.

Key points

- It is possible to identify employees at higher risk of developing post-traumatic stress disorder following workplace robberies by the intensity of early reactions.
- Management and supervisors should pay particular attention to cashiers who have been already exposed to several workplace robberies because of their potential vulnerability.
- It is important not only to focus only on objective indices of robbery severity in establishing intervention priorities but also to consider employees' subjective perception of threat.

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Conflicts of interest

None declared.

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Consequences of OH alert syndrome

The three builders arrive and are soon working on various tasks like busy ants—I am the customer, it's my new house extension and the builder boss keeps me informed of every detail of the 'build' with a disproportionate amount of my time spent choosing bricks, tiles, windows and all that goes with a such a project. All good so far. The occupational health (OH) alert syndrome first kicks in when I notice the youngest builder wearing trainers and as my gaze wanders to three pairs of builder's feet—a variety of footwear is observed. I begin to see not just the building but the manual handling that goes with the construction, the ears not being protected when using noisy machinery, how the young one smokes and then puffs on his Ventolin inhaler, the preference for big sausage baps mid-morning instead of breakfast and the consumption of high-energy drinks throughout the day. I also listen as they compare blisters on their hands like a badge of honour, how their backs ache from lifting and handling and how the boss is clearly under pressure managing various projects. What to do? I resist the urge to inspect their hands for skin problems and carry out a spot spirometry test on the young one. I feel like a covert OH officer as I do daily dynamic risk assessments checking footwear, trying to sneak a

look at their hands and put out fruit and suntan lotion with their tea—I realize it must look odd so I come clean and discuss with the boss my observations and what I do as a living. 'First time I've come across one of them', he replies. The next day I notice all three builders wearing safety boots, gloves and hearing protection and the young one is eating an apple. I feel an irrational sense of satisfaction but notice that they now look at me with a wary eye as I approach with the obligatory cups of tea. By the end of the project, the relationship moves from the role of important customer to counsellor as I listen in sound bites to the worries and woes of these builders whilst they drink their tea. It becomes increasingly difficult to get away; I'm becoming exhausted by this syndrome, can we ever be off duty as OH professionals? So, if anyone reading this appoints builders and the first thing they ask is whether you are one of those occupational health people you know that they have been exposed to a middle aged woman who takes an interest in safety footwear, likes to look at hands, puts apples on garden tables and eventually bribes her children to make builders tea.

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