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The mediating role of cognitive processing in the relationship between social support and secondary traumatic stress symptoms in healthcare professionals

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Abstract

Objective: The aim of this study was to establish how cognitive processing of trauma may mediate the interaction between social support and secondary traumatic stress (STS) symptoms in healthcare professionals.

Method: We collected data from 419 Polish paramedics and nurses. The age of study participants ranged from 19 to 65 years (M = 39.60, SD = 11.03). We used a custom-developed survey and the Secondary Traumatic Stress Inventory, Social Support Scale and Cognitive Processing of Trauma Scale. Pearson's correlation coefficients were applied to analyse the relationships between variables. A mediation analysis was used to check a mediating role of cognitive trauma processing.

Results: The results showed significant links between STS symptoms and social support as well as cognitive processing of trauma. Cognitive coping strategies, play the intermediary role in the relationship between social support and STS symptoms, however, this role varies depending on the source of support and preferred cognitive coping strategies.

Conclusions: Paramedics and nurses have higher risk in developing STS. Our findings show that cognitive trauma processing and social support may play an important role in secondary traumatic stress symptoms. It is crucial to develop and implement programs for the prevention and treatment of STS symptoms, which would take into account the studied variables.

cognitive processing of trauma; medical personnel; secondary traumatic stress; social support

INTRODUCTION

Medical personnel, especially paramedics and nurses, due to the nature of their work, are at risk of experiencing a number of stressful situations, i.e., heavy workloads, understaffing, aggression from patients and coworkers, inadequate financial and social support. In addition to a standard occupational stressors, healthcare providers may experience some traumat-

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ic stressors which may result in the onset of secondary traumatic stress – also known as secondary traumatic stress disorder (STSD), compassion fatigue (CF), or vicarious traumatization (VT) [1-7]. According to Figley [2] STS is exactly a consequence of working directly with trauma victims and is definite by the behavioral and emotional outcomes of indirect exposure to the trauma, similar to those in post-traumatic stress disorder – PTSD. The revised DSM-5 [8] now includes secondary stress exposure in criterion A, with the affected also experiencing intrusive symptoms and trauma-related changes in mood, cognition, arousal and avoidance. Many authors have stated that STS should be recognized as a manifestation of PTSD in individuals who engage in helping or show connections to traumatic events of others [9]. Past research highlighted the increased risk of STS among medical professionals, especially in nurses [9,10-17], and paramedics [18-20].

The role of social support and cognitive processing of trauma in the occurrence of STS

Social support, especially in the workplace, can reduce the severity of stress experienced by the indirect exposure to trauma. Social support mitigates the experienced emotions, promotes effective coping strategies and enables the moderation of cognitive patterns distorted as a result of trauma experienced by their clients [19,21].

Workplace supervisors and co-workers are the main sources of social support for trauma victim specialists. The support can reduce stress levels and moderate experienced emotions by increasing the positive and lowering the negative ones, as well as correct distorted cognitive schemes [22]. Social support may, therefore, be a factor in the prevention of developing of STS. Some research show that support from coworkers plays a significant role in mitigating the symptoms of STS among nurses and paramedics [11,18,21,23], some do not [19], or demonstrate a more dominant role of support received from relatives and friends [24,25].

Cognitive processing of trauma is also a major determinant of STS [19]. Since STS and PTSD symptoms are similar, PTSD models contextualizing symptoms as maladaptations of cognitive processing of trauma can also be applied to STS [4,27,28].

Cognitive processing of trauma facilitates the re-processing and re-contextualization of beliefs and perceptions modified by trauma that cause dysfunction in daily life. Williams, Davis and Millsap [29] list several factors as indicators of trauma processing as cognitive coping strategies: positive cognitive restructuring, downward comparison, regret, denial, and resolution/acceptance.

Cognitive processing of trauma is now well-characterized in first-line medial workers. Such studies on paramedics suggest that dysfunctional beliefs and coping strategies can predict the diagnosis of PTSD and STS [5,14,19]. Ehlers and Clark [28] believe that cognitive trauma processing may act as an explanatory mechanism for the negative consequences suffered by the individual and thus be a mediating factor. Past research on social support, cognitive processing of trauma, and STS symptoms suggests their interactions are complex.

Aim of the research

This study aimed to determine the relationships between social support received from the work environment (supervisors and coworkers) as well as support outside of work (family and friends), cognitive processing of trauma in the form of cognitive coping strategies (positive cognitive restructuring, downward comparison, resolution/acceptance, denial, regret) and STS symptoms among medical workers, nurses and paramedics, exposed to secondary trauma.

We adopted the ecological framework of trauma as the working model to explain secondary trauma. As described by Dutton and Rubinstein [27], the model considers coping strategies undertaken by the affected professionals working with trauma survivors, and personal and environmental factors such as personal resources and social support. We hypothesized that medical workers exposed to secondary trauma use social support and positive cognitive processing of trauma as coping strategies to decrease the severity of STS symptoms. We also hypothesized that coping strategies act as mediators in the relationship between social support and STS.

Participants and procedure

The study was conducted in provincial emergency stations, emergency medical teams, emergency departments, in oncology departments, intensive care, and hospice wards in Poland. The inclusion criterion was for Polish nurses and paramedics who experienced trauma during their treatment of patients suffering from accidents or somatic illnesses (e.g. oncological disease, stroke, myocardial infarction[1]). Tools were given to participants (n = 430) and collected by the authors. Individuals were informed that completion of the tools constituted informed consent to participate in the study. The research project received an approval of the Bioethics Committee. 419 subjects aged 19–65 years (M = 39.60, SD = 11. 03) delivered tools. Eleven tools were rejected due to incomplete responses. Among the subjects, 137 (32.7%) were male and 282 (67.3%) were female. The study group included paramedics (n = 201), where 60.2% were men, and nurses (n = 218), where the vast majority were women (92.7%). The length of service of the medical personnel surveyed ranged from 1 to 43 years (M = 12.18, SD = 9.74), the number of working hours per week ranged from 2 to 90 (M = 38.64, SD = 15.64), and the workload, expressed as the percentage of work devoted to directly assisting patients in relation to all job responsibilities ranged from 2 to 100% (M = 69.11, SD = 31.89).

Measures

Three tools and survey included questions about types of events which were experienced by patients, age, work experience as a paramedic/nurse, number of work hours per week devoted to working with patients, workload expressed in the percentage of work devoted to providing direct help for patients in relation to the whole performed work were used in the study:

- **Secondary Traumatic Stress Inventory – STSI** by Ogińska-Bulik and Juczyński [19] is a modified version of the Posttraumatic Stress Disorder Checklist (PCL-5) developed by Weathers et al. [30]. It is a self-assessment tool intended for testing people who care for trauma victims. It consists of 20 statements of traumatic events ("Repeated, disturbing, and unwanted memories of the stressful experience") referring to PSTD symptoms: 1. intrusion, 2. persistent avoidance of stimuli connected to trauma, 3. negative changes in cognition and/or mood and 4. increased arousal and reactivity. Participants were instructed to rate to what extent the items on the inventory affected them on a five-point scale: not at all (0); a little bit (1); moderately (2); quite a bit (3) to extremely (4). Cronbach's alpha for STSI was 0.90 and 0.71 for intrusion, 0.85 for avoidance, 0.89 for changes in cognition/mood, and 0.87 for increased arousal/reactivity (Ogińska-Bulik and Juczyński 2020).
- **Social Support Scale –** What support can you expect is a part of the Psychosocial Work Conditions Questionnaire [31] to evaluate the support received from the work environment (i.e. supervisors and coworkers as well as support outside of work, such as family and friends). Scores for each subscale range from 8 to 40 points. The tool is made up of 8 statements ("To what extent can you expect someone to help you in a certain way?") that respondents answer on a 5-point scale ranging from 1 (very small range) to 5 (very large range). Cronbach's alpha are: 0.94 for support from supervisors, 0.92 from coworkers, 0.89 from friends outside of work and 0.89 for support from family.
- **Cognitive Processing of Trauma Scale** (CPOTS) by Williams, Davis and Millsap [29] was adapted to Polish conditions by Ogińska-Bulik and Juczyński [32]. The tool consists of 17 statements (e.g. "Overall, there is more good than bad in this experience") and measures five aspects of cognitive processing in the form of coping strategies: positive cognitive restructuring, downward

[1] The diseases, according to the classification, meet the criteria of a traumatic stressor.

comparison, resolution/acceptance, denial, and regret. Study participants address each statement on a seven-point scale from – 3 (I certainly disagree) to 3 (I certainly agree). The result of each aspect is calculated separately. The coefficients obtained are: $\alpha = 0.84$ for positive cognitive restructuring, $\alpha = 0.89$ for downward comparison, = 0.82 for resolution/acceptance, $\alpha = 0.56$ for denial, and $\alpha = 0.72$ for regret.

Statistical analyses

SPSS Statistics for Windows (version 25.0) was used for statistical analyses. We first calculated means, standard deviations and Pearson's correlation coefficients to analyze the relationships between the measured variables. Then the PROCESS approach proposed by Preacher and Hayes [33] was used to test whether the cognitive processing of trauma acts as a mediator between social support and STS symptoms.

RESULTS

The average STS symptom score[2] obtained from the participants in the current study (Table 1) is slightly higher than the scores we reported in previous studies involving medical workers (M=26.0, SD=18.66, p<0.001) [19]. We adopted a 33-point threshold to define those who have probable STSD (n = 182, 43.4%) and the rest are subthreshold (n = 237, 56.64%).

Table 1. Descriptive statistics of analyzed variables.

Variables	M	SD
STS – total	31.00	19.59
intrusion	7.98	4.92
avoidance	3.26	2.27
negative changes in cognition and/or mood	10.22	7.34
arousal and reactivity	9.54	6.51
Social support		
from supervisors	23.45	8.40
from coworkers	27.98	7.44
from family	29.81	7.08
from friends	25.81	8.47
Cognitive coping strategies		
downward comparison	8.14	4.41
regret	6.41	4.15
positive cognitive restructuring	8.65	4.23
denial	8.61	5.21
resolution/acceptance	12.20	5.46

Abbreviations; STS– secondary traumatic stress

Nurses had higher STS symptoms scores (M = 32.23, SD = 20.69) than the paramedics (M = 29.67, SD = 18.28) but this difference is not statistically significant. In both groups, the percentage of those at high risk for STSD is similar; 43.3% in paramedics and 43.6% in nurses. Gender did not differentiate STS symptoms score differences (males: M = 30.32, SD = 18.31; females: M = 31.33 SD = 20.20, t = – 0.49). There is a weak relationship between age and STS symptoms (r = 0.12, p < 0.05). STS symptoms are related to the number of hours worked per week

[2] The research results are part of a larger research project and that some of the results were used in another publication.

(r = – 0.21, p < 0.001), and less so with workload (r = – 0.12, p < 0.01). Work experience as a paramedic/nurse does not significantly correlate with STS symptoms score.

Social support correlates negatively with STS scores. We found social support from friends (r = – 0.28, p < 0.001) and family (r = – 0.24, p < 0.01) were more effective than support received from supervisors (r = – 0.10, p < 0.05) and co-workers (r = – 0.07, p > 0.05). Negative cognitive coping strategies such as regret (r = 0.18, p < 0.01) and denial (r = 0.18, p < 0.01) correlated positively with STS scores, while positive strategies such as cognitive restructuring (r = – 0.17, p < 0.01) and resolution/acceptance (r = – 0.32, p < 0.001) correlated negatively with STS. In contrast, the downward comparison strategy is not statistically significantly associated with STS scores (r = 0.04, p > 0.05). Acquiring social support from others correlates positively with cognitive coping strategies and this correlation is stronger for support received from outside of the working environment. Support from friends is associated with positive (cognitive restructuring r = 0.32, p < 0.001; resolution/acceptance r = 0.35, p < 0.001; downward comparison r = 0.21, p < 0.01) and negative coping strategies (denial r = 0.17, p < 0.05; regret r = 0.21, p < 0.01). In contrast, the support received from the family is only associated with positive coping strategies (cognitive restructuring r = 0.28, p < 0.01; resolution/acceptance r = 0.29, p < 0.001; downward comparison r = 0.15, p < 0.05). Support from supervisors correlates with two positive (cognitive restructuring r = 0.0.19, p < 0.05; resolution/acceptance r = 0.17, p < 0.05) and one negative coping strategy (regret r = 0.14, p < 0.05), and support from coworkers correlates with two positive strategies (cognitive restructuring r = 0.15, p < 0.05; resolution/acceptance r = 0.11, p < 0.05) .

Hence, to test that the mechanism underlying the occurrence of STS symptoms is based on cognitive processing, mediation analysis was conducted to examine the intermediary role played by cognitive coping strategies between social support and STS scores. Eight significant models were obtained (Figs. 1–3).

As shown in Figure 1, both social support from supervisors and positive cognitive restructuring are negative predictors of STS symptoms score. In contrast, social support is a positive predictor of cognitive restructuring. By introducing this strategy as a mediator between social support and STS score, the relationship between support and STS score becomes statistically non-significant (total mediation). In other words, the positive cognitive restructuring strategy reduces the role of social support in the occurrence of STS

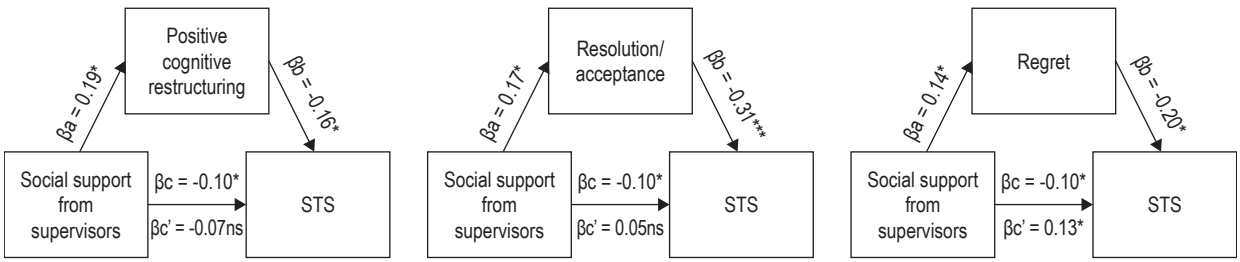

Figure 1. Model of relations between support from supervisions, cognitive processing of trauma of positive cognitive restructuring, resolution-acceptance, regret and secondary postraumatic stress βa, b + indirect effect; βc – total effect; βc' – direct effect. *p<p0.05; **p<0.01; ***p<0.001

Figure 2. Model of relations between social support, cognitive processing of trauma of positive cognitive restructuring, resolution-acceptance, regret and secondary postraumatic stress βa, b + indirect effect; βc – total effect; βc' – direct effect. *p<p0.05; **p<0.01; ***p<0.001

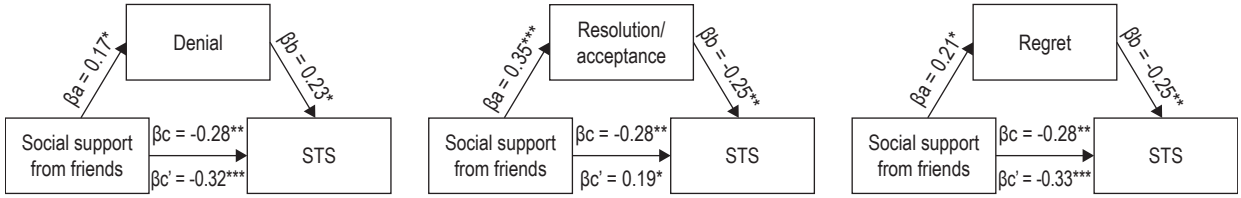

Figure 3. Model of relations between social support from friends, cognitive processing of trauma in the for of deniel, resolution-acceptance, regret and secondarz traumatic stress βa, b + indirect effect; βc – total effect; βc' – direct effect. *p<p0.05; **p<0.01; ***p<0.001

symptoms. A similar result was obtained when the mediator is resolution/acceptance strategy. In this case, however, we are dealing with a partial suppression effect since regret moderately increases the strength of the negative association between support and STS symptoms scores. This suggests that medical staff who receive support from their supervisors are less likely to have high STS scores if they grieved for their patient's trauma than those who do not experience grief. However, it should be taken into account that these are weak correlations (p <0.05).

Figure 2 presents the relationship between support from family, two positive coping strategies (positive cognitive restructuring, resolution/acceptance), and STS scores. In both cases, social support is positively correlated to coping strategies, which proved to be partial mediators between support and STS scores.

Figure 3 presents associations between support received from friends, three cognitive coping strategies (resolution/acceptance, denial, and regret), and STS scores. A positive strategy such as resolution/acceptance appeared to be a partial mediator between support and STS. In contrast, the two negative strategies (denial and regret) act as partial suppressors, increasing the strength of support and STS scores. Associations between the predictor (support from friends) and the dependent variable (STS scores) are negative. This suggests that medical staff who receive support from friends and cope with denial scored lower in STS. No significant correlations were obtained considering support from coworkers as an explanatory variable.

DISCUSSION

Our data indicate that 43.4% of the participants revealed high risk for STSD. The high risk of STSD in this occupational group is consistent with findings from other studies [6,9,11,13, 16-18,20]. This may indicate that STSD is becoming more prevalent among healthcare professionals working with trauma victims.

Our results are consistent with those in the literature to emphasize that the secondary exposure to traumatic events leads to STS and other negative consequences such as burnout, feeling overwhelmed, feeling of helpless, powerlessness, disengagement, lack of work satisfaction, difficulty in enjoying life, interpersonal conflicts, sexual difficulties, use of drugs and alcohol [6,9]. Available data support the notion that STS contribute to the stressful nature of medical professionals.

We identified a three-way interaction between social support, cognitive processing of trauma, and STS symptoms, as well as between support and cognitive processing of trauma. Social support, especially from family and friends, is negatively associated with STS. This is consistent with the results of a study conducted among nurses who care for trauma patients [26] indicating that nurses who do not receive support were more likely to experienced STS symptoms. Negative strategies (regret and denial) correlate positively, while positive strategies (positive cognitive restructuring and resolution/acceptance) negatively with STS scores, which is consistent with findings from five groups of medical professionals working with trauma victims [19]. Our findings suggest that cognitive processing of trauma plays a mediating role in the relationship between social support and STS. However, this role varies depending on the source of support and the cognitive coping strategies used. Social support from family and friends may reduce the severity of STS. Positive countermeasure strategies (cognitive restructuring and resolution/acceptance) were just as important in

mediating the reduction of STS with social support. On the other hand, regret and denial may promote negative symptoms of secondary exposure to trauma, but at the same time act as a partial suppressor to maintain the negative correlation between social support and STS. We conclude that medical workers who adopted positive forms of cognitive processing of trauma were able to depend less on social support to achieve lower STS. The use of negative coping strategy increases the role of support. It is worth mention that among positive coping strategies, downward comparison does not play a mediating role. This strategy did not correlate with STS scores.

Our findings on the mediating roles of coping strategies is consistent with past research, where cognitive processing of trauma is a mediator between trauma exposure STS symptoms [19]. Generally, cognitive processing of trauma allows those who have experienced trauma to revise their assumptions about themselves in relation to the world. It is also linked with the ability to give the experience sense and meaning for a positive outlook on reality.

It is important to consider that the described relationship between cognitive processing of trauma and STS may depend on many factors, such as the type of traumatic events experienced by the clients, the degree to which the workers are cognitively engaged in processing the trauma, or the coping resources they possess.

Our study has certain limitations. The study was cross-sectional and does not provide insights to cause and effect. In addition, the current study relies entirely on self-report data. Although the examined group was large, it was heterogeneous, with male paramedics predominating and female nursing staff. Results presented in the current study should not be considered generalizable to all medical staff working with trauma victims. The research did not consider the significance of directly experienced traumatic events, whether work-related or personal. In the case of social support, the focus was on its sources but different types (emotional, instrumental) were not analyzed. The study did not consider other coping strategies, such as the importance of self-care, highlighted by other researchers [34]. We cannot exclude the possibility that social support inversely mediates cognitive processing of trauma and STS.

Despite the limitations, our results provide novel insights to the range of factors influencing the outcome of STS exposure, indicating the importance of both social support and cognitive processing of trauma. Our study is robust with a large number of participants and included nurses and paramedics – who are less frequently studied. The use of a new measurement tool (Secondary Traumatic Stress Inventory), developed under the DSM-5 classification, is also a valuable contribution to the field.

Future studies should examine other indicators of cognitive processing of trauma, such as changes in core beliefs or ruminations triggered by secondary trauma exposure. Personal resources held by health professionals that may help reduce the severity of STS, including self-efficacy or spirituality, should also be explored. Expanding the study to include other health care professionals exposed to secondary trauma would facilitate the generalizability of our findings. Longitudinal studies is desired to monitor changes in STS symptoms.

These results can be applied to develop prevention programs aimed at reducing the severity of STS symptoms. It would be worthwhile to increase seeking and using social support and increase the repertoire of coping mechanisms like cognitive restructuring and resolution/acceptance. It may support the ability of medical professionals to effectively assist others and may improve the quality of their work and personal lives.

CONCLUSIONS

Secondary traumatic stress is becoming a common feature among healthcare professionals working with trauma victims. Cognitive coping strategies, play the intermediary role between social support and STS. However, this role varies depending on the source of support the medical workers access and their preferred cognitive coping strategies. Given the frequency and intensity of STS exposures to medical workers, it is of great importance to identify actionable outcomes to prevent and reduce the impact of STS on our frontline health professionals.

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