

Prevalence and determinants of secondary posttraumatic growth following trauma work among medical personnel: a cross sectional study

Nina Ogińska-Bulik^a, Piotr Jerzy Gurowiec^b, Paulina Michalska ^a and Edyta Kędra^c

^aDepartment of Health Psychology, Institute of Psychology, University of Lodz, Lodz, Poland; ^bInstitute of Health Sciences, University of Opole, Opole, Poland; ^cMedical Institute, State Higher Vocation School in Glogow, Glogow, Poland

ABSTRACT

Background: People helping trauma victims as a part of their work may experience positive results, known as Secondary Posttraumatic Growth (SPTG).

Aim: The present study aimed to determine the prevalence and determinants of SPTG among medical personnel, considering occupational load, job satisfaction, social support, and cognitive processing of trauma, understood as cognitive coping strategies.

Methods: Subjects comprised 419 representatives of the medical profession, including paramedics and nurses. The age of the subjects varied from 19 to 65 ($M = 39.60$; $SD = 11.03$). Four standard measurement tools were utilized: the Secondary Posttraumatic Growth Inventory, the Job Satisfaction Scale, the Social Support Scale, which measured four support sources, and the Cognitive Processing of Trauma Scale to assess five cognitive coping strategies. Pearson's correlation coefficients were applied to analyse the connections between the variables. A linear stepwise regression analysis was used to identify the determinants of SPTG. Pearson's correlation coefficients with confidence intervals were applied to analyse the connections between the variables.

Results: As many as 40% of participants experienced high levels of growth, with only 27.4% indicating a low level. The obtained results showed positive links between job satisfaction, all social support dimensions (from supervisors, co-workers, family, friends), all cognitive coping strategies (positive cognitive restructuring, downward comparison, resolution/acceptance, denial, regret), and SPTG. No significant connection between workload and SPTG total was discovered. The primary determinant of SPTG in the examined group of medical personnel is the cognitive processing of trauma, chiefly the strategy of positive cognitive restructuring.

Conclusions: Paramedics and nurses, despite their exposure to secondary trauma, experience positive posttraumatic consequences of the profession that entails helping the injured parties. It is advisable to encourage the medical personnel to apply positive coping strategies, find satisfaction in their work, and benefit from social support to promote posttraumatic growth.

Prevalencia y predictores de cambios postraumáticos positivos secundarios al trabajo con trauma en personal de la salud: un estudio transversal

Antecedentes: Las personas que ayudan a las víctimas del trauma como parte de su trabajo pueden experimentar resultados positivos conocidos como crecimiento postraumático secundario (CPTS).

Objetivo: Este estudio busca determinar la prevalencia y los determinantes del CPTS entre personal médico, considerando la carga ocupacional, satisfacción con el trabajo, soporte social y procesamiento cognitivo del trauma, comprendido como las estrategias cognitivas de afrontamiento.

Métodos: Los participantes incluían a 419 representantes de grupos de profesionales de la salud, incluyendo a paramédicos y a enfermeros. La edad de los participantes variaba entre los 19 y los 65 años ($M=39.69$; $SD=11.03$). Se emplearon cuatro instrumentos de medición estándar: el Inventario del Crecimiento Postraumático Secundario, la Escala de Satisfacción Laboral, la Escala de Soporte Social – que medía cuatro dimensiones de soporte –, y la Escala de Procesamiento Cognitivo del Trauma para evaluar cinco estrategias de afrontamiento cognitivo. Se aplicaron los coeficientes de correlación de Pearson para analizar las conexiones entre las variables. Se empleó un análisis de regresión lineal para identificar los determinantes del CPTS.

Resultados: Un 40% de los participantes experimentó altos niveles de crecimiento, con solo un 27,4% indicando un nivel bajo. Los resultados obtenidos mostraron relaciones positivas entre la satisfacción laboral, todas las dimensiones del soporte social (de los supervisores, de colegas, de la familia y de los amigos), todas las estrategias de afrontamiento cognitivo (reestructuración cognitiva positiva, comparación social a la baja, resolución/aceptación, negación, arrepentimiento) y el CPTS. No se descubrió alguna conexión entre la carga

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关键词

创伤认知加工; 工作满意度; 医务人员; 职业负担; 二次创伤后成长

HIGHLIGHTS

- Paramedics and nurses experience the positive aspects of the occupation that involves helping the injured; as many as 40% of those surveyed experienced high levels of growth.
- SPTG correlates with job satisfaction, social support and cognitive coping strategies.
- The main factor conditioning the occurrence of SPTG proved to be cognitive processing of trauma in the form of positive cognitive restructuring strategy.
- The results obtained confirm an assumption which indicates the importance of cognitive activity undertaken by an individual when faced with trauma.

laboral y el CPTS. El principal determinante del CPTS en el grupo de personal de la salud estudiado fue el procesamiento cognitivo del trauma, la estrategia capital de la reestructuración cognitiva positiva.

Conclusiones: Los paramédicos y los enfermeros, a pesar de su exposición al trauma secundario, experimentan consecuencias postraumáticas positivas de la profesión que devienen del ayudar a personas heridas. Es aconsejable animar al personal de la salud a aplicar estrategias de afrontamiento positivas, encontrar satisfacción en su trabajo y que se beneficien del soporte social que promueve el crecimiento postraumático.

医务人员创伤性工作后继发性创伤后积极改变的流行率和预测因素:一项横断面研究

背景:在工作中帮助创伤受害者的人们可能会经历积极的改变,被称为二次创伤后成长(SPTG)。

目的:本研究旨在确定医务人员中SPTG的流行率和决定因素,并考虑职业负担,工作满意度,社会支持和对创伤的认知加工(理解为认知应对策略)。

方法:被试由419名包括护理人员和护士的医学专业人员代表组成。被试年龄从19岁到65岁不等($M = 39.60$; $SD = 11.03$)。使用了四个标准测量工具:二次创伤后成长量表,工作满意度量表,测量4个支持源的社会支持量表以及评估5种认知应对策略的创伤认知加工量表。使用皮尔逊相关系数分析变量之间的联系。使用线性逐步回归分析来确定SPTG的决定因素。

结果:多达40%的参与者经历了高水平的成长,只有27.4%的参与者反映了低水平。获得的结果表明工作满意度,所有社会支持维度(来自主管,同事,家人,朋友),所有认知应对策略(积极的认知重组,向下比较,解决/接受,否认,后悔)和SPTG之间存在正相关关系。在工作负担和SPTG总数之间未发现显著关联。在所考查的医务人员中,SPTG的主要决定因素是创伤认知加工,其中首要的是积极的认知重建策略。

结论:医护人员和护士虽然在需要帮助受伤群体的职业中遭受了二次创伤,但也体验到了创伤后的积极后果。建议鼓励医务人员采取积极的应对策略,寻找工作中满意之处并从社会支持中受益,以促进创伤后成长。

1. Introduction

Medical personnel, nurses, and paramedics are among the groups of professionals particularly exposed to occupational stress (Firth-Cozens & Payne, 2000), including the stress related to helping victims of trauma. Indirect exposure to trauma results from a professional duty of helping people who have undergone various types of traumatic events (injuries, traffic accidents, violence, life-threatening¹ disease) that may be reflected in the form of secondary traumatic stress (STS; Figley, 1995). STS specifically addresses the abrupt onset of traumatic stress as a result of experiencing the trauma or distressing experience of the client by retelling the event (Baird & Kracen, 2006). The symptoms of STS are similar to those of PTSD, i.e., intrusion, avoidance, negative alterations in cognition and mood, and alterations in arousal and reactivity, with the difference mainly related to the source of trauma (DSM-V; American Psychiatric Association, 2013). PTSD occurs due to direct trauma experience, whereas STS results from indirect trauma (Pearlman & Saakvitne, 1995). It is worth noting that the DSM-V classification has extended the PTSD criteria to cover not only direct experience of a traumatic event but also indirect exposure, e.g., 'repeated or extreme exposure to aversive details of traumatic events' (American Psychiatric Association, 2013; Greinacher, Derezza-Greeven, Herzog, & Nikendei, 2019). This may suggest that what was previously reported as STS is in

fact a form of PTSD (Roden-Foreman et al., 2017). However, many authors indicated that STS should be considered a manifestation of PTSD symptoms in people who help or are somehow associated with others' traumatic events (Collins & Long, 2003; Ratrout & Hamdan-Mansour, 2020; Roden-Foreman et al., 2017). Existing literature also describes other terms that concern the negative psychological responses to indirect exposure to a traumatic event, i.e., vicarious traumatization (VT) or compassion fatigue (CF; Figley, 1995; McCann & Pearlman, 1990). Although these concepts refer to a similar phenomenon to STS, differences can be found between them. According to Craig and Sprang (2010), STS/CF may be described as 'socioemotional symptoms' and VT as 'changes in cognitive schemata'.

Among the various groups of professionals helping victims of trauma, e.g., social workers and therapists (Lee, Gottfried, & Bride, 2018; Rzeszutek, Partyka, & Gołąb, 2015), medical personnel may be particularly susceptible to secondary trauma due to being the first to attend to the victims following a traumatic event (Duarte, Pinto-Gouveia, & Cruz, 2016; Figley, 1995; Greinacher et al., 2019). Representatives of medical personnel are exposed to emotionally challenging situations, i.e., tough conversations with the patient and the family about death and trauma, which cause negative emotions and stress, leading to secondary negative posttraumatic changes.

On the other hand, working with trauma victims may be a source of positive posttraumatic changes, which are referred to as secondary posttraumatic growth (SPTG) or vicarious posttraumatic growth (VPTG). VPTG is defined as the personal growth and meaning gained through another's trauma (Abel, Walker, Samios, & Morozow, 2014). Just as in the case of posttraumatic growth (PTG) experienced by the victims of trauma, those positive changes appearing as a result of vicarious trauma relate to the perception of oneself, the relations with others, and one's life philosophy (Arnold, Calhoun, Tedeschi, & Cann, 2005; Brockhouse, Msetfi, Cohen, & Joseph, 2011; Calhoun & Tedeschi, 2013; Manning-Jones, de Terte, & Stephens, 2015, 2016, 2017). Other researchers also point to the increase in practical wisdom and benevolence among those working with victims of trauma (Vishnevsky, Quinlan, Kilmer, Cann, & Danhauer, 2015), along with an increase in self-worth, higher acceptance of others and faith in the efficiency of the undertaken activity, and appreciation of the work (Cohen & Collens, 2013).

VPTG develops through the same process as PTG (Calhoun, Cann, & Tedeschi, 2010; Cohen & Collens, 2013; Hyatt-Burkhart, 2013). Traumatic events experienced by those in their care constitute a significant challenge for the cognitive schemata of the professionals providing assistance. Those challenges trigger cognitive activity in the form of trauma processing, most often in the form of cognitive strategies of coping with trauma. The goal of cognitive processing of trauma is to assign sense and meaning to the experienced traumatic situations. Authors of the concept of PTG (Calhoun et al., 2010; Tedeschi & Calhoun, 2004) point to the importance of people's individual traits and the social support, both of which may influence the appearance of positive posttraumatic changes both directly and indirectly, facilitating the cognitive processing of trauma. The model of PTG also shows that the development of posttraumatic growth may depend on the mentioned constructs, e.g., individual traits, social support, or cognitive processing of trauma. Due to the similarities between PTG and SPTG/VPTG development mechanisms, these factors may also determine the SPTG occurrence. Further research in this area, therefore, seems to be necessary.

2. Secondary posttraumatic growth among medical personnel

The literature has provided data indicating positive posttraumatic changes among medical personnel, including nurses and paramedics, working with the injured or suffering from various types of diseases

(Jurišova, 2016, Ogińska-Bulik, 2015a, 2015b; Ogińska-Bulik & Kobylarczyk, 2015; Ogińska-Bulik & Zadworna-Cieślak, 2018; Shakespeare-Finch, Smith, Gow, Embelton, & Baird, 2003).

Some authors found a high level of secondary posttraumatic changes among nurses participating in life-threatening childbirths (Beck, Eaton, & Gable, 2016; Beck, Rivera, & Gable, 2017) as well as nurses employed in palliative care (Ogińska-Bulik, 2018). However, other authors have stressed the low or moderate degree of VPTG in groups of medical personnel, including nurses, physicians, ambulance workers from emergency centres, doctors, and health visitors (Kang et al., 2018; Taubman-Ben-Ari & Weintraub, 2008; Zerach & Shalev, 2015). The quite interesting findings come from comparative studies involving several groups of professionals (nurses, paramedics, social workers, therapists, probation officers, etc.). These studies show that medical personnel and therapists obtained higher scores of SPTG compared to other groups of professionals (Lev-Wiesel, Goldblatt, Eiskovits, & Admi, 2009; Manning-Jones et al., 2017; Ogińska-Bulik & Juczyński, 2020). Some authors consider work-related stress to be a catalyst for positive posttraumatic changes, which would be a reasonable explanation for the relatively higher level of the SPTG among medical personnel (Shakespeare-Finch et al., 2003). Moreover, according to the PTG model, people who suffer moderately strong negative effects of trauma are more susceptible to positive consequences (a positive relationship between STS and SPTG, as well as PTSD and PTG). However, some caution should be exercised considering this issue (Calhoun et al., 2010; Manning-Jones et al., 2017; Tedeschi & Calhoun, 2004).

3. Determinants of secondary posttraumatic growth

The determinants of positive consequences of indirect exposure to trauma include organizational factors, namely occupational load and support from the working environment, and individual factors, where a particular role is ascribed to cognitive trauma processing (Brockhouse et al., 2011; Calhoun & Tedeschi, 2013; Cohen & Collens, 2013; Kang et al., 2018; Manning-Jones et al., 2017; Morse-Karzen, 2016).

4. Occupational load

Cohen and Collens (2013) indicate that higher occupational load promotes the occurrence of VPTG. These positive links between occupational load and SPTG are confirmed by research related primarily to therapists (Abel et al., 2014; Arnold

et al., 2005; Brockhouse et al., 2011; Cohen & Collens, 2013; Froman, 2014). Positive though weak associations among years of practice and VPTG were found in labour and delivery nurses (Beck et al., 2016). However, a few studies did not find a connection between employment history and SPTG among persons working with trauma victims, including nurses (Brockhouse et al., 2011; Froman, 2014; Linley & Joseph, 2007; Zerach & Shalev, 2015). Workload, as the number of hours spent working with trauma victims or years of experience, proved to be unrelated to the secondary/vicarious posttraumatic changes among both ambulance personnel (Kang et al., 2018) and NICU nurses (Beck & Casavant, 2020).

5. Social support

Social support, especially in the workplace, may not only reduce the severity of the stress experienced, but also promote the positive posttraumatic changes among those helping trauma victims. The available research conducted among professionals, including medical personnel or those dealing with mental health, i.e., the staff of ambulance teams, confirms the importance of colleague or co-worker social support for VPTG development (Kang et al., 2018; Manning-Jones et al., 2017). However, other data do not confirm the relation between social support and VPTG. One example is the study conducted among therapists (Brockhouse et al., 2011), in which organizational support did not allow for a prediction of the onset of VPTG.

6. Job satisfaction

Many researchers note the importance of job satisfaction as a factor that promotes SPTG among professionals working with trauma victims (Arnold et al., 2005; Calhoun & Tedeschi, 2013; Gibbons, Murphy, & Joseph, 2011; Pantilat, Anderson, Gonzales, & Widera, 2015). Nevertheless, it should be highlighted that little research has been conducted in this area. In Ogińska-Bulik & Juczyński's (2020) study, job satisfaction was positively related to SPTG, but only in the group of therapists. Such a link was not established for medical personnel. These results suggest that the relationship between those variables varies between groups of professionals.

7. Cognitive trauma processing

The vicarious post-traumatic growth model developed by Cohen and Collens (2013) indicates the importance of undertaken remedial efforts, both behavioural and cognitive. However, only a few studies to date verified this model's assumptions,

especially concerning cognitive activities. The positive links between the challenges for fundamental beliefs and SPTG were revealed by midwives who participated in complicated births (Beck et al., 2017). This result suggests certain flexibility of cognitive patterns, as expressed in their readiness for modification, actually facilitates the positive consequences of secondary exposure to trauma. In a study of staff and volunteers from domestic violence organizations (Morse-Karzen, 2016), correlational analyses found significant relationships between SPTG and positive cognitive restructuring and resolution, as well as negative correlations between SPTG and regret. Moreover, regression analysis from the Morse-Karzen study found that four out of five cognitive processing strategies significantly contribute to SPTG. In Ogińska-Bulik and Juczyński (2020) research among professionals, including paramedics and nurses, resolution/acceptance, positive cognitive restructuring, and downward comparison turned out to be the determinants of SPTG.

8. Aim of the study

The present study aimed to establish the prevalence and determinants of STPG among medical personnel exposed to secondary trauma. Those determinants include work-related environmental variables, including occupational load in the form of employment history as a paramedic/nurse, the number of hours per week spent assisting patients, and workload expressed by the percentage of time spent helping the patients directly compared to all other duties. Job satisfaction and social support obtained from superiors and colleagues were also included among the work-related variables. Family and friends' support and cognitive trauma processing, understood through five cognitive strategies of coping with trauma, were also included in the study.

The adopted research model refers to the PTG theory (Calhoun et al., 2010; Tedeschi & Calhoun, 2004), highlighting the importance of cognitive processing of trauma, but also pointing out the importance of social support in the appearance of positive posttraumatic changes. It also alludes to the Cohen and Collens model (2013), which underlines the role of the individual's behavioural and cognitive efforts in positive changes after trauma. These models and the aforementioned were the basis for determining the nature of relationships between variables, where SPTG was an outcome variable, and other variables acted as explanatory variables.

The assumption was that the main determinant of SPTG is the cognitive processing of trauma, with the positive strategies, namely resolution/acceptance and positive cognitive restructuring, being of particular importance. The present study also adopted a stance

that SPTG will be positively linked to occupational load, job satisfaction, and social support.

9. Methods

9.1. Procedures and sample

The present study involved 430 representatives of medical personnel who provide medical assistance to affected patients as a part of their professional duties. The study was conducted between November 2019 and February 2020 in voivodeship medical emergency stations, emergency teams, and the emergency wards of several hospitals in Poland, as well as in oncology wards, intensive care, and hospices. The current research project was voluntary and anonymous and approved by the Bioethics Commission of the Opole Medical School (no. 81/P1/2019). The questionnaires were delivered to and collected by the authors or persons trained by the authors during medical staff working hours after prior initial oral approval of the study. Moreover, the respondents completed a written informed consent form, which had a clause stating that completing the questionnaires indicated consent to participate. The criteria for inclusion in the study were as follows: working as a nurse/paramedic and working with people who had experienced trauma related to an injury or illness.² Data relating to 11 people were not included in the analysis as their questionnaires were not fully completed. Therefore the analysis included the results of 419 people aged 19–65 ($M = 39.60$, $SD = 11.03$).

There were 137 (32.7%) men and 282 (67.3%) women among the respondents. The group consisted of paramedics ($n = 201$), where 60.2% were men, and a group of nurses ($n = 218$), the majority of whom were women (92.7%). Most paramedics assisted people after all sorts of accidents, mostly traffic (57.2%), also after injuries, such as strokes and heart attacks (42.8%). The group of nurses included persons working with cancer patients (87.7%) and those injured in accidents (18.3%). The employment history of the surveyed medical personnel ranged from 1 year to 43 years. The number of hours per week spent assisting the suffering patients ranged from 2 to 90, while the workload, expressed as the percentage of work time spent directly assisting patients compared to all other duties, varied from 2 to 100% (Table 1).

9.2. Measures

The present study employed a survey that included questions about age, type of events experienced by patients, employment history in the paramedic/nurse profession, number of hours per week spent working with patients, workload expressed by the percentage

of direct assistance to patients concerning all duties performed, as well as the four standard measurement tools described below:

The Secondary Posttraumatic Growth Inventory – SPTGI, as developed by Ogińska-Bulik and Juczyński (2020), is designed to measure positive changes related to exposure to indirect trauma in professionals. It contains 12 statements assessed on a 6-degree scale, from ‘I have not experienced this change’ (0) to ‘I have experienced this change to a very large degree’ (5). It led to identifying four factors, namely (1) New challenges and increased professional skills; (2) An increase in spiritual experiences and a sense of responsibility for others; (3) Greater self-confidence and appreciation of life, and (4) An increase in acceptance and acting for the benefit of others. Each factor is composed of three statements. High indicators of reliability were obtained and expressed by Cronbach’s α coefficient, namely 0.90 for the whole scale and 0.71; 0.85; 0.89; 0.87 for individual factors, respectively. Cronbach’s α obtained for the overall score in the current study was 0.94.

The Satisfaction with Work Scale is a modified version of the Satisfaction with Life Scale – Diener’s SWLS (Diener, Emmons, Larsen, & Griffin, 1985), developed by Zalewska (2003) and designed to measure overall life satisfaction. Once the statements are modified, they refer to job assessment (*‘In many ways, my work is nearly ideal’*). The tool consists of five items for which the investigator uses a 7-point response scale, from 1 (*strongly disagree*) to 7 (*strongly agree*). All statements constitute the same single dimension and show high internal consistency in the heterogeneous sample of employees and particular professional groups. Cronbach’s α obtained for the inventory in the current study was 0.87.

Social Support Scale – Whose Support You Can Count On is part of the **Psychosocial Working Conditions** questionnaire (Cieślak & Widerszal-Bazyl, 2000). The tool allows for the measurement of support received from both work-related sources, comprising superiors and co-workers, as well as outside of work, i.e., from family and friends (*‘To what extent can you count on someone helping you in a specific way?’*). The tool consists of eight statements which participants answer on a 5-point scale from 1 (*very small extent*) to 5 (*very large extent*). The psychometric properties of the scale are satisfactory (support from superiors: $\alpha = 0.94$, co-workers: $\alpha = 0.92$, friends from outside work: $\alpha = 0.89$, and family: $\alpha = 0.89$). Cronbach’s α s obtained for each subscale in the current study were respectively: 0.94, 0.91, 0.91, 0.90.

The Cognitive Processing of Trauma Scale (CPOTS), developed by Williams, Davis, and Millsap (2002), was adapted to Polish conditions by Ogińska-Bulik and Juczyński (2018). The tool consists of 17 statements (*‘Overall, there is more good*

Table 1. Descriptive statistics and correlation coefficients among analysed variables (N = 419).

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	
1. SPTG total	–																					
2. SPTG.1	0.85***	–																				
3. SPTG.2	0.81***	0.50***	–																			
4. SPTG.3	0.91***	0.73***	0.66***	–																		
5. SPTG.4	0.90***	0.76***	0.59***	0.78***	–																	
6. Gender	0.05	0.01	0.05	0.05	0.06	–																
7. Age	–0.01	–0.05	–0.00	0.02	–0.00	0.09	–															
8. Occupational group	0.09	0.08	0.05	0.12*	0.07	–0.06	0.73***	0.11*	–													
9. Work experience	0.09	0.10*	0.09	0.07	0.03	–0.24*	–0.09	–0.34***	0.09	–												
10. Number of working hours	0.08	0.11*	0.09	0.06	0.03	–0.10	–0.01	–0.18**	0.14**	0.54***	–											
11. Workload	0.35***	0.29***	0.23**	0.34***	0.35***	–0.08	–0.08	–0.03	–0.02	0.13**	0.12*	–										
12. Job satisfaction	0.20**	0.12*	0.20**	0.16**	0.20**	0.02	–0.12**	0.16**	–0.11*	0.01	0.08	0.35***	–									
13. SS.supervisors	0.22**	0.18**	0.22**	0.19**	0.19**	0.11*	–0.04	0.33***	–0.11*	–0.11*	–0.10*	0.28***	0.62***	–								
14. SS.co-workers	0.26**	0.26***	0.14**	0.26***	0.24**	–0.04	–0.09	0.02	–0.06	–0.03	–0.10*	0.34**	0.21**	0.40***	–							
15. SS.family	0.30***	0.30***	0.18**	0.28***	0.31***	–0.14**	–0.24**	–0.14**	–0.11*	0.11*	0.11*	0.49***	0.47***	0.26***	0.49***	–						
16. SS.friends	0.52***	0.46***	0.42***	0.46***	0.46***	–0.09	–0.05	–0.05	0.03	0.15**	0.07	0.36***	0.19**	0.15**	0.28***	0.31***	–					
17. CPOT.1	0.33***	0.30***	0.29***	0.28***	0.29***	–0.09	–0.11*	–0.15**	0.03	0.10*	0.08	0.18**	0.08	0.02	0.15**	0.20**	0.59***	–				
18. CPOT.2	0.48***	0.44***	0.30***	0.48***	0.42***	–0.09	–0.10	–0.10	0.03	0.18**	0.13*	0.41***	0.17**	0.11*	0.29***	0.35***	0.67***	0.51***	–			
19. CPOT.3	0.23**	0.13*	0.29***	0.17**	0.19**	–0.20**	–0.11*	–0.22**	0.04	0.09	0.03	0.11*	0.07	–0.08	0.02	0.17**	0.43***	0.63***	0.33***	–		
20. CPOT.4	0.24**	0.17**	0.27***	0.19**	0.20**	–0.14**	–0.19**	–0.15**	0.04	0.09	0.06	0.14**	0.14**	–0.05	–0.04	0.21**	0.39***	0.48***	0.30***	0.70***	–	
21. CPOT.5	32.35	7.64	7.67	8.92	8.13	1.67	39.60	1.52	12.18	38.24	69.11	21.28	23.44	27.95	29.80	25.78	8.66	8.14	12.20	8.61	6.42	
Mean	13.92	3.71	4.41	4.08	3.86	0.47	11.03	0.50	9.75	15.65	31.89	6.65	8.38	7.38	7.62	8.42	4.23	4.43	5.46	5.22	4.15	
Standard deviation																						

SPTG = secondary posttraumatic growth; SPTG.1 = new challenges and increased professional skills; SPTG.2 = increase in spiritual experiences and a sense of responsibility for others; SPTG.3 = greater self-confidence and appreciation of life; SPTG.4 = increase in acceptance and acting for the benefit of others; SS = social support; CPOT.1 = positive cognitive restructuring; CPOT.2 = downward comparison; CPOT.3 = resolution/acceptance; CPOT.4 = denial; CPOT.5 = regret. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

than bad in this experience') and measures five cognitive processing aspects: positive cognitive restructuring, downward comparison, resolution/acceptance, denial, and regret. Research participants are asked to relate to every statement on a 7-degree scale, from -3 (*strongly disagree*) to 3 (*strongly agree*). The score for each scale is counted separately. The reliability of the Polish version of CPOTS was assessed using Cronbach's α coefficient, and the result was satisfactory. The generated coefficients were: 0.84 for positive cognitive restructuring, 0.89 for downward comparison, 0.82 for resolution/acceptance, 0.56 for denial, and 0.72 for regret. The present study employed a version of the questionnaire adjusted to the investigation of people indirectly exposed to trauma. Cronbach's α s obtained for each subscales in the current study were respectively: 0.75, 0.80, 0.84, 0.75, 0.77.

9.3. Statistical analyses

The IBM SPSS software, version 25, was used to calculate the present study's data. The Student's t -test was used to measure differences in SPTG between gender and occupational groups. Pearson's correlation coefficients were applied to analyse the connections between the variables (Tables 1 and 2). A multi-variable model was built to identify the dependent variable (SPTG) determinants among the independent variables (occupational load, work satisfaction, cognitive trauma processing, social support). A linear regression (stepwise method) analysis was used to verify the model (Tables 4 and 5). The assumptions of the regression analysis were met by the data (Appendix 1).

10. Results

The SPTG result is close to the mean obtained in previous research on five groups of professionals working with trauma victims ($M = 31.06$, $SD = 12.14$; Ogińska-Bulik & Juczyński, 2020). Considering the criteria established

for SPTG (score of 38 points sets a threshold value for great secondary positive posttraumatic changes), a low level of secondary growth is experienced by 27.4%, an average level by 32.5%, and a high level by 40.1% of study subjects. Gender did not affect the severity of secondary positive posttraumatic changes. Considering the Student's t -test results, the analysed groups indicated no significant differences in the level of SPTG (Table 3). Moreover, there were no significant links between age, gender, occupational group, and SPTG (Table 1).

Occupational load indicators were not related to the overall SPTG score. Statistically significant connections applied only to individual dimensions of SPTG, mainly to new challenges and increased professional skills; there was a positive correlation between the number of hours per week spent working with patients and the workload expressed as a percentage of work spent on direct assistance to injured patients. In turn, greater self-confidence and appreciation of life was positively associated with work experience. Yet, the obtained values of correlation coefficients were very low (r from 0.10 to 0.12). SPTG and its factors positively correlated with job satisfaction (r from 0.23 to 0.35), social support (r from 0.12 to 0.30), and cognitive coping strategies (r from 0.13 to 0.52). It should be pointed out that slightly higher correlation coefficient values refer to family and friends' support rather than support within the workplace. All analysed strategies, both positive and negative, were positively linked to the intensity of secondary positive posttraumatic changes. However, higher values of correlation

Table 3. Differences in SPTG between gender and occupational group.

	Secondary Posttraumatic Growth			
	M	SD	t	p
Gender			-1.03	>0.05
Men	31.34	13.10		
Women	32.84	14.29		
Occupational group			-0.29	>0.05
Nurses	32.55	14.16		
Paramedics	32.14	13.67		

M = mean; SD = standard deviation; t = t-Test.

Table 2. Confidence intervals for correlation coefficients regarding main study results ($N = 419$).

Variables	SPTG total	SPTG.1	SPTG.2	SPTG.3	SPTG.4
Gender	-0.097; 0.312	-0.082; 0.110	-0.051; 0.141	-0.046; 0.146	-0.032; 0.160
Age	-0.105; 0.088	-0.145; 0.046	-0.100; 0.092	-0.072; 0.120	-0.100; 0.092
Occupational group	-0.076; 0.116	-0.086; 0.106	-0.103; 0.090	-0.076; 0.117	-0.068; 0.125
Work experience	-0.006; 0.184	-0.016; 0.175	-0.046; 0.145	0.024; 0.214	-0.026; 0.165
Number of working hours	-0.013; 0.179	0.004; 0.192	-0.008; 0.184	-0.026; 0.165	-0.068; 0.125
Workload	-0.016; 0.175	0.014; 0.204	-0.011; 0.181	-0.038; 0.154	-0.071; 0.122
Job satisfaction	0.263; 0.432	0.200; 0.376	0.137; 0.319	0.252; 0.422	0.263; 0.432
SS.supervisors	0.101; 0.290	0.024; 0.214	0.109; 0.297	0.066; 0.252	0.102; 0.291
SS.co-workers	0.127; 0.310	0.022; 0.213	0.127; 0.310	0.100; 0.281	0.100; 0.281
SS.family	0.163; 0.350	0.169; 0.355	0.045; 0.233	0.168; 0.347	0.146; 0.333
SS.friends	0.210; 0.385	0.210; 0.385	0.085; 0.271	0.190; 0.367	0.221; 0.394
CPOT.1	0.446; 0.587	0.373; 0.544	0.338; 0.496	0.381; 0.533	0.372; 0.543
CPOT.2	0.242; 0.413	0.210; 0.384	0.200; 0.376	0.190; 0.367	0.200; 0.376
CPOT.3	0.403; 0.550	0.359; 0.514	0.210; 0.385	0.403; 0.551	0.338; 0.496
CPOT.4	0.137; 0.319	0.034; 0.223	0.200; 0.376	0.075; 0.262	0.092; 0.281
CPOT.5	0.149; 0.336	0.075; 0.262	0.179; 0.357	0.092; 0.281	0.107; 0.295

Abbreviations as in Table 1.

Table 4. Determinants of SPTG total in the examined group of medical staff ($N = 419$).

Determinants	Secondary Posttraumatic Growth						
	B	BE	β	t	R ²	p-value	95.0% CI for B
Positive cognitive restructuring	1.10	0.18	0.33	6.134	0.27	0.000	0.748; 1.453
Resolution/acceptance	0.48	0.14	0.18	3.356	0.03	0.001	0.197; 0.755
Job satisfaction	0.27	0.10	0.13	2.831	0.02	0.005	0.082; 0.456
SS.co-workers	0.22	0.08	0.12	2.793	0.01	0.005	0.066; 0.379
Gender	3.02	1.20	0.10	2.511	0.01	0.012	0.655; 5.378
Work experience	0.14	0.06	0.10	2.479	0.01	0.014	0.029; 0.255
F(6,418) = 36.317	R = 0.588		R² = 0.346		Adj.R² = 0.336		R²-changes = 0.010

B = unstandardized regression coefficient; BE = B error; β = standardized regression coefficient; t = t-test value; p = the level of significance; 95.0% CI = confidence intervals; R = correlation coefficient; R² = determination coefficient; Adj.R² = adjusted R². Tolerance >0.10 and VIF <5; Durbin-Watson statistic = 1.498.

coefficients concern positive strategies, such as cognitive restructuring, resolution/acceptance and downward comparison, rather than negative ones, that is, regret and denial.

The next step was to check which variables determine the occurrence of SPTG (Table 4). Of all the variables introduced, six entered the stepwise regression equation; together they explained up to 35% of the dependent variable's variance. The main determinant proved to be the positive cognitive restructuring strategy ($\beta = 0.33$, $p < 0.001$), explaining the dependent variable's 27% variance. The more often the helper uses this strategy, the higher the intensity of positive posttraumatic changes. The participation of the remaining variables in explaining SPTG does not exceed 5%.³ Separate analyses were additionally carried out for individual dimensions of secondary growth after trauma (Table 5). Considering in final interpretation only determinants that explained at least 5% of the dependent variable variance, the substantial role for all SPTG dimensions was played

mostly by positive cognitive restructuring (β from 0.27 to 0.33 for each factor; R² from 0.18 to 0.21). For greater self-confidence and appreciation of life, it was resolution acceptance ($\beta = 0.28$, R² = 0.24).

11. Discussion

11.1. Level of SPTG among medical personnel

The medical personnel, including paramedics and nurses, experienced positive posttraumatic changes, as revealed by SPTG results from secondary exposure to trauma. As many as 40% of those surveyed experienced high levels of growth, with only 27.4% indicating a low level of growth. This relatively high SPTG score may be because the most often used strategies among participants were positive cognitive restructuring and resolution/acceptance, which were found to be positively associated with SPTG and moderately determined the SPTG variable's value. Also, respondents often benefited from social support, primarily from the family

Table 5. Determinants of SPTG factors in the examined group of medical staff ($N = 419$).

Determinants	Secondary Posttraumatic Growth Factors				
	β	R ²	p	F	R ² for model
New challenges and increased professional skills				31.210	0.274
Positive cognitive restructuring	0.27	0.21	0.000		
Resolution/acceptance	0.21	0.03	0.000		
SS.friends	0.16	0.02	0.001		
Denial	-0.11	0.01	0.023		
Work experience	0.10	0.01	0.044		
Increase in spiritual experiences and a sense of responsibility for others				30.887	0.230
Positive cognitive restructuring	0.33	0.18	0.000		
Denial	0.18	0.02	0.001		
SS co-workers	0.17	0.02	0.001		
Gender	0.09	0.01	0.045		
Greater self-confidence and appreciation of life				31.953	0.318
Resolution/acceptance	0.28	0.24	0.000		
Positive cognitive restructuring	0.22	0.03	0.000		
Job satisfaction	0.13	0.02	0.005		
Work experience	0.12	0.01	0.002		
Gender	0.11	0.01	0.012		
SS.co-workers	0.09	0.01	0.035		
Increase in acceptance and acting for the benefit of others				33.242	0.287
Positive cognitive restructuring	0.28	0.21	0.000		
Resolution/acceptance	0.15	0.01	0.002		
Job satisfaction	0.14	0.05	0.004		
Gender	0.13	0.01	0.012		
SS.friends	0.12	0.01	0.016		

β = standardized regression coefficient; p = the level of significance; R² = determination coefficient. Tolerance >0.10 and VIF <5. Durbin-Watson statistic: SPTG.1 = 1.597; SPTG.2 = 1.550; SPTG.3 = 1.553; SPTG.4 = 1.665.

($M = 29.80$, range of scores = 8–40) and revealed an average level of job satisfaction, which also positively correlates with SPTG. The high intensity of positive posttraumatic changes among medical personnel was also indicated by Austin, Pathak, and Thompson (2018) and Ogińska-Bulik and Juczyński (2020). It should be emphasized that it is unknown whether the posttraumatic growth among those who help the patients and the growth discovered in the patients themselves actually co-occurs. Those helpers may witness their patients' growth but may also actively support it and simultaneously use it to benefit their own growth.

11.2. Associations between the analysed variables and SPTG

Occupational load was not associated with the intensity of SPTG, as expressed in the overall SPTGI score, which is consistent with some previous research (Brockhouse et al., 2011; Froman, 2014; Linley & Joseph, 2007). It means that the work experience, understood as years of employment as a paramedic/nurse, the number of working hours per week, and the workload, expressed as the percentage of work devoted to direct assistance to the patients, do not translate into a higher intensity of secondary positive posttraumatic changes. A portion of research data available in the literature indicates positive connections between those variables, but it mainly concerns groups of therapists (Abel et al., 2014; Arnold et al., 2005; Cohen & Collens, 2013; Froman, 2014). This suggests that the relationship between occupational load and SPTG may be influenced by occupational group. Furthermore, occupational load may play a more significant role in the occurrence of negative consequences of secondary exposure to trauma. This seems to be confirmed by data obtained during research on five professional groups (Ogińska-Bulik & Juczyński, 2020), showing that occupational load was more closely associated with symptoms of STS than SPTG.

Job satisfaction, social support, and all cognitive coping strategies were positively connected with SPTG. The obtained data fall in line with the expectations and the results of other studies that indicate positive links between these variables (Gibbons et al., 2011; Kang et al., 2018; Linley & Joseph, 2007; Manning-Jones et al., 2017; Morse-Karzen, 2016; Ogińska-Bulik & Juczyński, 2020). It appears that job satisfaction, social support, especially from family and friends, and particularly positive cognitive coping strategies, may help individuals to regulate their emotions, pick up more efficient coping strategies, and correct cognitive schemata distorted by the experienced trauma, and thus, facilitate SPTG.

The factor most closely associated with SPTG in the case of stepwise regression analysis appears to be the strategy of positive cognitive restructuring. It allows for

an explanation of both the general SPTG result and the individual dimensions included therein. Positive cognitive restructuring by finding the positive side of the traumatic event may encourage the individual to re-evaluate their life and lead to better functioning in the present post-traumatic reality.

The existence of positive relations between negative cognitive coping strategies, i.e., regret and denial, and SPTG is quite interesting. If people helping trauma victims manifest negative emotions and take upon themselves the blame for the patient's pain, as well as express denial in the face of unfolding situations, it may facilitate secondary positive posttraumatic changes. Experiencing regret resulting from others' suffering may inspire the search for answers to existential questions, including the meaning of life. This attitude may persuade those providing help to re-evaluate their own lives and give them a new sense, facilitating SPTG. In turn, the use of denial strategies when faced with the unfolding situations may be a specific defensive mechanism against strong stress stemming from a confrontation with patients' pain and suffering. This in turn may promote the positive effects of indirectly experienced trauma. There is also a probability that negative coping strategies in the form of regret and denial initially lead to negative effects of secondary exposure to trauma, usually in the form of STS symptoms. These may consequently act as a catalyst for positive changes. This tendency is indicated by the PTG model (Calhoun et al., 2010; Tedeschi & Calhoun, 2004) and research reporting positive links between STS and SPTG (Austin et al., 2018; Manning-Jones et al., 2017; Ogińska-Bulik & Juczyński, 2020).

The obtained results confirm a model developed for PTG, which indicates the importance of cognitive activity undertaken by an individual when faced with trauma (Calhoun et al., 2010; Tedeschi & Calhoun, 2004). It may indicate the model's application also for SPTG. Just as with direct exposure to trauma, secondary exposure leads to distortions in fundamental assumptions about the world. Consequently, violating such key assumptions makes it possible to reconstruct them, which leads to the promotion of positive posttraumatic changes. Despite the model's assumptions and the present study's conclusions, it should be considered that the possible inverse relationships between the variables, especially concerning job satisfaction, may occur. High job satisfaction may be seen not only as a cause but also as an effect of SPTG. It may also be perceived as one of the components of secondary positive posttraumatic changes.

11.3. Strengths and limitations

The present study has certain limitations. It was cross-sectional, which does not allow for any inference on cause-and-effect relationships. The current research did not consider the importance of directly experienced

traumatic events, both work-related and personal. Subjective indicators of indirect exposure to trauma and the negative effects of indirect trauma, understood as manifested STS symptoms, were not considered. The present study also did not regard other coping strategies and the role of self-care, the importance of which is emphasized by other researchers (Manning-Jones et al., 2016). Also, the significance of social support types (emotional, instrumental) was also discarded. Furthermore, it should be remembered that searching for social support may also be interpreted as a coping strategy. The study group was not homogeneous; men outnumbered the women among paramedics, and women were a majority among the nurses.

Despite the indicated limitations, the present study's results brought in new information regarding the determinants of the positive consequences of secondary exposure to trauma among medical personnel. The results of the conducted research indicate that working with trauma victims may be a source of secondary positive posttraumatic changes and that a unique role in their occurrence should be attributed to the cognitive processing of trauma. Those results may help build some intervention strategies to cope effectively with the consequences of indirect trauma exposure. The significant value of the current study lies in the large group of subjects, including not only nurses but also paramedics, a less often studied group. One particular advantage is the use of a new measurement tool, developed to assess secondary positive posttraumatic changes among professionals working with trauma victims.

These analyses may inspire further research, which might take into account other determinants of cognitive processing of trauma, such as disturbance of basic beliefs about self and the world or ruminating about the events experienced by the patients. It is also crucial to test the importance of personal resources possessed by medical personnel in relation to SPTG, especially their sense of self-efficacy. Furthermore, it may be purposeful to test the mediational role of cognitive trauma processing in the relation between social support and job satisfaction and SPTG. Another area worth expanding includes representatives of other medical professionals exposed to secondary trauma. Longitudinal studies that would capture the changes in SPTG are also desirable.

11.4. Implications for practice

The information from the current study may provide some guidance for building preventive programmes on the subject of secondary positive posttraumatic changes. These programmes should consider the expansion of competencies for coping with trauma and benefiting from social support. It also seems

essential to undertake practices of self-care. It is an important factor that supports professionals' ability to provide help to effectively assist others and improve the quality of their work and personal lives (Molnar et al., 2017).

12. Conclusions

Paramedics and nurses experience the positive aspects of the occupation that involves helping the injured. Job satisfaction and social support are positively connected to SPTG. Positive links are also observed between SPTG and all cognitive coping strategies. The main determinant of SPTG proved to be a positive cognitive restructuring strategy. Positive coping strategies, satisfaction with work, and social support seem to help promote posttraumatic growth among medical personnel.

Notes

1. The listed events satisfy the criteria for a traumatic stressor (American Psychiatric Association, 2013).
2. After an accident or struggling with illness: cancer, stroke or heart attack.
3. Only factors that explain at least 5% of the variance of the dependent variable are considered as SPTG determinants in the final interpretation.

Authorship

The authors collected data, wrote the paper and performed the statistical analyses.

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The authors confirm that the data supporting the findings of this study are available within the article [and/or] its supplementary materials.

ORCID

Paulina Michalska  <http://orcid.org/0000-0003-2179-0307>

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Appendix

Appendix 1. Assumptions of linear regression met by the data.

Variables	Skewness	Kurtosis
SPTG total	-0.64	-0.19
SPTG.1	-0.40	-0.43
SPTG.2	-0.19	-0.92
SPTG.3	-0.62	-0.42
SPTG.4	-0.44	-0.61
Age	-0.00	-1.02
Work experience	0.90	0.08
Number of working hours	-0.06	0.56
Workload	-0.45	-1.30
Job satisfaction	-0.57	-0.06
SS.supervisors	-0.10	-0.73
SS.coworkers	-0.36	-0.02
SS.family	-0.54	0.04
SS.friends	-0.25	-0.64
CPOT.1	-0.19	-0.40
CPOT.2	-0.19	-0.52
CPOT.3	-0.49	-0.11
CPOT.4	0.03	-0.89
CPOT.5	0.09	-0.92

Abbreviations as in [Table 1](#).

1. Multiple regression assumes that the residuals are normally distributed. All coefficients take values close to "0", none exceed the value +/-1
2. Regression analysis is resistant to a slight fracture of the linearity assumption.
3. The number of observations is greater than the number of all variables used in the analysis; 50+15 observations for predictor (Tabachnick & Fidell, 2007).
4. No multicollinearity tolerance >0.10 and VIF <5; no auto-correlation Durbin-Watson statistic 1<d<3 (Field, 2009).
5. The results of the subjects are similarly distant for different levels of the independent variable.