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ARAŞTIRMA MAKALESİ **RESEARCH ARTICLE**

The Relationship Between Posttraumatic Stress, Post-Traumatic Cognitions and Posttraumatic Growth in Healthcare Professionals During the COVID-19 Pandemic*

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Abstract

Objective: The COVID-19 pandemic has dramatically changed the entire life order in Türkiye and in the world. It is envisaged that this pandemic will have various long-term effects on healthcare workers. This study examined the relationship between post-traumatic stress symptoms (PTS symptoms) (impact of COVID-19 pandemic) (ICP), post-traumatic stress disorder (PTSD), post-traumatic cognitions (PTC) and post-traumatic growth (PTG) in healthcare professionals during the COVID-19 pandemic.

Method: The sample of the study consisted of 248 medical doctors and 252 nurses between the ages of 18 and 54 who were employed in healthcare institutions and organizations in Türkiye. In addition to Demographic Information Form, a number of questionnaires were used to collect the data. These questionnaires included the Impact of Events Scale-Revised (IES-R), Post-Traumatic Stress Disorder-Short Scale (NSESSS-PTSD), Post-Traumatic Cognition Inventory (PTCI) and Post-Traumatic Growth Inventory (PTGI). Data were collected online and were analysed by using SPSS IBM 23 program and PROCESS Macro v.4.1 plug-in.

Results: Findings showed that there was a positive relationship between IES-R and NSESSS-PTSD ($r=0.95$, $p<0.01$), between IES-R and PTCI ($r=0.31$, $p<0.01$) and between PTCI and NSESSS-PTSD ($r=0.30$, $p<0.01$). On the other hand, there was a negative relationship between IES-R and PTGI ($r=-0.10$, $p<0.05$), between PTCI and PTGI ($r=-0.29$, $p<0.01$) and between PTGI and NSESSS-PTSD ($r=-0.16$, $p<0.01$). Also, PTC mediated the relationship between PTS symptoms (ICP) and/or the predisposition to PTSD with PTG.

Conclusion: Findings showed that IES-R, PTCI, PTGI and NSESSS-PTSD were related to one another. Moreover, PTC played a mediating role in the relationship between PTS symptoms (ICP) and/or PTSD with PTG. It is envisaged that present findings will shed light on future studies among healthcare professionals in difficult times including COVID-19 pandemic.

Keywords: Pandemic, Post-Traumatic Cognitions, Growth, Stress

COVID-19 Pandemisinde Sağlık Çalışanlarında Travma Sonrası Stres, Travma Sonrası Bilişler ve Travma Sonrası Gelişim Arasındaki İlişki

Öz

Amaç: COVID-19 pandemisi Türkiye'de ve dünyada dramatik bir biçimde tüm yaşam düzenini değiştirmiştir. COVID-19 pandemi döneminin sağlık çalışanları üzerinde uzun vadede çeşitli etkilerinin olacağı öngörülmektedir. Bu araştırma COVID-19 pandemi döneminde sağlık çalışanlarında; travma sonrası stres belirtileri (TSS belirtileri) (COVID-19 pandemisinin etkisi) (CPE), travma sonrası stres bozukluğu (TSSB), travma sonrası bilişler (TSB) ve travma sonrası gelişim (TSG) arasındaki ilişkiyi incelemeyi amaçlamıştır.

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Yöntem: Çalışmanın örneklemini, Türkiye'de sağlık kurum ve kuruluşlarında hizmet veren, 18- 54 yaş aralığında 248 hekim ve 252 hemşire katılımcı oluşturmuştur. Veri toplama aracı olarak, Demografik Bilgi Formuna ek olarak, Olayların Etkisi Ölçeği (IES-R), Travma Sonrası Stres Bozukluğu- Kısa Ölçek (NSESSS-PTSD), Travma Sonrası Bilişler Ölçeği (PTCI) ve Travma Sonrası Gelişim Ölçeği (PTGI) kullanılmıştır. Veriler çevrimiçi olarak toplanmış ve SPSS IBM 23 program ve PROCESS Macro v.4.1 plug-in kullanılarak analiz edilmiştir.

Bulgular: IES-R ve NSESSS-PTSD arasında ($r=0.95$, $p<0.01$), IES-R ve PTCI arasında ($r=0.31$, $p<0.01$) ve PTCI ve NSESSS-PTSD arasında ($r=0.30$, $p<0.01$) pozitif bir ilişki olduğunu göstermiştir. Buna karşılık, IES-R ve PTGI arasında ($r=-0.10$, $p<0.05$), PTCI ve PTGI arasında ($r=-0.29$, $p<0.01$) ve PTGI ve NSESSS-PTSD arasında ($r=-0.16$, $p<0.01$) negatif bir ilişki olduğu gösterilmiştir. Ayrıca, TSS belirtileri (CPE) ve/veya TSSB'na yatkınlık ile TSG düzeyleri arasındaki ilişkiye TSB aracılık etmiştir.

Sonuç: TSS belirtileri (CPE) ve/veya TSSB ile TSG düzeyleri arasındaki ilişkide TSB'in aracı rolü olduğunu göstermiştir. Bu araştırmada elde edilen bulguların, COVID-19 pandemisi gibi zor zamanlarda sağlık çalışanları ile yapılacak olan çalışmalara ışık tutacağı düşünülmektedir.

Anahtar Kelimeler: Pandemi, Travma Sonrası Bilişler, Gelişim, Stres

Introduction

There is controversy on how psychological trauma is defined (Krupnik, 2019). Psychological trauma refers to the unique experience of an event or a chronic condition such as accidents, natural disasters, abuse and war in which the individual is frightened of death, experiences an impediment to physical or mental wellbeing and his/her ability to cope is damaged (Dalenberg et al., 2017). Therefore, the COVID-19 pandemic can be considered as a long-term traumatic experience (Forte et al., 2020). Although this pandemic has impacted the lives of many individuals, some groups may have been emotionally more affected. One such group may be healthcare professionals because of a number of reasons, such as being subjected to an increased risk of infection, an increased workload and responsibilities, and conflicting personal and/or professional needs.

Studies have shown that healthcare professionals experience more psychological problems during this pandemic than in other epidemics (Dong et al., 2020). Studies have also shown that medical doctors and nurses experience many different psychological problems during COVID-19 pandemic. These include emotional distress, anxiety, stress, fear, panic, anger, sadness, depressive mood, substance misuse, burn out and posttraumatic stress symptoms (PTS symptoms) (Chew et al., 2020; Conversano et al., 2020; Forrest et al., 2021; Huang et al., 2020; Johnson et al., 2020; Kang et al., 2020a; Kang et al., 2020b; Stuijfzand et al., 2020; Song et al., 2020). In particular among healthcare professionals, a study by Forrest et al. (2021) showed that a significant percent of participants reported burn out, anxiety, and sadness. In addition, studies have also reported that these professionals experience tiredness and sleep problems (Kang et al., 2020a; Kang et al., 2020b; Stuijfzand et al., 2020). Metanalysis and review studies undertaken during this pandemic have also shown similar findings (Batra et al., 2020; Greenberg et al., 2021a; Pappa et al., 2020; Preti et al., 2020; Sun et al., 2021).

The psychological problems experienced by healthcare professionals may be associated with a number of factors. During traumatic experiences such as the COVID-19 pandemic individuals' schemas or core beliefs in relation to themselves, others and the world can change and this change can in turn have an impact on automatic thoughts. During this process, posttraumatic cognitions (PTCs) as examples of automatic thoughts can be related to psychological problems. However, to the authors' knowledge, the relationship of PTCs with psychological problems was not examined among healthcare professionals during this pandemic.

Another factor, probably associated with the experience of psychological problems among healthcare professionals may be posttraumatic growth (PTG). This construct involves positive transformations that can occur following traumatic experiences such as increased personal strength, spiritual growth and appreciation for life (Tedeschi & Calhoun, 1996; Tedeschi & Blevins, 2015).

A few studies have focused on PTG during the COVID-19 pandemic among healthcare professionals. For example, Moreno-Jimenez et al. (2021) showed that high fear of infection was associated with an increase in PTG whereas low behavioural disengagement was related to an increase in PTG. Behavioural disengagement occurs when an individual expects a negative outcome and has low perceived ability to cope with this outcome (Carver et al., 1989). Cui et al. (2021) found that PTCs were important factors in PTG even when the effect of other factors such as perceived social support and coping styles were taken into account. Based on the knowledge of the authors no study examined the relationship of PTCs with PTG among health professionals during this pandemic.

PTCs can play a significant role in the relationship of PTS symptoms and/or posttraumatic stress disorder (PTSD) with PTG. Therefore, the present study examined the relationship between PTS symptoms, the predisposition to PTSD, PTCs and PTG among healthcare professionals during the COVID-19 pandemic. The present study is a pioneering study. That is, it is envisaged that the present findings will identify targets for psychoeducational interventions in difficult times including COVID-19 pandemic among healthcare professionals.

Method

Consistent with the aims of the present study, the relational survey model was used.

Participants

The sample consisted of 500 healthcare professionals including medical doctors and nurses aged between 18 and 54 working in different healthcare institutions in Türkiye during the COVID-19 pandemic. Purposeful sampling method was used.

Measurement Tools

Demographic Information Form, Impact of Event Scale-Revised (IES-R), Posttraumatic Stress Disorder-Short Scale (NSESSS-PTSD), Posttraumatic Cognitions Inventory (PTCI) and Posttraumatic Growth Inventory (PTGI) were used to collect the data.

Demographic information form

This form included questions related to demographic characteristics such as age, sex, financial status and marital status and characteristics related to the COVID-19 pandemic such as diagnosis of COVID-19 disease and the stage of diagnosis.

Impact of Event Scale-Revised (IES-R)

This scale (Weiss & Marmar, 1997) assessed the levels of PTS symptoms. It contained 22 items which were rated on a 5-point likert scale. The scale was adapted to people living in Türkiye (Corapcioglu et al., 2006). In the present study, the scale was employed to assess the impact of COVID-19 pandemic (ICP). Internal reliability coefficient for this scale was calculated as 0.95.

Posttraumatic Stress Disorder-Short Scale (NSESSS-PTSD)

This scale (LeBeau et al., 2014) was a scale which assessed the levels of the diagnostic criteria of PTSD based on DSM-5 following a traumatic event. In the present study, this scale was employed to assess the predisposition to PTSD rather than to make a diagnosis of this disorder. It contained 9 items rated on a 5-point likert scale. The scale was adapted to people living in Türkiye (Evren et al., 2016). In the present study, internal reliability coefficient for this scale was calculated as 0.94. Two similar scales were used in the present study. This was because the former scale aimed to measure ICP whereas the latter scale aimed to measure the impact of all traumatic events experienced by the participants.

The Posttraumatic Cognitions Inventory (PTCI)

This inventory (Foa et al., 1999) measured PTCs which played a role in the development and maintenace of PTS symptoms. It consisted of 36 items rated on a 7-point Likert scale. The adaptation of the scale was carried out by Gulec et al. (2014) and Yagci-Yetkiner (2010). In the present study, internal reliability coefficient for this scale was calculated as 0.97.

Posttraumatic Growth Inventory (PTGI)

This inventory (Tedeschi & Calhoun, 1996) measured positive transformations in relation to oneself, relationship with others and philosophy of life and contained 23 items rated on a 6-point Likert scale. The scale was adapted to people living in Türkiye (Aydın & Kabukcuoglu, 2020). In the present study, internal reliability coefficient for this scale was calculated as 0.88.

Procedure

The present study was approved by the ethics committee of Istanbul Aydin University (Date: 26 May 2022; Approval number: E-88083623-020-51942). Participants gave informed consent before taking part in the present study. Data were collected through Google Forms following Ethical approval and approval from Republic of Türkiye Ministry of Health Scientific Research Platform. Due to the fact that only medical doctors and nurses were included as participants in the present study, the hospitals where the study was undertaken were informed by intermediaries via e-mail and telephone following the approvals. The participation was sought in a number of ways. First, the link of the study was sent to the medical doctors and nurses electronically by the IT departments of the hospitals where they worked at. Second, the intermediaries sent the link of the study to the e-mail groups of medical doctors and nurses working in the Red Cross throughout Türkiye. Third, the link of the study was sent to mail and social media groups formed specifically for nurses and medical doctors working in different departments of the hospitals. Fourth, the link of the study was sent through e-mail to the forums of medical doctors and nurses working throughout Türkiye. Fifth, medical doctors and nurses who participated in the study also disseminated the link of the study to other medical doctors and nurses. The exclusion criterion included the presence of a physical or cognitive disability which prevented participation. Participants filled in the questionnaires after completing Informed Consent Form online. Data were collected between the first of June 2022-the nineth of July 2022.

Data Analysis

SPSS IBM 23 program was used to undertake the statistical analyses. Data set was checked for lost data and extreme values. Skewness and kurtosis values were computed to check the distribution of the data. Skewness values ranged from -0.003 to 0.847 and kurtosis values ranged from -0.311 to 0.275. Skewness and kurtosis values of all scales and sub-scales indicated normal distribution.

Cronbach's Alpha (α) coefficients and Pearson Product Moment Correlation Coefficients were computed to examine internal consistency of the scales and the

relationships between variables, respectively. IBM SPSS program with the PROCESS 3.5 was used to undertake mediation analyses.

Results

Demographic Characteristics and Characteristics related to the COVID-19 Pandemic

These characteristics are detailed in **Table 1**. 59.4% of the participants were female and 40.6% were male. 49.6% were medical doctors and 50.4% were nurses. During the COVID-19 pandemic 65% reported to continue to work as before, 26% to work more than before and 9% less than before. 88.4% reported to work with patients who were diagnosed with COVID-19 disease. 87.2% reported to have a diagnosis of COVID-19 disease and 26.8% reported the loss of a significant other because of the COVID-19 disease.

Table 1. Demographic Characteristics and Characteristics Related to the COVID-19 Pandemic

Demographic Characteristics		N	%
Sex	Female	297	59.4
	Male	203	40.6
Age	18-24 yrs	108	21.6
	25-34 yrs	189	37.8
	35-44 yrs	121	24.2
	45-54 yrs	82	16.4
Marital Status	Single	174	34.8
	Married	277	55.4
	Divorced	36	7.2
	In relationship	13	2.6
Educational Status	Primary School	0	0.0
	Secondary School	0	0.0
	High School	18	3.6
	University	314	62.8
	Postgraduate Degree	168	33.6
Occupation	Medical Doctor	248	49.6
	Nurse	252	50.4
Number of Children	0	260	52.0
	1	97	19.4
	2	129	25.8
	More than 2	14	2.8
Duration of Professional Experience	0-5 yrs	186	37.2
	6-10 yrs	99	19.8
	11-15 yrs	31	6.2
	16-20 yrs	73	14.6
	More than 20 yrs	111	22.2
Longest Place of Residence	Metropolis	272	54.4
	City	168	33.6
	County	60	12.0
Frequency of Shift	Same as before	325	65.0
	Less than before	45	9.0
	More than before	130	26.0
Working with Patients with a Diagnosis of COVID-19 Disease	Yes	442	88.4
	No	58	11.6
Mode of working	Day shift	119	23.8
	Night duty	77	15.4
	Both day shift and night duty	246	49.2
	Not working with patients with COVID-19 disease	58	11.6
Conditions of Hospital	Very insufficient	54	10.8
	Insufficient	169	33.8
	In between	193	38.6
	Sufficient	84	16.8
	Entirely sufficient	0	0.0
Sharing of Living Space	With Nobody	89	17.8
	With Family	388	77.6
	With Friends	12	2.4
	With Partner	11	2.2
Fear of Infection	Not at all	10	2.0
	A little	28	5.6
	Moderate	101	20.2
	Much	102	20.4
	Very much	259	51.8
Living Conditions	With Family	329	65.8
	With Alone	119	23.8
	With Friends	13	2.6
	With Partner	39	7.8
Personal Space at Home	Yes	419	83.8
	No	81	16.2
Diagnosis of COVID-19 Disease	Yes	436	87.2
	No	64	12.8
Stage of Diagnosis	In quarantine/No symptom	137	27.4
	Hospital/In treatment	18	3.6
	Recovered	281	56.2
	No diagnosis	64	12.8
Knowing somebody with a diagnosis of COVID-19 disease	Yes	359	71.8
	No	141	28.2
Knowing somebody who died from COVID-19 disease	Yes	213	42.6
	No	287	57.4
Losing somebody close from COVID-19 disease	Yes	134	26.8
	No	366	73.2
Witnessing death	Yes	363	72.6
	No	137	27.4
Professional Competence	Very incompetent	0	0.0
	Incompetent	56	11.2
	Neither Competent or Incompetent	197	39.4
	Competent	202	40.4
	Entirely competent	45	9.0
Access to a Supervisor	No	51	10.2
	Yes, but insufficient communication	218	43.6
	Yes, sufficient communication	231	46.2

Descriptive values of the scores on the scales were given in **Table 2**. The mean scores for IES-R, PTCI, PTGI and NSESSS-PTSD were 32.42 (SD=19.11), 116.85 (SD=49.00), 56.99 (SD=20.06) and 13.37 (SD=9.56), respectively.

Table 2. Descriptive Values of the Scores on the Scales

	N	Min	Maks	$\bar{x}$	SD
IES-R	500	0	84	32.42	19.11
PTCI	500	33	231	116.85	49.00
PTGI	500	0	115	56.99	20.06
NSESSS-PTSD	500	0	36	13.37	9.56

Note: Impact of Event Scale-Revised (IES-R), Posttraumatic Cognitions Inventory (PTCI), Posttraumatic Growth Inventory (PTGI), Post Traumatic Stress Disorder-Short Scale (NSESSS-PTSD)

Correlational Analyses

These findings are given in **Table 3**. There was a positive relationship between IES-R and NSESSS-PTSD (r=0.95,

p<0.01), between IES-R and PTCI (r=0.31, p<0.01) and between PTCI and NSESSS-PTSD (r=0.30, p<0.01). On the other hand, there was a negative relationship between IES-R and PTGI (r=-0.10, p<0.05). Similarly, there was a negative relationship between PTCI and PTGI (r=-0.29, p<0.01) and between PTGI and NSESSS-PTSD (r=-0.16, p<0.01).

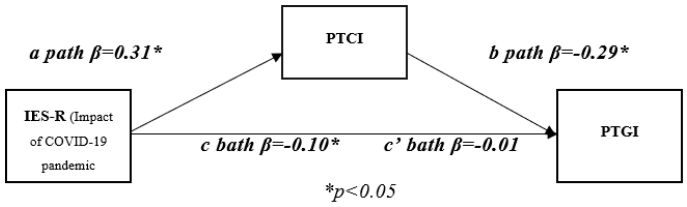
Table 3. Correlational Analyses of the Scale Scores

	1	2	3	4
1.IES-R	-			
2.PTCI	0.31**	-		
3.PTGI	-0.10*	-0.29**	-	
4.NSESSS-PTSD	0.95**	0.30**	-0.16**	-

**p<0.01, *p<0.05, Note: Impact of Event Scale-Revised (IES-R), Posttraumatic Cognitions Inventory (PTCI), Posttraumatic Growth Inventory (PTGI), Post Traumatic Stress Disorder-Short Scale (NSESSS-PTSD)

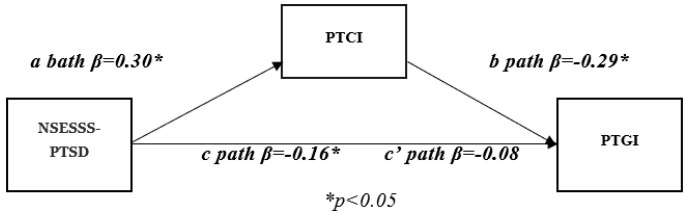
Mediation Analyses

The mediation effect of the PTCs in the relationship of PTS symptoms (ICP) and/or the predisposition to PTSD with PTG were examined. These findings are detailed in **Table 4** and **Figure l** and **Figure 2**. Findings confirmed these mediation effects.



Note: Posttraumatic Cognitions Inventory (PTCI), Posttraumatic Growth Inventory (PTGI), Impact of Event Scale-Revised (IES-R)

Figure 1. The Mediating Role of the PTCs in the Relationship of the PTS symptoms (ICP) with PTG



Note: Posttraumatic Cognitions Inventory (PTCI), Posttraumatic Growth Inventory (PTGI), Post Traumatic Stress Disorder-Short Scale (NSESSS-PTSD)

Figure 2. The Mediating Role of the PTCs in the Relationship of the Predisposition to PTSD with PTG

Discussion

The relationship between PTS symptoms (ICP), the predisposition to PTSD, PTCs and PTG was examined in the present study among healthcare professionals during the COVID-19 pandemic.

The Relationship of PTS Symptoms (ICP) and/or the Predisposition to PTSD with PTCs

Findings showed that among healthcare professionals, PTS symptoms (ICP) and the predisposition to PTSD were positively related to PTCs. That is, as the levels of PTS symptoms (ICP) and the predisposition to PTSD increased the levels of PTCs increased. This finding is consistent with the findings of previous studies undertaken in contexts other than the pandemic. These studies have shown that trauma related maladaptive cognitions play a significant role in the development and maintenance of PTS symptoms and these cognitions can indicate a higher level of symptoms (Dunmore et al., 2001; Foa et al., 1999; Shin et al., 2014).

This finding highlights the importance of PTCs during traumatic events including COVID-19 pandemic and indicates that PTS symptoms or the predisposition to PTSD may have distorted healthcare professionals' cognitions or vice versa. Based on the authors' knowledge no study reported this relationship during the COVID-19 pandemic among healthcare professionals.

The Relationship of PTS Symptoms (ICP) and/or the Predisposition to PTSD with PTG

Among healthcare professionals, findings showed that the levels of PTS symptoms (ICP) and the predisposition to PTSD were negatively related to the levels of PTG. That is, as the levels of PTS symptoms (ICP) and the predisposition to PTSD increased the levels of PTG decreased. No study reported this relationship during the COVID-19 pandemic among healthcare professionals. However, a qualitative study among nurses found that working with patients who were diagnosed of COVID-19 disease paved the way for PTG (Lee & Lee, 2020).

Theoretically, the experience of PTS symptoms does not determine whether or not PTG will occur (Tedeschi & Calhoun, 2004). The development of PTG may be a significant outcome in itself. However, the presence of PTG does not preclude the presence of PTS symptoms and the two phenomena often occur together (Greenberg et al., 2021b; Pietrzak et al., 2021). This finding is consistent with the views that for PTG to occur traumatic life events need to lead to a certain degree of distress and PTS symptoms and PTG can be experienced together (Tedeschi & Calhoun, 2004). This finding is also consistent with previous findings obtained in the general population during the COVID-19 pandemic (Koliouli et al., 2021; Vazquez et al., 2021). Therefore, this finding indicates that experiencing growth following major crises and traumas including the COVID-19 pandemic is not a coincidence. During difficult times such as the COVID-19 pandemic psychoeducational interventions aiming at decreasing the levels of PTS symptoms and increasing levels of PTG may be useful. Future studies can examine the effects of these interventions.

The Relationship of PTCs with PTG

The present findings showed that among healthcare professionals, PTCs were negatively associated with the levels of PTG. That is, as the PTCs increased the levels of PTG decreased. Most studies examined the effect of either PTCs or PTG (Arredondo & Caparros, 2021).

Table 4. Mediation Analyses

Independent Variable	Mediating Variable	Dependent Variable	Direct Effect	Indirect Effect	%95 Confidence Interval LL	UL
IES-R	PTCI	PTGI	-0.10*	-0.09*	-0.12	-0.07
Independent Variable	**Mediating Variable**	**Dependent Variable**	**Direct Effect**	**Indirect Effect**	**%95 Confidence Interval LL**	**UL**
NSESSS-PTSD	PTCI	PTGI	-0.16*	-0.08*	-0.22	-0.11

*p<0.05, Note: Impact of Event Scale-Revised (IES-R), Post Traumatic Stress Disorder-Short Scale (NSESSS-PTSD), Posttraumatic Cognitions Inventory (PTCI), Posttraumatic Growth (PTGI)

As far as the authors are aware no study reported this relationship during the COVID-19 pandemic among healthcare professionals. However, some studies have shown the relationship of other types of cognitions with PTG within the context of COVID-19 pandemic among healthcare professionals. For example, a study (Zhang et al., 2021) found that self-efficacy positively predicted the level of PTG among nurses. Another study (Lyu et al., 2021) among frontline healthcare workers showed that an increase in PTG in wave 2 was related to an increase in optimism; however, this optimism decreased when the pandemic was perceived as out of control, leading to a decrease in PTG in wave 3.

From a cognitive point of view, the experience of trauma sometimes offers very important information that is in contrast with the individuals' ideas about themselves and their model of the world (Blanco et al., 2010). Posttraumatic negative cognitions might affect the levels of PTS symptoms and the prognosis among individuals who were subject to traumatic experiences (Dunmore et al., 2001). This finding indicates that the nature of pre-traumatic schemas is an important factor for the development of PTS symptoms or PTSD and PTG (Dalgleish, 2004). PTG occurs while one is trying to understand the causes and the meaning of a traumatic event and to regulate the resulting distress (Tedeschi & Calhoun, 2004).

In the present study, as the levels of the individuals' posttraumatic negative cognitions increased the levels of PTS symptoms or the predisposition to PTSD increased. Also, as the levels of posttraumatic negative cognitions decreased the levels of PTG increased. The individuals' negative cognitions in relation to themselves such as blaming oneself and the world can be viewed as important negative cognitions for the maintenance of PTS symptoms or PTSD (Brown et al., 2019; Dekel et al., 2013; Foa et al., 1999) and other psychological symptoms (Moser et al., 2007). These cognitions can contribute towards creating a sense of threat, maintaining symptomatology, and increasing anxiety (Beck et al., 2004). Individuals who have high levels of PTS symptoms or PTSD and posttraumatic negative cognitions are likely to be more prone to psychological problems (Holmes et al., 2020).

The Mediation Effect of PTCs in the Relationship of PTS Symptoms (ICP) and/or the Predisposition to PTSD with PTG

In the present study, findings showed the mediation effect of PTCs in the relationship of PTS symptoms (ICP) with PTG and in the relationship of the predisposition to PTSD with PTG. That is, among healthcare professionals the relationship of PTS symptoms or the predisposition to PTSD with PTG was mediated by PTCs. This finding, in addition to indicating that a traumatic event is related to posttraumatic negative cognitions and PTS symptoms or the predisposition to PTSD, indicates that posttraumatic positive cognitions is a catalyzer for PTG.

Healthcare professionals were subject to the effects of an unpredictable event such as the pandemic. Overall, the present findings indicate that during the pandemic posttraumatic negative cognitions are related to negative feelings and negative emotional fluctuations whereas PTG is related to positive transformations resulting from traumatic events including the pandemic. The effectiveness of the coping strategies used for traumatic events or situations can be associated with PTCs. Here it may important to consider the relationship of PTCs with feelings. Studies have shown that among those who experienced traumatic events such as breast cancer, emotional expression and emotional processing are related to the levels of PTCs and PTG (Manne et al., 2004; Norlander et al., 2005). These studies have also shown that individuals with high levels of positive feelings tend to experience growth whereas individuals with high levels of negative feelings are less likely to experience high energy and growth (Manne et al., 2004; Norlander et al., 2005). Therefore, within the context of trauma, positive PTCs can be considered as an important factor for successful adaptation following a trauma.

Therefore, psycho-educational interventions that will be offered to healthcare professionals in difficult circumstances such as the COVID-19 pandemic in the future may aim at reducing posttraumatic negative cognitions and increasing posttraumatic positive cognitions if the aim is to reduce PTS symptoms or the predisposition to PTSD and to increase PTG. These interventions may aim at raising awareness of both posttraumatic negative and positive cognitions and disputing the negative ones and developing

or strengthening the positive ones. Future research can also examine the effects of these interventions.

Conclusion: The relationship between PTS symptoms (ICP), the predisposition to PTSD, PTCs and PTG was examined in the present study among healthcare professionals during the COVID-19 pandemic. Data were collected from medical doctors and nurses.

Findings reported the positive relationship of PTS symptoms (ICP) and/or the predisposition to PTSD with PTCs, and that the negative relationship of PTCs with PTG. Findings also showed the mediation effect of PTCs in the relationship of PTS symptoms (ICP) with PTG and in the relationship of the predisposition to PTSD with PTG. The present study is a pioneering study in this area.

Based on these findings psychoeducational interventions aiming at decreasing PTS symptoms and increasing levels of PTG may be useful. PTCs could be considered as a target for psychoeducational interventions aiming at increasing PTG in difficult times including COVID-19 pandemic among healthcare professionals. Future studies can examine the effects of these interventions. The present findings indicate that healthcare professionals may be offered psychoeducational interventions aiming at increasing PTG in order to help them to manage their stress levels in difficult times such as COVID-19 pandemic.

The present findings cannot be generalized to all healthcare professionals. In order to do so, future studies need to examine the relationship between PTS symptoms (ICP), the predisposition to PTSD, PTCs and PTG and the mediating effect of PTCs in a wider sample of healthcare professionals. The sample also need to consist of allied healthcare professionals such as laboratory and radiology technicians and chemists as well as healthcare personnel such as administrative and security staff and personnel at food supply chain in addition to medical doctors and nurses.

Limitations: The present study has certain limitations. First, in the present study Posttraumatic Stress Disorder-Short Scale (NSESSS-PTSD) was used to assess the predisposition to PTSD rather than to make a diagnosis of PTSD. Moreover, structured interviews were not undertaken. Second, in the present study information on the history of previous trauma and psychological or psychiatric problems were not obtained. Moreover, as structured interviews were not conducted, current anxiety-related or depressive symptoms were also not assessed. These problems can have a confounding effect. Third, the present study was cross sectional. Fourth, the data were collected within the third year of the pandemic. As a result, it is not clear whether or not participants worked directly with patients who were diagnosed as having COVID-19 disease. Therefore, the findings need to be interpreted with these limitations in mind.

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