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MEDIATING ROLE OF POST TRAUMATIC GROWTH (PDG) BETWEEN POST TRAUMATIC STRESS DISORDER (PTSD) AND COPING STRATEGIES AMONG FLOOD SURVIVORS

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Abstract

This study aimed to examine the relationships among post-traumatic stress disorder (PTSD), post-traumatic growth (PTG), and coping strategies, including religiosity and parent-peer attachment, among flood survivors in Khyber Pakhtunkhwa, Pakistan. Additionally, it aimed to assess the mediating role of PTG between PTSD and these coping strategies. Using a correlational research design, the study sampled 500 young adults aged 18-25 from flood-affected areas. Results indicated that PTG was negatively correlated with PTSD and positively associated with religiosity and parent-peer attachment. Structural equation modeling showed that PTG mediated the relationship between PTSD and coping strategies, improving the models' explanatory power. Significant differences were found between males and females where females reported higher PTSD, PTG, religiosity and males showed higher parent and peer attachment.

Keywords: Post Traumatic Growth (PTG), Post Traumatic Stress Disorder (PTSD), Coping Strategies, flood survivors

Introduction

Floods are quite common natural disasters, and it is proven that individuals who undergo this calamity experience certain degrees of psychological problems in various parts of the globe. The most frequently reported psychological consequence reported by survivors of these terrible incidents is post-traumatic stress disorder (PTSD) (Sayed et al., 2015). Some of the symptoms include; Involuntary and distressing recollection of events when experienced or

heard about, being easily startled, and avoiding trauma stimuli in general (American Psychiatric Association, 2013). Importantly, it is crucial to understand that not all people, who experience traumatizing situations, will develop PTSD. Some display adaptation, and likely demonstrate traits associated with post-traumatic growth (PTG), which is an improvement in one's cognitive schemas after encountering highly demanding adverse life events (Shakespeare-Finch & Lurie-Beck, 2014). Although, studies have suggested that PTG may also serve as a moderator through which the effect of trauma on psychological consequences may occur (Hamama-Raz et al., 2021). In the same context, religiosity and parent-peer attachment are some of the coping strategies that affect how people handle trauma and the emergence of PTSD or PTG as identified (Chan & Rhodes, 2013; Mohammad Khani et al., 2020).

In Asian continent, the number of natural disasters, especially floods and their consequences, is high because climatic and geographical conditions here are diverse. Different floods particularly in the Asian countries such as India, Bangladesh and China have been seen to have significant psychological effects on the people affected. For example, study conducted in India with flood victims, showed high rates of PTSD, while those with more social support, had higher rates of PTG (Kar et al., 2007). In Bangladesh, also similar findings were observed in which religious coping and community support was rated as important for the development of PTG and resilience among the flood victims. In China, such antecedent studies have pointed out that family support and religiosity were factors which could help alleviate PTSD symptomatology and enhance PTG in disaster survivors (Jin et al., 2011). As such, these studies confirm notions postulated in coping theory among flood victims in Asia, spirituality, and parent-peers' attachment influence psychological effects.

Floods are common in Pakistan, especially in the northern and southern areas of the country; thus, it struggles in meeting the psychological needs in the aftermath of floods. The research shows that the population of Pakistan having PTSD after floods is rather high and a significant number of them reported the development of subsequent PTG (Khan et al., 2017). The findings of the study conducted in the Swat Valley illuminated that enhanced PPA had a positive impact on decreasing the symptoms of PTSD and on experiencing PTG among the flood affected adolescent students. A quantitative cross-sectional study conducted in Sindh also avowed that religions are the most significant sources of emotional support and essential in the formation of PTG amongst the flooded adult community (Javed et al., 2018). Moreover, it is established that community-based intervention programs that strengthen the support network and religious activity can increase PTG and decrease PTSD in the flooded areas of Pakistan

(Rafique & Hunt, 2015). These studies stress the significance of coping methods involving religiosity and parent-peer attachment to affect the psychological consequence in the flood victims of Pakistan.

Rationale

Flood not only cause physical destruction but it also causes psychosocial destruction, and hence, a comprehension of the influences of floods in the realm of mental health is critical for the creation of interventions (Neria et al., 2008). whereas PTSD seems to be among the most typical outcomes of such experiences which is manifested through symptoms like intrusive recollections, and hyperarousal, PTG can be defined as positive psychological growth in relation to a spiritual calamity (Tedeschi & Calhoun, 2004). The purpose of this research is to establish what determines flood victims' outcomes by comparing PTSD and PTG, with the moderating variables of religiosity and parent-peer attachment. Prior studies suggest that the identified coping strategies play a vital role in the moderation of the trauma impact; nonetheless, there is not much information on flood victims in Asia and Pakistan only (Kar et al., 2007; Islam & Walkerden, 2017).

Thus, cultural, religious and social conditions in Asia provide a rather intriguing setting to investigate the phenomena of trauma recovery (Wang et al., 2011). Religiosity, and, family, and peer relationships are accessible in this region and help students to cope with difficulties and build up resilience (Chan & Rhodes, 2013). Floods are a severe natural disaster in Pakistan, and this study established psychological consequences on individuals and groups and identified Psychosocial factors for coping and mental wellness; Pakistani patients' religiosity and parent-peer attachment may hold risks for coping and mental health. Analyzing such relationships, this study wants to enhance the understanding of the context on culturally appropriate interventions to advance mental health and disaster recovery.

Theoretical Framework

The present study's theoretical foundation is based on attachment theory as postulated by Bowlby (1969) and elaborated by Ainsworth (1978) and focuses on the relationship between PTSD, coping, and PTG in flood victims. According to attachment theory it is those early relationships with the caregivers that define individual' attachment styles that are secure, insecure avoidant, or insecure anxious/ambivalent, their socioemotional development, as well as their response to stressors (Mikulincer, & Shaver, 2010). Secure attachment is associated with adaptive coping strategies and emotional resilience, whereas insecure attachment styles may impede effective stress management (Mikulincer & Shaver, 2010). This study aims to

elucidate the mediating role of PTG, the positive psychological change experienced as a result of struggling with trauma, between PTSD and coping strategies (Tedeschi & Calhoun, 2004). By examining how attachment styles influence coping mechanisms and PTG in flood survivors, this research seeks to provide insights for targeted interventions to enhance resilience and recovery in disaster-affected populations (Saleem, 2013; Reynolds, 2022).

Objectives and Hypothesis

- To examine the relationship among PTSD, PTG and Coping strategies among flood survivors.
- To assess the mediating role of PTD between PTSD and Coping strategies among flood survivors.

Hence, following were the hypothesis:

- H1: PTG was negatively correlated to PTSD among flood survivors.
- H2: PTG was positively correlated to Religiosity, Parent and Peer attachment.
- H3: PTG will mediate the relationship between PTSD and coping strategies i.e., religiosity and parent-peer attachment.

Conceptual Model

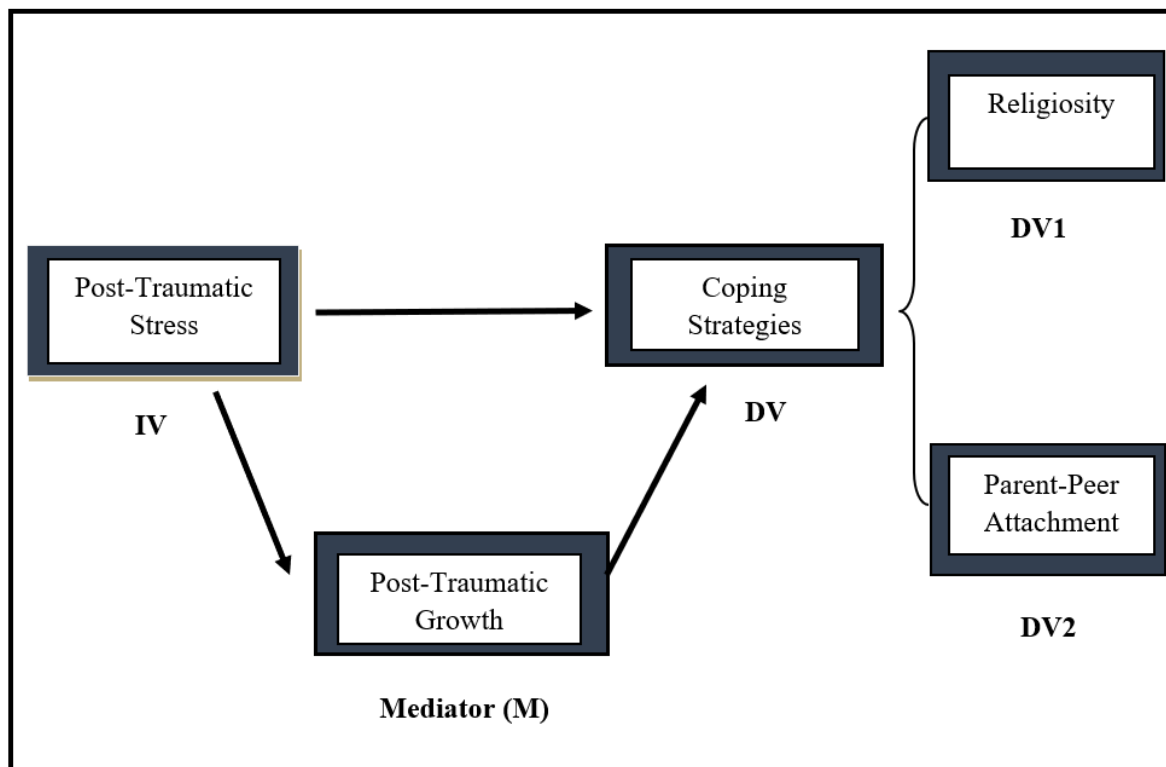


Figure 1. Conceptual Model

Methodology

Study Design

The study used correlational research design.

Population and Sampling

More than 600,000 people were displaced due to flood in various districts of Khyber Pakhtunkhwa i.e., Dir, Charsadda, Swat, Dera Ismail Khan and Tank (Ali, 2022). Hence, present study intended to target these affected individuals with age range 18 to 25.

500 (250 males and 250 females) sample were chosen using purposive sampling technique from these areas' camps, homes, colleges and shelters using the formula (Yamane, 1967): $n = \frac{N}{1+N(e)^2}$.

Inclusion and exclusion

Flood affected individuals in 2022 with age range 8 to 25 were included, while individuals with known psychological disorders were excluded.

Instruments

Demographic sheet contained age, gender, socioeconomic status and marital status.

The Posttraumatic Diagnostic Scale for DSM-V (PDS-5)

Foa et al. (2016) developed the scale having 24-items to screen out PTSD. It has 20-items and start with 2-questions to determine the presence of traumatic event and traumatic experience. The reliability reported was .96 predicting high reliability.

Post Traumatic Growth Inventory short form (PTGI-SF)

It is a 5-points scoring scale (1= strongly disagree to 5= strongly agree) with a shortened version (Cann et al., 2010). In this study, the shortened version was used with high score indicating greater post traumatic growth. The reliability reported was 0.85 (Cann et al., 2010), and consistent factor structure and validity (Kaler et al., 2011).

The index of Religiosity

In this study, 27-items scale in Urdu developed by Aziz and Rehman (1996) was used. It has split-half reliability Of 0.80.

Inventory of Parent and Peer Attachment-Revised (IPPA-R)

It is Likert scale with response range 1= never true to 3= very true having reliability of 0.86 (Gullone & Robinson, 2005).

Procedure

Purposive sampling technique was used to approach flood affected individuals of Dir, Swat, Charsadda, Tank and Dera Ismail Khan. Inform consent was taken after informing them about the purpose and nature of the study and then booklets were given. A researcher with fluent in English, Urdu and Pashto was there at the time of data collection and free counseling was provided who needed it. Ethical standards were also followed during the study and special consideration was given to it.

Results

The current study aimed to investigate the mediating role PTG between PTSD and coping strategies, the results generated are tabulated below;

Table 1

Correlation Matrix of Study Variables (n=500)

Variables	M	SD	PTSD	PDG	IR	PA	PE
PTSD	68.13	9.84	-				
PDG	30.53	5.93	.73**	-			
IR	70.55	20.94	.57**	.36**	-		
PA	59.75	13.19	.05	-.04	-.12**	-	
PE	55.86	9.80	.07	-.03	-.13**	.73**	-

Note: PTSD: Post-traumatic stress disorder; PDG= Post-traumatic Growth; IR= Index of Religiosity; PA= Parent Attachment; PE= Peer Attachment, * $p < .05$, ** $p < 0.0005$.

The correlation matrix of study variables, based on a sample of 500 participants, reveals several key relationships. Post-traumatic stress disorder (PTSD) has a strong positive correlation with post-traumatic growth (PDG), indicating that higher levels of PTSD are associated with higher levels of PDG. Additionally, PTSD shows a moderate positive correlation with the Index of Religiosity (IR). PDG also moderately correlates with IR, suggesting a connection between post-traumatic growth and religiosity. Both parent attachment (PA) and peer attachment (PE) are strongly correlated, reflecting a significant relationship between these two types of attachment. However, IR has weak negative correlations with both PA and PE. These findings highlight the interplay between PTSD, PDG, religiosity, and different types of attachments, suggesting complex interdependencies among these variables.

Table 2 Mediating role of PTG between PTSD and coping strategies using SEM (n=500)

	Model 1 (without PDG as a mediating variable)		Model 2 (with PDG as a mediating variable)		Model 1 (without PDG as a mediating variable)		Model 1 (with PDG as a mediating variable)		Model 1 (without PDG as a mediating variable)		Model 1 (with PDG as a mediating variable)	
	<i>IR</i>		<i>IR</i>		<i>PA</i>		<i>PA</i>		<i>PE</i>		<i>PE</i>	
Dependent Variable	β	t-value	β	t-value	β	t- value	β	t- value	β	t- value	β	t-value
Independent Variable												
PTSD	0.42	11.2**	0.63	10.3**	0.22	8.6**	0.38	9.5**	0.44	9.7**	0.67	10.5**
Adjusted R ²	0.45		0.59		0.76		0.81		0.62		0.79	

Note: PTSD: Post-traumatic stress disorder; PDG= Post-traumatic Growth; IR= Index of Religiosity; PA= Parent Attachment; PE= Peer Attachment, **: denotes significance at 5% (two-tailed t-test).

The analysis in Table 2 examines the mediating role of post-traumatic growth (PDG) between post-traumatic stress disorder (PTSD) and coping strategies, using structural equation modeling (SEM) with a sample of 500 participants. The results are presented across two models: Model 1 (without PDG as a mediating variable) and Model 2 (with PDG as a mediating variable).

For the dependent variable Index of Religiosity (IR), PTSD shows a significant positive effect in both models, with a β of 0.42 and a t-value of 11.2 in Model 1, and a β of 0.63 and a t-value of 10.3 in Model 2. The adjusted R² increases from 0.45 in Model 1 to 0.59 in Model 2, indicating an improved explanatory power when PDG is included as a mediating variable. For the dependent variable Parent Attachment (PA), PTSD also has a significant positive effect, with a β of 0.22 and a t-value of 8.6 in Model 1, and a β of 0.38 and a t-value of 9.5 in Model 2. The adjusted R² rises from 0.76 in Model 1 to 0.81 in Model 2, again showing that the inclusion of PDG as a mediator enhances the model.

For the dependent variable Peer Attachment (PE), PTSD's effect remains significant, with a β of 0.44 and a t-value of 9.7 in Model 1, and a β of 0.67 and a t-value of 10.5 in Model 2. The adjusted R² increases from 0.62 in Model 1 to 0.79 in Model 2, further supporting the mediating role of PDG.

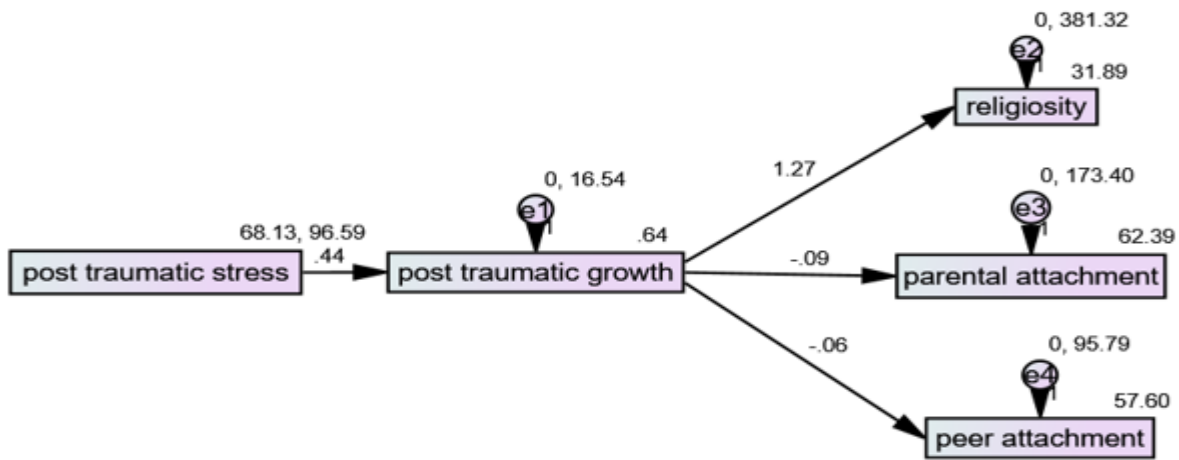


Figure. 2 Mediation Role of PTG between PTSD and Coping Strategies

Table 3 Mean Difference along Gender on Post-traumatic Stress, Post-traumatic Growth, Religiosity, Parent Attachment and Peer Attachment (n=500)

Variable	Male (292)		Female (208)		t(df)	p
	M	SD	M	SD		
PTSD	67.8	10.6	68.5	8.6	-.82(498)	.02
PDG	30.2	6.3	30.9	5.3	-1.4(498)	.01
IR	66.3	20.8	76.4	19.7	-5.4 (498)	.00
PA	61.3	12.2	57.6	14.2	3.1 (498)	.02
PE	56.8	9.4	54.5	10.2	2.5 (498)	.03

Note: PTSD: Post-traumatic stress disorder; PDG= Post-traumatic Growth; IR= Index of Religiosity; PA= Parent Attachment; PE= Peer Attachment, * $p < .05$, ** $p < 0.0005$.

Table 3 illustrates gender differences in psychological and relational variables among 500 participants (292 males and 208 females). Females exhibit significantly higher levels of PTSD ($p=0.02$), post-traumatic growth ($p=0.01$), and religiosity ($p=0.00$) compared to males. Males, on the other hand, report significantly higher levels of parent attachment ($p=0.02$) and

peer attachment ($p=0.03$). These findings highlight notable gender-based distinctions in how individuals experience and cope with stress and attachment.

Discussion

Hypothesis 1: PTG was negatively correlated with PTSD among flood survivors

The initial hypothesis (H1) suggested that post-traumatic growth (PTG) would be negatively correlated with post-traumatic stress disorder (PTSD) among flood survivors. This concept originates from a notion that people who report considerable personal changes following a calamity might experience less PTSD symptoms (Tedeschi and Calhoun 2004). Nevertheless, analysing the study findings, it is possible to notice the close positive relationship between PTSD with PTG. This means that the level of PTG increases with an increase in the level of PTSD. This is consistent with the study conducted by Levine et al. (2008) on the distinct transformations after severe trauma where the results demonstrated that increased distress could be associated with corresponding gains and a person's attempt to seek new meanings and strengths in traumatized conditions. Therefore, the results obtained in this study contribute to the understanding of the patterns of association between PTSD, PTG, religiosity, and social attachments. The positive outlook on the relationship between PTSD and PTG negates the first hypothesis (H1) and indicates that while the individuals irrespective of the kind of trauma they had to go through endure great PTSD, they can also deal with PTG difficulties. This is in line with the concept used by Zoellner and Maercker (2006) that posttraumatic growth results when individuals are exposed to high level of trauma.

Hypothesis 2: PTG was positively correlated with Religiosity, Parent, and Peer Attachment

The second hypothesis specifically postulated that PTG would be directly related with religiosity, parent and peer attachment. This hypothesis is developed under the consideration that spirituality and supportive social relations facilitate personal development after trauma (Pargament, 2001). Indeed, the results of the undertaken study provide partial support of this hypothesis. PTG had a moderate positive association with the Index of Religiosity (IR), which implies that more religious people appear to experience more post-traumatic growth. Shaw et al. (2005) supported the observation by establishing that religion offers a structure by which people may make meaning out of the traumatic events as well as grow.

The partial support for H2 is in concord with the acknowledging that religiosity can be a major factor in PTG. Religions and faith offer people a way of explaining such events as well

as support structures which can help the trauma victims (Pargament, 2001). It seems that the nature of the relations between religiosity and social attachments is rather intricate, which might explain weak negative relationships between IR and both PA and PE. For example, the subjects might turn to religious beliefs rather than to family and friends, as Granqvist & Kirkpatrick (2004) suggested that based on religious faith, for instance, might therefore contribute to the weak negative correlations found.

Nevertheless, the correlation between PTG and both PA and PE turned out to be not as high as anticipated. As for the PA and PE, the significant high correlation was recorded, however, a negative correlation with IR was observed. This infers that while parental and peer attachment are observed to be positively correlated, the association between the extent of such attachment and religiosity is negligible or slightly negative. This could be due to the results by Granqvist and Kirkpatrick (2004) for instance, they propounded that religious people will rely more on their religion than friends or family members, which predict less relation between religion and attachment.

Hypothesis 3: Post-traumatic growth (PTG) would mediate the relationship between post-traumatic stress disorder (PTSD) and coping strategies, including religiosity and parent-peer attachment.

The analysis using structural equation modeling (SEM) with 500 participants supports this hypothesis, demonstrating that PTG enhances the explanatory power of PTSD's effects on these coping strategies. Specifically, PTSD's positive effects on the Index of Religiosity (IR), Parent Attachment (PA), and Peer Attachment (PE) are significantly stronger when PTG is included as a mediator, as evidenced by increased β values and adjusted R^2 in Model 2 compared to Model 1. This suggests that PTG plays a critical role in how individuals adapt to trauma, aligning with previous findings that emphasize the importance of personal growth in enhancing spiritual beliefs and social support systems (Pargament, 2001; Zoellner & Maercker, 2006). The results are consistent with studies by Linley and Joseph (2004), which highlight that personal growth following trauma can enhance social support networks, and with the work of Calhoun and Tedeschi (2006), who found that PTG can provide a framework for finding meaning in adversity. This intricate interplay between trauma, growth, and coping mechanisms indicates that PTG facilitates stronger, more supportive social connections and a meaningful spiritual framework, thus enhancing overall resilience in trauma survivors. The reason behind this relationship could be that individuals experiencing growth after trauma develop new

perspectives and strengths that enable them to seek and utilize social and spiritual resources more effectively.

Gender differences revealed that males and females experience and regulate stress and attachment differently. As demonstrated in Table 3, females had significantly higher mean score of PTSD ($t= 3.32, p=0.02$), PTG ($t= 3.86, p=0.01$), and religiosity ($t=11.11, p=0.001$) than males. This hints to the fact that females are more vulnerable to experience traumatic events yet they are also better positioned to benefit from the process as well as tend to find comfort in religion. These results corroborate other studies pointing to the fact that women are more vulnerable to developing PTSD because they experience more interpersonal trauma and are equally or even more sensitive to stress of a traumatic nature (Olf, 2017; Christiansen & Elklit, 2022). Additionally, Bryant et al. (2020) established the perception that after the trauma, women engage more in the spirituality as a way of coping. Vice versa, males have higher scores of parent attachment and peer attachment ($t= 2.14, p= 0.02, t= 2.12, p= 0.03$ respectively) suggesting better relational quality with family and friends. This is in consonance with the literature outlined by Thompson et al. (2021) which observed that male patients hit their close networks for resilience. These gender-related differences also bring into focus, the gender-sensitive contention that while it is necessary to support individuals after trauma, male and female's coping style and subsequent supportive requirement may not be the same.

Conclusion

The purpose of this research was to examine the associations between PTSD and PTG and coping resources such as religiosity and parent-peer attachment among flood affected people in Khyber Pakhtunkhwa, Pakistan. Findings showed that PTG was inversely related with PTSD, and positively related to religiosity and attachment stating, that the higher PTG is, the lower is PTSD and the stronger the religious approach and the level of attachment. Moreover, study 2 enabled the exploration of PTG moderation to the relationship between PTSD and coping - religiosity and attachment. There were also some gender differences that can be discussed, such as the fact that females have higher level of PTSD, PTG, and religiosity than males, which is opposite to the fact that males have stronger parent and peer attachment. Implications from these studies include the need to encourage PTG and explore gender differences in the aftermath of floods in survivors.

Limitations and Recommendations for further studies

Despite this, this study has the following limitations: Yet, there are a number of limitations associated with the study due to cross-sectional approach that can be singled out:

First of all, one appeared to be the methodological limitation due to cross-sectional approach, namely the effectiveness of establishing cause-and-effect relationships between PTSD, PTG, and coping styles. Longitudinal studies could be more useful to answer questions regarding the causal relationships and in the long-term changes. Second, using self-report that means assessment of the participants' symptoms can also have vices and may lead to underestimation or overestimation in the exercise of the research study. The above investigations could be followed by clinical assessments and data obtained from several sources to enhance dependability. Thirdly, the sample included only young adults and the study was conducted only on selected districts of Khyber Pakhtunkhwa, so the study's results can not be generalized on the similar samples of other ages in other districts of Khyber Pakhtunkhwa. In the same way, the generalization of results could also have been done by expanding the sample size with more demography variation. Hence, they were able to provide no report of the consequences of potential independent factors such as previous psychological illnesses or socio-economic background on the wanted outcomes. Therefore, the management of such variables should be taken to the next level in the future by researchers so that the impact of PTSD and PTG can be rolled out correctly. Also, considering the factors of interest that are relevant to Post-Traumatic Growth, it would be relevant to establish how the victims can be helped to cope with the future events.

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