

# Investigation of the Associations between Posttraumatic Growth, Sleep Quality and Depression Symptoms in Syrian Refugees

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## ABSTRACT

Multiple traumatic events that refugees experience have different impact on psychological dimensions from deficiency to growth. The aim of the study was to investigate the associations between sleep quality, depression and post-traumatic growth in Syrian refugees.

Seventy two Syrian refugees attending to psychiatric outpatient clinic participated in this cross-sectional study. Participants were evaluated with Beck Depression Inventory (BDI), Post-Traumatic Growth Inventory (PTGI) and Pittsburgh Sleep Quality Index (PSQI) via clinical interviews.

All participants reported in various degrees of posttraumatic growth and the mean total PTGI score was 62.30 (SD: 18.25). Exposure to multiple traumas was common (Mean: 4.33, SD: 2.29). There were no significant differences on BDI, PSQI and PTGI scores between genders. All of PTGI subdomain scores were negatively associated with BDI scores, with larger effect sizes with personal strength ( $R^2: 0.18$ ) and appreciation of life ( $R^2: 0.16$ ). Having no past psychiatric disorder history was significantly associated with PTGI ( $\beta = 29.1$ ,  $p = 0.02$ ). In the path model to predict depression symptom severity in a single model, posttraumatic growth was associated with less severe depression symptoms, and sleep quality mediated the association between depression symptom severity and trauma exposure.

Syrian refugees in outpatient clinics reported depressive symptomatology and posttraumatic growth after exposure to multiple traumatic events. Results suggest that posttraumatic growth and better sleep quality in refugee populations may index better outcomes of psychological distress.

**Keywords:** Syrian refugees, depression, multiple trauma, post-traumatic growth

## Introduction

Refugees are exposed to several traumatic events typically as experiencing violence and killings, bombing, being tortured or imprisoned (1,2). An important proportion of the refugees have high risk for physical, mental and social health problems. Various psychiatric problems may occur anytime after resettlement (3,4).

The conflict environment that started in Syria in March 2011 caused many people to migrate. Over 5.6 million individuals left Syria due to the conflict environment as of the beginning of 2019 (5). Several studies have been published about the war related trauma and negative psychological aspects of the conflicts in Syria on the civilian population. A study reported that depressive disorders were the most common mental disorders among Syrian refugees in Sweden, with a rate of 40%, followed by anxiety disorders (31.8%) and PTSD (29.9%)

(6). Among Syrian refugees in Turkey, PTSD was reported in a wide range between 29.8% and 83.4%, and depression between 27.4% and 70.5% (3,7,8,9). Furthermore, a recent study reported that Syrian refugees settled in Turkey had higher trauma characteristics and PTSD levels than refugees settled in Sweden (10).

There is growing research interest on the plausible positive effects of the psychological trauma (2,11). Tedeschi and Calhoun firstly described posttraumatic growth as “positive psychological change experienced as a result of the struggle with extremely challenging life events” (12). Posttraumatic growth was demonstrated in refugee populations (13,14). However, to date results on posttraumatic growth and factors affecting posttraumatic growth were conflicting. Time after the traumatic event and increased exposure were associated with the level of posttraumatic growth in a study with immigrant

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Received: 08.09.2020, Accepted: 28.01.2021

psychiatric outpatients (15). However, other studies found no association with the time after the traumatic event (16). Furthermore, the severity of traumatizing events and separation from family were reported as negative factors on posttraumatic growth (13). Finally, adequate financial income and humanitarian supports were positively associated with posttraumatic growth in a study conducted with Syrian refugees (15).

Sleep is a primary biological process necessary for physical and psychological well-being. Poor sleep quality is one of the most common symptoms that refugees report, which may impair functioning and give rise to or worsen other mental health problems including depression (17). A recent cross-sectional study among Syrian refugees in Jordan reported that the majority of the refugees (52.2%) suffered from moderate to severe insomnia (18). Traumatic events and associated psychological reactions are key factors associated with poor sleep quality (19). However, there is a limited number of studies on sleep quality, its relation to trauma exposure and depression peculiar to refugees (20).

In this study, the primary aim was to explore the associations between posttraumatic growth, sleep quality and depression symptoms among Syrian refugees in Turkey who experienced multiple traumatic events. The hypotheses we propose were: i) Posttraumatic growth would be associated with sociodemographic factors including gender, employment, marital status, public financial support, history of psychiatric illness rather than the type of the traumatic event ii) Depression symptom severity would decrease with increasing levels of posttraumatic growth and the subdomains iii) Trauma exposure and depression symptoms would be associated with poor sleep quality. In other words, we hypothesized that depression symptoms would give rise as a consequence of the disruptive impact of trauma exposure on sleep quality.

## Materials and Methods

**Participants:** The study recruited 75 Syrian refugees who consecutively attended to the psychiatry outpatient clinic of Harran University between June and October 2019 with mild to moderate depressive symptoms. Harran University is localized at southeast of Turkey. The term “refugee” addressed Syrian residents in Turkey under temporary protection status.

The participants were included if they were between 18 to 65 years old and volunteered to

participate in the study. Individuals were excluded if they reported a psychoactive substance use, had a psychotic disorder or were pregnant or on breastfeeding. Therefore, three individuals were excluded due to refusal to participate in the study, resulting in 72 participants. Data was collected using Beck Depression Inventory (BDI-I), Post-Traumatic Growth Inventory (PTGI) and Pittsburgh Sleep Quality Index (PSQI). A psychiatrist conducted interviews with an Arabic speaking translator.

The protocol of the study was approved by the Institutional Ethics Review Board of Harran University, Faculty of Medicine. The study was conducted in accordance with the Declaration of Helsinki. Written informed consents were obtained from all participants.

## Procedures

**Demographic Information Form:** Participants’ age, gender, marital status, duration of stay in Turkey, employment status, educational level, financial support, cigarette use, alcohol use, views on returning to their home country and history of previous psychiatric disorders were covered. Traumatic Events List was used to assess the traumatic events experienced and/or witnessed by the victims of war and migration. (21,22).

**Beck Depression Inventory-I (BDI):** BDI-I is a commonly used self-report tool measuring depressive symptoms. There is a strong relationship between total score of the BDI and clinical ratings of depression (23). The Arabic version of the BDI-I was used in this study. Validity and reliability of the Arabic version of BDI-I were previously shown (24,25).

**Post-Traumatic Growth Inventory (PTGI):** PTGI is a tool to assess changes in individuals’ lives after specific traumatic events. The self-report scale consists of 21 items (12). PTGI has five subdomains: Spiritual change (SC), personal strength (PS), new possibilities (NP), relating to others (RO) and appreciation of life (AL). The Arabic version of the scale showed satisfactory internal consistency (Cronbach’s alpha: 0.94) (26). The validity of the six point scale (0-5) has been investigated in many studies of refugee populations (15,26,27,28). Higher sum scores represent higher levels of posttraumatic growth experienced.

**Pittsburgh Sleep Quality Index (PSQI):** PSQI evaluate sleep quality and patterns in adults. The 19-item scale measures seven components of sleep: quality, latency, duration, habitual

efficiency, disturbance, use of medication for sleep, and daytime dysfunction. The total of all components yields a global subjective sleep quality score. A total score greater than 5 indicates poor sleep quality (29). The psychometric properties of the Arabic version of the PSQI showed satisfactory reliability (Cronbach's alpha: 0.65) (30).

**Statistical analysis:** The software package STATA, version 13 was used for the analyses (StataCorp, 2013). Double check of the data showed no missing values. The normality of the distribution, linearity and homoscedasticity of continuous variables were checked using histograms and scatter diagrams. First, descriptive analyses were conducted to define general characteristics of the refugees as well as types of traumatic experiences. For the first hypothesis, clinical scores of the sample (BDI, PTGI, PSQI) were presented with standard deviations. Then, differences between genders were analysed using t test. For the second hypothesis, the associations between independent variables (demographics and traumatic event types) and the PTGI total scores were analysed using univariate linear regression. For the third hypothesis, linear regression analyses were again used to predict depression severity outcome by subdomains of posttraumatic growth. As the time after the traumatic event can be a confounding factor in the association between depression and PTGI, the time after the traumatic events was included in the model. Relevant effect size measure (Cohen's d for t test and  $R^2$  for linear regression) were calculated. As suggested in previous research, the lower bound of large effect size was assumed as  $d:0.8$ , medium effect size as  $d:0.5$ , and small effect size as  $d:0.2$  (31,32). Finally, in order to evaluate the fourth hypothesis, depression symptom severity was predicted in a single model using path analysis. Adequacy of model fit was based on chi-square, root mean square error of approximation (RMSEA), standardized root mean square residual (SRMR), goodness-of-fit (GFI) and adjusted goodness-of-fit statistic (AGFI) as recommended in previous research (33,34,35). A significance level of 0.05 was used in these analyses.

## Results

**Demographic, traumatic events characteristics and clinical outcomes of the sample:** The current study included 72 Syrian refugees (39 males, 33 females) with a mean age of 33.01 years (SD: 9.82, range: 20-60). Fifty-four participants

(75.0%) were high school or university graduates. More than half of the participants were married (n: 46, 63.89%) and employed (n: 40, 55.56%). Twenty-six participants (36.11%) reported public financial support. Thirty-one (43.06%) participants reported cigarette use and about a quarter (n: 16, 23.61%) reported alcohol use. About half of the participants (n: 37, 51.39%) reported wishing to return to home country.

Exposure to multiple types of trauma was common in the sample (Mean 4.33, SD: 2.29, range: 0-7). The most common traumatic events experienced were as follows: Bombing (n: 55, 76.39%), extortion (n: 37, 51.39%), physical damage (n: 34, 47.22%) and armed assault (n: 34, 47.22%). 93.66% of the participants experienced or witnessed at least one traumatic event. All participants reported a degree of posttraumatic growth (Mean total PTGI: 62.30, SD: 18.25)

Table 1 shows BDI, PSQI, PTGI and their subscale scores distributed by gender. There were no large or significant differences between genders on BDI, PSQI, PTGI and subsdomain scores. However, females had slightly higher PSQI sleep latency score and males had slightly higher PSQI sleep duration, habitual sleep efficiency and use of sleep medication scores with small effect sizes (Cohen's  $d > 0.2$ ). Furthermore, females had slightly higher PTGI-personal strength and appreciation of life scores than males again with small effect sizes (Cohen's  $d > 0.2$ ).

**Univariate Regression Analyses Predicting Posttraumatic Growth Outcome by Sociodemographics and Traumatic Event Types:** The associations between the sociodemographics, traumatic event types and the PTGI-total scores are presented in table 2. None of these features significantly predicted PTGI total score, except having no history of past psychiatric disorder.

**Regression Analyses Predicting Depression Symptom Severity Outcome By Subdomains of Posttraumatic Growth:** Univariate regression analyses predicting depression symptom severity among Syrian refugees are shown in table 3. Depression symptom severity was negatively associated with all posttraumatic growth subdomains. Among posttraumatic growth subdomains; personal strength ( $R^2: 0.18$ ) and appreciation of life ( $R^2: 0.16$ ) had larger effect sizes than the other subdomains.

**Path Analysis To Predict Depression Symptom Severity In A Single Model:** In order to predict depression symptom severity in a single

**Table 1.** Clinical scale scores of Syrian refugees distributed by sex (n=72)

	Male (n=39)	Female (n=33)			
	Mean±SD	Mean±SD	t	P	Cohen's d
PSQI global	6.79±3.57	5.93±3.4	1.02	0.30	0.16
PSQI-SQ	1.28 ±0.91	1.15±0.79	0.63	0.52	0.15
PSQI-SL	1.07± 0.83	1.30±0.91	-1.09	0.27	0.25
PSQI-SD	0.79± 0.95	0.48±0.87	1.43	0.15	0.33
PSQI-SE	0.66±1,15	0.42± 1.0	0.94	0.34	0.22
PSQI-SDis	1.38±0.67	1.27±0.62	0.72	0.47	0.17
PSQI-SM	0.58±0.96	0.30±0.68	1.42	0.15	0.33
PSQI-DD	1.0± 0.60	1.0± 0.82	<0.01	0.99	<0.01
BDI-total	15.15±12.14	17.06±11.48	-0.68	0.49	0.16
PTGI-total	61.10±20.61	63.72±15.19	-0.60	0.54	0.14
PTGI-RO	18.84±7.83	17.66±7.06	0.66	0.50	0.15
PTGI-NP	15.33±5.76	16.03±5.12	-0.53	0.59	0.12
PTGI-SC	5.38±2.62	5.60±2.12	-0.38	0.69	0.09
PTGI-PS	12.79±5.19	14.45±3.83	-1.51	0.13	0.35
PTGI-AL	8.74± 4.05	9.96±2.36	-1.52	0.13	0.36

PSQI: Pittsburgh Sleep Quality Index, SQ: Sleep Quality, SL: Sleep Latency, SD: Sleep Duration, SE: Sleep Efficiency, SDis: Sleep Disturbance, SM: Sleep Medication, DD: Daytime dysfunction, BDI: Beck Depression Inventory, PTGI: Post-Traumatic Growth Inventory, RO: Relating to Others, NP: New Possibilities, SC: Spiritual Change, PS: Personal Strength, AL: Appreciation of Life

model, a path analysis was used. Adequacy of model fit analyses showed satisfactory fit:  $\chi^2 (1, n = 72) = 0.14, p = 0.52, RMSEA = 0.00; SRMR = 0.01, GFI = 1.0; AGFI = 0.99$ . The path analyses showed that sleep quality mediated the association between trauma exposure and depression symptom severity. Trauma exposure was associated with sleep quality but not with depression symptom severity, directly. Furthermore, posttraumatic growth was negatively associated with depression symptom severity (Figure 1).

**Discussion**

The mean PTGI score of the participants shows moderate to high posttraumatic growth (36,37). The mean PTGI scores were higher than the scores of Syrian Refugees resettled in Jordan. Furthermore, the scores were also higher than the war related refugees of former Yugoslavia (15,38). To date, significant associations in a negative manner have been shown between posttraumatic growth and depression (10,38,39). In accordance with these results, we found a significant association between posttraumatic growth and depression symptom severity supporting our hypothesis. Furthermore, the associations were significant with all subdomains of PTGI. The

associations were stronger with personal strength and appreciation of life subdomains.

Contrary to our hypothesis, but in line with a previous study on posttraumatic growth among former political prisoners (40), demographic factors including age and marital status were not significantly associated with posttraumatic growth. Previous studies reported important associations between socio-economic factors and beneficial transformation of the life-threatening experience, as higher socio-economic status was associated with higher levels of personal strength (15,40). In those studies, socioeconomic status was mainly based on income. Unemployment and presence of public financial support, which were our main assessments related to socioeconomic status, did not show such an association. The inconsistency between the results may be due to the difference in the variables used.

Duration of stay in Turkey was not associated with posttraumatic growth. Previous studies showed contradictory results on the association between length of time since the traumatic exposure and the level of posttraumatic growth (2,16). The inconsistency between results may be due to different characteristics of the samples. As expected, posttraumatic growth had a significant association with having no history of psychiatric

**Table 2.** Univariate regression analysis predicting posttraumatic growth outcome by sociodemographics and traumatic event types

	B	95% CI	p
<b>Sociodemographics</b>			
Sex (female)	2.62	-6.0 -- 11.27	0.54
Age (years)	0.24	-0.19 -- 0.68	0.26
Marital (non-married)	-7.04	-15.8 -- 1.79	0.11
Employment (unemployed)	-2.9	-11.58 -- 5.75	0.50
Education (at least high school)	-1.0	-10.97 -- 8.97	0.84
Public financial support (none)	2.28	-6.69 -- 11.26	0.61
Cigarette use (none)	6.82	-1.75 -- 15.39	0.11
Alcohol use (none)	7.6	-2.37 -- 17.65	0.13
Past psychiatric illness (none)	29.11	3.74 -- 54.47	0.02
Duration in Turkey (more than 2 years)	-4.18	-14.53 -- 6.15	0.42
<b>Experienced traumatic events</b>			
Bombing	-11.58	-24.35 -- 1.18	0.07
Armed assault	1.03	-7.72 -- 9.80	0.81
Physically harmed	-6.4	-15.4 -- 2.48	0.15
Tortured	-5.24	-13.85 -- 3.36	0.22
Taking hostages	0.59	-8.05 -- 9.23	0.89
Sexual violence	-6.31	-14.84 -- 2.20	0.14
Extortion	2.68	-6.5 -- 11.9	0.56

**Table 3.** Regression analyses predicting depression symptom severity outcome by subscales of posttraumatic growth

	B	95% CI	P
Age	-0.37	-0.64 -- -0.1	0.009
PTGI-total	-0.26	-0.40 -- -0.12	<0.001
PTGI-SC	-1.17	-2.30 -- -0.21	0.04
PTGI-PS	-1.09	-1.64 -- -0.55	<0.001
PTGI-NP	-0.57	-1.07 -- -0.07	0.026
PTGI-RO	-0.41	-0.78 -- -0.05	0.024
PTGI-AL	-1.36	-2.12 -- -0.59	0.001

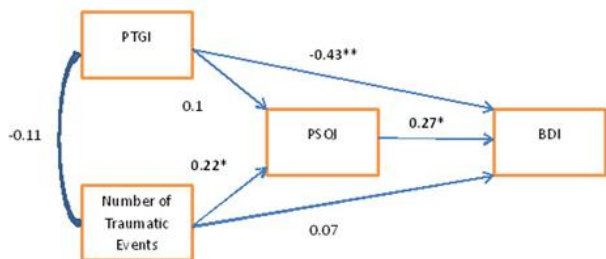
PTGI: Post-Traumatic Growth Inventory, SC: Spiritual Change, PS: Personal Strength, NP: New Possibilities, RO: Relating to Others, AL: Appreciation of Life

disorder. Furthermore, no significant associations between certain traumatic event types and posttraumatic growth was found, in line with a previous study (41). This is reasonable because posttraumatic growth theory does not address specific types of traumas.

Our results showed no large or significant differences of depression severity, sleep quality and posttraumatic growth scores between genders. However, females showed slightly higher (but non-significant) scores on some subdomains of posttraumatic growth (e.g. personal strength and appreciation of life). Depression symptom severity

is commonly higher in female populations than males (42). Almost all of the participants (93.66%) had a history of at least one traumatic experience. The no large or non-significant difference in depression severity scores between genders found in our sample may be due to the slightly higher posttraumatic growth subdomain scores among females. However, this interpretation needs further investigation.

The results of the path analysis including the number of traumatic event types, sleep quality, posttraumatic growth and depression symptom severity endorsed the hypothesized associations.



**Fig. 1.** Model representing the associations between post traumatic growth, number of traumatic events, sleep quality, and sleep depression (n = 72). BDI: Beck Depression Inventory, PTGI: Post-Traumatic Growth Inventory, PSQI: Pittsburgh Sleep Quality Index Note: Standardized regression weights for all paths are presented. Significant paths are indicated with bold (p < 0.05 \*, p < p.01 \*\*). Error variables are not presented for clarity.

The path model showed that sleep quality mediated the association between trauma exposure and depression symptom severity. Furthermore, increasing posttraumatic growth was significantly associated with less depression symptom severity. This proposes that the presence of poor sleep quality increases the risk of developing depression symptoms associated with trauma exposure in refugees. This is in line with previous findings demonstrating that a good sleep quality predicts better outcomes of trauma therapy (43). Considering our findings, it may be hypothesised that improving sleep quality may have protective effects for the depressive effects of trauma exposure in refugee populations. However, this result warrants caution and needs to be tested in randomized clinical trials.

There are limited number of studies that have investigated the associations between posttraumatic growth, depressive symptoms and sleep quality, specifically among refugees. As far as we are aware, this is the first study assessing the associations between positive changes related to traumatic events, sleep quality and depressive symptoms among refugees. In the context of clinical intervention strategy, the improvement of sleep quality may be a good target for the prevention and also better treatment outcomes of trauma-related psychological distress including depression symptoms.

The following limitations should be taken into account while considering the results. First, even though the number of participants (n: 72) is similar to the studies with a similar design (1,2), the sample size can be considered as relatively small. This may have led to insufficient power in some analyses. However, adequacy of model fit analyses showed satisfactory fit for the path

model. Furthermore, effect size measures were calculated and interpreted for power issues. Second, due to the lack of a control group, we were not able to introduce control comparisons. Third, we do not have the PTSD rates of the participants, which might have value in this sample. Finally the cross-sectional design of the study prevents the assumptions of causality for the demonstrated associations (i.e. the development of psychological growth or symptoms and affecting factors over time).

Most of the clinicians treating war related refugees have the primary focus to decrease psychiatric symptoms. However, promoting the positive changes is also important. Our findings call for further investigation of the associations between traumatic event types and sleep problems which may lead to more effective intervention programs for refugees. Social and mental support programs as well as clinical interventions should focus on increasing sleep quality and better traumatic growth. Further studies need to explore the factors that conduce to traumatic growth in the Syrian refugee population.

**Declaration of Conflicting Interests:** The authors declared no potential conflicts of interest with respect to the authorship and/or publication of this article.

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