

## BRIEF REPORT

# Associations between sleep problems and posttraumatic stress symptoms, social functioning, and quality of life in refugees with posttraumatic stress disorder

Hannah Schumm<sup>1</sup>  | Regina Steil<sup>2</sup>  | Franziska Lechner-Meichsner<sup>2,3</sup>  |  
Nexhmedin Morina<sup>4</sup>  | Cornelia Weise<sup>5</sup>  | Ricarda Mewes<sup>6</sup>  | Sascha Kuck<sup>4</sup>  |  
Julia Reuter<sup>2</sup> | Julia Giesebrecht<sup>5</sup> | Barbara Cludius<sup>1</sup> | Thomas Ehring<sup>1</sup> 

<sup>1</sup>Department of Psychology, Ludwig Maximilian University of Munich, Munich, Germany

<sup>2</sup>Department of Psychology, Goethe University Frankfurt, Frankfurt, Germany

<sup>3</sup>Department of Psychology, Utrecht University, Utrecht, Netherlands

<sup>4</sup>Institute of Psychology, University of Münster, Münster, Germany

<sup>5</sup>Department of Psychology, Philipps-University of Marburg, Marburg, Germany

<sup>6</sup>Faculty of Psychology, University of Vienna, Vienna, Austria

## Correspondence

Hannah Schumm, Department of Psychology, LMU Munich, Leopoldstr. 13, Munich, Germany.  
Email: [Hannah.Schumm@psy.lmu.de](mailto:Hannah.Schumm@psy.lmu.de)

## Funding information

Bundesministerium für Bildung und Forschung, Grant/Award Number: 01EF1804C

## Abstract

Many patients with posttraumatic stress disorder (PTSD) suffer from sleep problems, leading to impairments in social functioning and quality of life. Refugees are at high risk for sleep problems due to stressful life circumstances and a high PTSD prevalence. However, limited data on the frequency of sleep problems in refugees with diagnosed PTSD exist. This study examined the frequency of sleep problems in refugees with PTSD and their associations with symptoms of PTSD. Additionally, we investigated the contribution of sleep problems to social functioning and quality of life. Participants ( $N = 70$ ) were refugees from different countries of origin currently living in Germany. All participants met the criteria for PTSD and completed measures of PTSD symptom severity, subjective sleep problems, social impairment, and quality of life. There was a very high frequency of sleep problems in the sample (100%), and sleep problems were significantly associated with both clinician-rated,  $r = .47$ , and self-rated,  $r = .30$ , PTSD symptom severity after controlling for overlapping items. Contrary to expectations, sleep problems did not predict social impairment,  $d = 0.16$ , nor quality of life,  $d = 0.13$ , beyond the effect of other PTSD symptoms. The findings highlight the widespread frequency of sleep problems among refugees. Future studies should assess the causal nature of the association between sleep problems and measures of psychosocial functioning in more detail and examine its dynamic change over time.

Many patients with posttraumatic stress disorder (PTSD) suffer from severe sleep problems, such as difficulties initiating and maintaining sleep or nightmares (Koffel et al., 2016; Pruiksma et al., 2016). Moreover, sleep problems are highly correlated with PTSD symptom severity

(Cox et al., 2018) and often persist following PTSD treatment (Pruiksma et al., 2016). A population with a high prevalence of sleep problems in general, as well as a high risk of PTSD, is refugees (Richter et al., 2018, 2020). Refugees differ from many other trauma-exposed

This is an open access article under the terms of the [Creative Commons Attribution-NonCommercial-NoDerivs](https://creativecommons.org/licenses/by-nc-nd/4.0/) License, which permits use and distribution in any medium, provided the original work is properly cited, the use is non-commercial and no modifications or adaptations are made.

© 2023 The Authors. *Journal of Traumatic Stress* published by Wiley Periodicals LLC on behalf of International Society for Traumatic Stress Studies.

populations in that they have often experienced prolonged and repeated traumatic events in their country of origin and during their flight. Moreover, after arriving in the host country they encounter numerous postmigration living difficulties, such as a lack of resources, family separation, or asylum policies, which can negatively impact psychosocial functioning (Li et al., 2016). Moreover, refugees often live in facilities with several hundreds of people, sharing a room with strangers. Unsurprisingly, previous research has demonstrated an extremely high prevalence of sleep problems among refugees. For example, in a sample of over 700 refugees with PTSD, Sandahl et al. (2017) found that almost all participants (99.1%) had trouble sleeping. Moreover, in a sample of refugees and asylum seekers, Lies et al. (2019) found that 75.5% of participants reported moderate-to-severe sleep difficulties, and a recent review by Richter et al. (2020) established a prevalence of sleep problems in refugees ranging from 39% to 99%. Despite the high risk of PTSD in this population, only two studies (Sandahl et al., 2017, 2021) have investigated the prevalence of sleep problems in refugees with diagnosed PTSD. However, Sandahl et al. (2017) measured sleep problems using a single item with unknown psychometric properties, which cannot capture the multidimensionality of sleep problems. The first aim of the present study was, therefore, to investigate the frequency of sleep problems among refugees with PTSD in Germany using a multidimensional questionnaire. Second, we aimed to assess the association between sleep problems and PTSD symptom severity in the sample.

Another study aim was to investigate the contribution of sleep problems to social functioning and quality of life, over and above the effect of other symptoms of PTSD. Considering the need to cope with numerous postmigration living difficulties and adapt to a new environment and culture, adequate social functioning is immensely important for refugees. Impaired sleep may deplete emotional and cognitive resources and negatively impact social functioning. Additionally, health-related quality of life is essential for participation in the labor market and the formation of close relationships in one's host country. Yet, research suggests that sleep problems have detrimental effects on social functioning and quality of life (Krakow et al., 2002). Further, studies have demonstrated that sleep problems are associated with worse psychosocial functioning in refugees with and without PTSD (Lies et al., 2019; Sandahl et al., 2021).

Despite important insights from these studies on the association between psychosocial functioning and sleep problems in refugees, methodological limitations exist. Lies et al. (2019) did not use PTSD diagnosis as an inclusion criterion and used a single item to assess sleep problems. Sandahl et al. (2021) assessed sleep problems in

refugees with PTSD using a multidimensional instrument (i.e., the Pittsburgh Sleep Quality Index; PSQI) but did not consider known risk factors for refugee mental health, such as residence status or time in the host country, and incorporated existing clinical sleep problems into the inclusion criteria. Furthermore, the impact of sleep problems on quality of life in refugees with PTSD remains unstudied. Therefore, further investigation on the potential negative effects of sleep problems on psychosocial functioning and quality of life among this population is needed.

The present study included a treatment-seeking sample of refugees with PTSD and assessed self-reported and clinician-rated PTSD symptom severity and self-reported sleep problems, social impairment, and quality of life. We hypothesized that we would find a positive association between subjective sleep problems and both self-reported and clinician-rated PTSD symptoms. In addition, we expected that self-reported sleep problems would positively predict social impairment over and above the effect of other self-reported PTSD symptoms. Finally, we hypothesized that self-reported sleep problems would predict a lower quality of life over and above the effect of other self-reported symptoms of PTSD.

## METHOD

### Participants and procedure

Data were drawn from a large multicenter randomized controlled trial comparing imagery rescripting with treatment as usual in refugees with PTSD. A full description of the trial and intervention conditions can be found in the study protocol (Steil et al., 2021). The ethics committee of the German Psychological Association approved the study (SteilRegina2019-10-18-VA, SteilRegina2020-02-26AM), and all participants provided written informed consent. Inclusion criteria were a primary diagnosis of PTSD according to the *Diagnostic and Statistical Manual of Mental Disorders (DSM-5; American Psychiatric Association, 2013)*; having entered Germany as a refugee, (independent of current asylum status); age between 18 and 65 years; and motivation for trauma-focused treatment. Exclusion criteria were a lifetime diagnosis of psychosis, bipolar disorder, or substance dependence; acute suicide risk; and a change in psychopharmacological medication within the previous month. Baseline data from 70 participants included in the trial between February 2020 and July 2022 were used for the present study. At baseline, diagnostic interviews were conducted to assess the inclusion and exclusion criteria as well as PTSD symptom severity, and patients filled out a set of questionnaires. Interviews

were conducted in English and German. For participants who were not fluent in either language, a trained interpreter translated during the interview. Previously validated versions of the questionnaires were provided in English, German, Arabic, and Farsi. If a participant spoke Pashto ( $n = 11$ ) or was unable to complete a questionnaire due to literacy issues, an interpreter read the questions aloud and recorded the answers.

## Measures

### PTSD symptom severity

#### *Clinician-rated symptoms and PTSD diagnosis*

The Clinician-Administered PTSD Scale for *DSM-5* (CAPS-5; Weathers et al., 2013) is a structured clinical interview that is used to assess posttraumatic stress symptoms and PTSD diagnostic status. Symptoms are rated on a 5-point Likert scale ranging from 0 (absent) to 4 (extreme), and a total severity score is calculated by summing the scores for all 20 symptoms. The CAPS is considered the gold standard in PTSD assessment and has shown strong interrater reliability and good convergent validity (Weathers et al., 2018). In the present sample, the CAPS-5 total score demonstrated good internal consistency, Cronbach's  $\alpha = .83$ .

#### *Self-reported PTSD symptoms*

The International Trauma Questionnaire (ITQ; Cloitre et al., 2018) is an 18-item, self-report measure that is used to assess PTSD symptom severity and disturbances in self-organization according to the *International Statistical Classification of Diseases and Related Health Problems* (11th ed.; *ICD-II*; World Health Organization [WHO], 2019) and has demonstrated sound psychometric properties (Cloitre et al., 2018). Respondents rate their distress caused by each symptom on a 5-point scale ranging from 0 (*not at all*) to 4 (*extremely*). We calculated a total score for the six core *ICD-II* PTSD items according to scoring guidelines (Cloitre et al., 2018). In the present sample, the ITQ exhibited adequate internal consistency for the six PTSD items, Cronbach's  $\alpha = .73$ .

#### *PTSD symptoms excluding sleep items*

To avoid overlap with other measures of sleep problems and the artificial inflation of associations in our analyses, we also calculated modified total scores that excluded CAPS-5 and ITQ items assessing nightmares or sleep problems. This encompassed CAPS-5 Items B2 ("nightmares") and E6 ("sleep disturbances") and ITQ Item P1 ("upsetting dreams"). The modified scores were used for all analyses.

### Sleep problems

The PSQI (Buysse et al., 1989) is a 19-item self-report measure of past-month sleep problems. The items cover seven components, including subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, the use of sleep medication, and daytime dysfunction. Each component is rated on a 0–3 severity scale to indicate the frequency of each problem, with total scores ranging from 0 to 21. A total score of 5 or higher indicates clinically significant sleep problems. The PSQI has demonstrated strong validity and reliability (Mollayeva et al., 2016). In the current sample, Cronbach's alpha was .76.

### Social impairment

The General Health Questionnaire (GHQ-28; Goldberg et al., 1997) is a screening instrument for general psychological health, containing four subscales: Somatic Symptoms, Anxiety, Depression, and Social Impairment. For the present analyses, only the seven-item Social Impairment subscale was used. Items are rated on a 4-point scale ranging from 0 (*not at all*) to 3 (*much more than usual*), with higher scores indicating higher levels of social impairment. The GHQ-28 has demonstrated validity across different languages (Goldberg et al., 1997) and has been used in refugee samples (Kalafi et al., 2002). In the present sample, the GHQ-28 Social Impairment subscale demonstrated adequate internal consistency, Cronbach's  $\alpha = .79$ .

### Health-related quality of life

The European Quality of Life 5 Dimensions questionnaire (EQ-5D-5L; EuroQol Group, 2019) was used to assess health-related quality of life. The measure has been used across a wide range of settings and has shown strong construct validity and reliability (Feng et al., 2021). The usually recommended country-specific utility scores were not applicable in the present study due to the heterogeneity of the sample in terms of country of origin; thus, a total sum score was calculated instead. The EQ-5D demonstrated rather low internal consistency in the current sample, Cronbach's  $\alpha = .65$ .

### Data analysis

Analyses were performed using R (Version 4.2.0; R Core Team, 2022). Descriptive statistics were calculated to examine the frequency of sleep problems. Pearson correlation

analyses were conducted to test the associations between sleep problems and self-reported and clinician-rated PTSD severity using modified total scores that excluded items related to sleep problems and nightmares. Two separate hierarchical multiple regression analyses were conducted to test our hypotheses regarding the contribution of sleep problems as a predictor of social impairment and health-related quality of life, with social impairment (GHQ-28 Social Impairment subscale) and quality of life (EQ-5D) as outcomes. This approach allowed us to test the effects of specific predictors while controlling for the influence of other predictors. In the first step, demographic variables (i.e., age, residence status, time since arrival, housing situation) identified as risk factors for refugee mental health in previous research (Steel et al., 2006) were entered. To control for other symptoms of PTSD and clarify the individual contribution of sleep problems as a predictor, PTSD symptom severity (ITQ modified total score) was entered in the second step. In the third step, sleep problems (PSQI total score) were added. Our analysis had high power (i.e., .81) to detect incremental variances of medium effect sizes in the last step ( $f^2 = .18$ ). Missing values for sociodemographic data are indicated in Table 1. As less than 4% of data were missing on the PSQI, listwise deletion was applied, resulting in 10% missing global scores. No data were missing on any other self-report questionnaires or on the CAPS-5.

## RESULTS

### Descriptive statistics

Demographic and clinical sample characteristics and descriptive statistics are shown in Table 1. Participants ranged in age from 18 to 62 years ( $M = 31.12$  years,  $SD = 11.25$ ). A total of 65.7% of the sample was male. Participants came from various countries, with the largest group coming from Afghanistan. Participants differed in asylum status and, therefore, work permit.

### Frequency of sleep problems

Global PSQI scores ranged from 6 to 21 ( $M = 14.32$ ,  $SD = 4.02$ ), with 100.0% of participants scoring above the clinical cutoff of 5 points. A total of 85.3% of participants rated their sleep quality as “fairly bad” or “very bad,” and only 8.7% reported that they slept the recommended 8 hr per night. In total, 34.8% of participants reported sleeping, on average, less than 4 h per night, and 71.6% of participants reported that it was “somewhat” of a problem or a “very big” problem to have enough energy to fulfill everyday tasks.

## Association between sleep problems and PTSD severity

In line with our hypotheses, we found a positive, moderate correlation between self-reported sleep quality (PSQI) and other self-reported PTSD symptoms (ITQ),  $r = .30$ ,  $p = .016$ . We also found a positive, moderate correlation between self-reported sleep quality and other clinician-rated PTSD symptoms (CAPS),  $r = .47$ ,  $p < .001$ .

### Role of sleep problems in social impairment

The results of hierarchical multiple regressions predicting social impairment are presented in Table 2. In the first step, only residence status was a significant predictor. In the second step, PTSD severity significantly predicted social impairment,  $F(1, 60) = 18.13$ ,  $p < .001$ , accounting for an additional 21% of the variance. Contrary to our hypotheses, when sleep problems were entered as an additional predictor, the model did not significantly improve,  $F(1, 52) = 1.39$ ,  $p = .241$ .

### Role of sleep problems in quality of life

Results of hierarchical multiple regressions predicting quality of life are presented in Table 2. In the first step, none of the demographic variables was a significant predictor. When PTSD severity was entered into the model in the second step, model fit was significantly improved,  $F(1, 60) = 17.80$ ,  $p < .001$ , and accounted for an additional 22% of the variance. Contrary to our hypotheses, when sleep problems were entered as an additional predictor of quality of life, it did not significantly improve the model,  $F(1, 52) = 1.02$ ,  $p = .323$ .

## DISCUSSION

This study aimed to use a multidimensional questionnaire to assess the frequency of sleep problems among refugees with PTSD in Germany. Additionally, we explored the associations between sleep problems and other PTSD symptoms as well as their impact on social functioning and quality of life.

We found a high frequency of severe sleep problems among refugees with PTSD in Germany. The entire sample exceeded the threshold for clinically relevant sleep problems, with participants reporting poor sleep quality and a lack of energy for daily tasks. These findings align

TABLE 1 Baseline demographic and clinical characteristics.

Variable	%	<i>M</i>	<i>SD</i>
Gender			
Male	65.7		
Female	31.4		
Other	2.9		
Age (years)		31.12	11.25
Country of origin <sup>a</sup>			
Afghanistan	40.3		
Syria	14.9		
Iraq	6.0		
Nigeria	6.0		
Sierra Leone	6.0		
Iran	4.5		
Bosnia	3.0		
Jordan	3.0		
Turkey	3.0		
Other <sup>b</sup>	13.5		
Residence status <sup>a</sup>			
Secure	65.7		
Insecure	34.3		
Time since arrival in Germany (years) <sup>c</sup>		4.98	4.90
Formal education (years) <sup>c</sup>		8.88	4.24
< 5	15.2		
5–8	24.2		
9–12	50.0		
> 12	10.6		
Housing situation <sup>a</sup>			
Own apartment	28.4		
Living with friends/family	11.9		
Community housing facility	59.7		
Currently employed <sup>a</sup>	34.3		
Clinician-rated PTSD severity (CAPS)		40.77	11.32
Self-reported PTSD severity (ITQ)		16.34	5.79
Social impairment (GHQ-28 Social Impairment subscale)		12.43	4.61
Subjective quality of life (EQ-5D)		11.96	4.65

Notes: PTSD = posttraumatic stress disorder; CAPS = Clinician-Administered PTSD Scale for DSM-5; ITQ = International Trauma Questionnaire; GHQ-28 = General Health Questionnaire; EQ-5D = European Quality of Life Questionnaire; PSQI = Pittsburgh Sleep Quality Index.

<sup>a</sup>*n* = 67.

<sup>b</sup>One participant each from Cameroon, Eritrea, Gaza, Guinea, Kuwait, Nigeria, Paraguay, Saudi Arabia, and Tanzania.

<sup>c</sup>*n* = 66.

with results reported by Sandahl et al. (2017, 2021), who assessed sleep problems among refugees with PTSD in Denmark. Our study extends these findings by focusing on refugees with PTSD in Germany and utilizing a multi-dimensional sleep inventory. Interestingly, the results are comparable to Sandahl and colleagues' (2021) findings, although, in contrast to that study, we did not employ sleep problems as an inclusion criterion. This underlines the sig-

nificance of sleep problems in treatment-seeking refugees with PTSD and strengthens the generalizability of our findings to refugees who are not specifically seeking treatment for sleep problems. Previous studies that have explored sleep problems in refugees without diagnosed PTSD have reported lower prevalence rates, with only about half of the participants exceeding clinical thresholds for insomnia (e.g., Lies et al., 2021). The higher frequency of sleep

**TABLE 2** Hierarchical regression analyses predicting social impairment and quality of life.

Variable	$R^2$ (adjusted)	$\Delta R^2$	$B$	$SE B$	$\beta$	$p$
<b>Outcome: Social impairment (GHQ-28 Social Impairment subscale)</b>						
Step 1	.09 (.03)	.09				
Age			-.06	.13	-.06	.610
Residence status			.26	.13	.26	.048
Time in Germany			-.19	.13	-.19	.172
Housing situation			-.15	.13	-.15	.251
Step 2	.30 (.25)	.21			.48	< .001
PTSD severity (ITQ)			.49	.12	.12	< .001
Step 3	.26 (.18)	-.04				.241
Sleep problems (PSQI)			.15	.12	.16	.241
<b>Outcome: Quality of life (EQ-5D)</b>						
Step 1	.06 (-.00)	.06				.452
Age			.10	.13	.10	.461
Residence status			.18	.14	.18	.190
Time in Germany			-.18	.14	-.18	.201
Housing situation			-.12	.13	-.12	.383
Step 2	.27 (.21)	.22				< .001
PTSD symptom severity (ITQ)			.51	.12	.49	< .001
Step 3	.29 (.21)	.02				.323
Sleep problems (PSQI)			.12	.12	.13	.323

Note: GHQ-28 = General Health Questionnaire; ITQ = International Trauma Questionnaire; PSQI = Pittsburgh Sleep Quality Index; EQ-5D = European Quality of Life Questionnaire.

problems in our sample may be attributed to PTSD, which is known to be associated with sleep disturbances and frequent nightmares.

Regarding the second study aim, we found a significant association between poorer sleep and higher levels of PTSD symptom severity across a clinical interview and a self-report questionnaire. These results align with previous findings in nonrefugee patients with PTSD (Cox et al., 2018) and trauma-affected refugees both with and without a PTSD diagnosis (Lies et al., 2019; Sandahl et al., 2021). Our study extends these findings by demonstrating a similar pattern using clinician-rated PTSD symptom severity. To ensure the validity of the associations, we adjusted measures of PTSD symptoms to exclude sleep-related items, which previous studies have often neglected to do. Our results provide a more accurate estimation of the association between sleep problems and PTSD in refugees. Likely, the association between sleep problems and PTSD symptoms is reciprocal, with daytime PTSD symptoms, such as hyperarousal, contributing to impaired sleep and, in turn, poor sleep exacerbating daytime PTSD symptoms.

Surprisingly, we did not find that sleep problems predicted social impairment or quality of life beyond other posttraumatic stress symptoms in refugees with PTSD. No previous study has examined the impact of sleep problems on quality of life in refugees, and only one study has

explored the role of sleep problems in predicting social impairment in refugees with PTSD (Sandahl et al., 2021). Several explanations may account for the lack of significant results in the present study, among them methodological considerations. First, sleep problems showed restricted variance and ceiling effects, with the entire sample reporting high levels of sleep problems that fell above clinical thresholds, possibly leading to nonsignificant findings. Secondly, the predictors—self-reported PTSD severity and sleep problems—were moderately correlated. Such multicollinearity, albeit small, can reduce the statistical power to detect statistically significant independent variables and lead to nonsignificant findings (Pettit & Belsley, 1992). Third, the substantial impact of PTSD symptom severity on both outcomes may have outweighed the contribution of sleep problems, rendering the additional contribution of sleep problems negligible. Additionally, participants in our sample primarily sought treatment for PTSD rather than sleep problems specifically. In contrast, Sandahl et al. (2021) included a sample of individuals who were specifically seeking treatment for both PTSD and sleep problems, which may have increased the effect of sleep problems on social functioning in their study compared to ours.

The present study had several limitations. The reliance on self-report measures and lack of objective measures of

sleep quality warrant caution in interpreting the findings. Objective and subjective measures of sleep may differ in PTSD samples (Werner et al., 2016), although patients do not generally overestimate their sleep problems (Ghadami et al., 2014). Second, for Pashto speakers and illiterate participants, an interpreter was required. Although such a procedure is common in studies investigating refugees, the validity of using interpreter-assisted assessment so far remains unclear. Third, the sample was limited to PTSD treatment-seeking refugees, reducing the generalizability of the results. However, the sample is representative of refugees in Germany with regard to gender, age, and country of origin (German Federal Office for Migration and Refugees, 2023).

In sum, the present study shows that an alarming number of participants reported insufficient energy for daily tasks due to sleep problems and highlights the need for further research on the impact of sleep problems on psychosocial measures in refugees with PTSD. Furthermore, the study emphasizes that PTSD symptom severity is the strongest predictor of quality of life and social functioning. Effective PTSD treatment is recommended to alleviate these impairments. However, López et al. (2017) argued that sleep problems may hinder the response to PTSD treatment. Thereby, the already scarce treatment options for refugees might be underutilized, further risking a chronic course of the disorder. Future studies should explore whether sleep problems improve sufficiently during trauma-focused treatment or if additional interventions are necessary for this group. One possibility could be cognitive behavioral therapy for insomnia (i.e., CBT-I), which has been shown to be effective in patients with PTSD (Talbot et al., 2014).

## OPEN PRACTICES STATEMENT

The study from which the data were drawn was pre-registered in the German Clinical Trials Register (DRKS00019876). The study reported in this article was not formally preregistered. Neither the data nor the materials have been made available on a permanent third-party archive; requests for the data or materials should be sent via email to the lead author at [hannah.schumm@psy.lmu.de](mailto:hannah.schumm@psy.lmu.de).

## AUTHOR NOTE

As part of the ReCAP consortium ([www.project-recap.de](http://www.project-recap.de)), this study has been funded by the German Federal Ministry of Education and Research (01EF1804C).


The authors have no conflicts of interest to declare.

## ORCID

Hannah Schumm  <https://orcid.org/0000-0002-2485-0531>

Regina Steil  <https://orcid.org/0000-0002-5367-5664>

Franziska Lechner-Meichsner  <https://orcid.org/0000-0002-7227-1905>

Nexhmedin Morina  <https://orcid.org/0000-0002-2331-9140>

Cornelia Weise  <https://orcid.org/0000-0001-5216-1031>

Ricarda Mewes  <https://orcid.org/0000-0002-4724-9597>

Sascha Kuck  <https://orcid.org/0000-0003-3022-2766>

Thomas Ehring  <https://orcid.org/0000-0001-9502-6868>

## REFERENCES

- American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). <https://doi.org/10.1176/appi.books.9780890425596>
- Buysse, D. J., Reynolds, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: A new instrument for psychiatric practice and research. *Psychiatry Research*, 28(2), 193–213. [https://doi.org/10.1016/0165-1781\(89\)90047-4](https://doi.org/10.1016/0165-1781(89)90047-4)
- Cloitre, M., Shevlin, M., Brewin, C. R., Bisson, J. I., Roberts, N. P., Maercker, A., Karatzias, T., & Hyland, P. (2018). The International Trauma Questionnaire: Development of a self-report measure of ICD-II PTSD and complex PTSD. *Acta Psychiatrica Scandinavica*, 138(6), 536–546. <https://doi.org/10.1111/acps.12956>
- Cox, R. C., Alex McIntyre, W., & Olatunji, B. O. (2018). Interactive effects of insomnia symptoms and trauma exposure on PTSD: Examination of symptom specificity. *Psychological Trauma: Theory, Research, Practice, and Policy*, 10(5), 508–514. <https://doi.org/10.1037/TRA0000336>
- EuroQol Research Foundation. (2020). *EQ-5D-Y user guide* (Version 2.0). <https://euroqol.org/publications/user-guides/>
- Feng, Y. S., Kohlmann, T., Janssen, M. F., & Buchholz, I. (2021). Psychometric properties of the EQ-5D-5L: A systematic review of the literature. *Quality of Life Research*, 30(3), 647–673. <https://doi.org/10.1007/s11136-020-02688-y>
- German Federal Office for Migration and Refugees. (2023). *National figures on asylum*. <https://www.bamf.de/SharedDocs/Anlagen/DE/Statistik/BundesamtinZahlen/bundesamt-in-zahlen-2022-asyl.html>
- Ghadami, M. R., Khaledi-Paveh, B., Nasouri, M., & Khazaie, H. (2014). PTSD-related paradoxical insomnia: An actigraphic study among veterans with chronic PTSD. *Journal of Injury and Violence Research*, 7(2), 54–58. <https://doi.org/10.5249/jivr.v7i2.607>
- Goldberg, D. P., Gater, R., Sartorius, N., Ustun, T. B., Piccinelli, M., Gureje, O., & Rutter, C. (1997). The validity of two versions of the GHQ in the WHO study of mental illness in general health care. *Psychological Medicine*, 27(1), 191–197. <https://doi.org/10.1017/S0033291796004242>
- Kalafi, Y., Hagh-Shenas, H., & Ostovar, A. (2002). Mental health among Afghan refugees settled in Shiraz, Iran. *Psychological Reports*, 90(1), 262–266. <https://doi.org/10.2466/PRO.2002.90.1.262>
- Koffel, E., Khawaja, I. S., & Germain, A. (2016). Sleep disturbances in posttraumatic stress disorder: Updated review and implications for treatment. *Psychiatric Annals*, 46(3), 173–176. <https://doi.org/10.3928/00485713-20160125-01>

- Krakow, B., Melendrez, D., Johnston, L., Warner, T. D., Clark, J. O., Pacheco, M., Pedersen, B., Koss, M., Hollifield, M., & Schrader, R. (2002). Sleep-disordered breathing, psychiatric distress, and quality of life impairment in sexual assault survivors. *Journal of Nervous and Mental Disease*, *190*(7), 442–452. <https://doi.org/10.1097/00005053-200207000-00004>
- Li, S. S. Y., Liddell, B. J., & Nickerson, A. (2016). The relationship between postmigration stress and psychological disorders in refugees and asylum seekers. *Current Psychiatry Reports*, *18*(9), 1–9. <https://doi.org/10.1007/S11920-016-0723-0/METRICS>
- Lies, J., Jobson, L., Mascaro, L., Whyman, T., & Drummond, S. P. A. (2021). Postmigration stress and sleep disturbances mediate the relationship between trauma exposure and posttraumatic stress symptoms among Syrian and Iraqi refugees. *Journal of Clinical Sleep Medicine*, *17*(3), 479–489. <https://doi.org/10.5664/JCSM.8972>
- Lies, J., Mellor, A., Jobson, L., & Drummond, S. P. A. (2019). Prevalence of sleep disturbance and its relationships with mental health and psychosocial issues in refugees and asylum seekers attending psychological services in Australia. *Sleep Health*, *5*(4), 335–343. <https://doi.org/10.1016/j.sleh.2019.06.002>
- López, C. M., Lancaster, C. L., Gros, D. F., & Acierno, R. (2017). Residual sleep problems predict reduced response to prolonged exposure among veterans with PTSD. *Journal of Psychopathology and Behavioral Assessment*, *39*(4), 755–763. <https://doi.org/10.1007/s10862-017-9618-6>
- Mollayeva, T., Thurairajah, P., Burton, K., Mollayeva, S., Shapiro, C. M., & Colantonio, A. (2016). The Pittsburgh Sleep Quality Index as a screening tool for sleep dysfunction in clinical and non-clinical samples: A systematic review and meta-analysis. *Sleep Medicine Reviews*, *25*, 52–73. <https://doi.org/10.1016/J.SMRV.2015.01.009>
- Pettit, L., & Belsley, D. A. (1992). Conditioning diagnostics: Collinearity and Weak data in regression. *Applied Statistics*, *41*(3), 601–601. <https://doi.org/10.2307/2348093>
- Pruiksma, K. E., Taylor, D. J., Wachen, J. S., Mintz, J., Young-McCaughan, S., Peterson, A. L., Yarvis, J. S., Borah, E. V., Dondanville, K. A., Litz, B. T., Hembree, E. A., & Resick, P. A. (2016). Residual sleep disturbances following PTSD treatment in active duty military personnel. *Psychological Trauma: Theory, Research, Practice, and Policy*, *8*(6), 697–701. <https://doi.org/10.1037/tra0000150>
- R Core Team. (2022). *R: A language and environment for statistical computing* [computer software]. <https://www.r-project.org/>
- Richter, K., Baumgärtner, L., Niklewski, G., Peter, L., Köck, M., Kellner, S., Hillemacher, T., & Büttner-Teleaga, A. (2020). Sleep disorders in migrants and refugees: A systematic review with implications for personalized medical approach. *EPMA Journal*, *11*(2), 251–260. <https://doi.org/10.1007/S13167-020-00205-2>
- Richter, K., Peter, L., Lehfeld, H., Zäske, H., Brar-Reissinger, S., & Niklewski, G. (2018). Prevalence of psychiatric diagnoses in asylum seekers with follow-up. *BMC Psychiatry*, *18*(1), 1–7. <https://doi.org/10.1186/S12888-018-1783-Y/TABLES/3>
- Sandahl, H., Carlsson, J., Sonne, C., Mortensen, E. L., Jennum, P., & Baandrup, L. (2021). Investigating the link between subjective sleep quality, symptoms of PTSD, and level of functioning in a sample of trauma-affected refugees. *Sleep*, *44*(9), Article zsab063. <https://doi.org/10.1093/sleep/zsab063>
- Sandahl, H., Vindbjerg, E., & Carlsson, J. (2017). Treatment of sleep disturbances in refugees suffering from post-traumatic stress disorder. *Transcultural Psychiatry*, *54*(5–6), 806–823. <https://doi.org/10.1177/1363461517746314>
- Steel, Z., Silove, D., Brooks, R., Momartin, S., Alzuhairi, B., & Susljik, I. (2006). Impact of immigration detention and temporary protection on the mental health of refugees. *The British Journal of Psychiatry*, *188*, 58–64. <https://doi.org/10.1192/BJP.BP.104.007864>
- Steil, R., Lechner-Meichsner, F., Johow, J., Krüger-Gottschalk, A., Mewes, R., Reese, J. P., Schumm, H., Weise, C., Morina, N., & Ehring, T. (2021). Brief imagery rescripting vs. usual care and treatment advice in refugees with posttraumatic stress disorder: Study protocol for a multi-center randomized-controlled trial. *European Journal of Psychotraumatology*, *12*(1), Article 1872967. <https://doi.org/10.1080/20008198.2021.1872967>
- Talbot, L. S., Maguen, S., Metzler, T. J., Schmitz, M., McCaslin, S. E., Richards, A., Perlis, M. L., Posner, D. A., Weiss, B., Ruoff, L., Varbel, J., & Neylan, T. C. (2014). Cognitive behavioral therapy for insomnia in posttraumatic stress disorder: A randomized controlled trial. *Sleep*, *37*(2), 327–341. <https://doi.org/10.5665/SLEEP.3408>
- Weathers, F. W., Blake, D. D., Schnurr, P. P., Kaloupek, D. G., Marx, B. P., & Keane, T. M. (2013). *The Clinician-Administered PTSD Scale for DSM-5 (CAPS-5)*. <https://www.ptsd.va.gov/professional/assessment/adult-int/caps.asp>
- Weathers, F. W., Bovin, M. J., Lee, D. J., Sloan, D. M., Schnurr, P. P., Kaloupek, D. G., Keane, T. M., & Marx, B. P. (2018). The Clinician-Administered PTSD Scale for DSM-5 (CAPS-5): Development and initial psychometric evaluation in military veterans. *Psychological Assessment*, *30*(3), 383–395. <https://doi.org/10.1037/pas0000486>
- Werner, K. B., Griffin, M. G., & Galovski, T. E. (2016). Objective and subjective measurement of sleep disturbance in female trauma survivors with posttraumatic stress disorder. *Psychiatry Research*, *240*, 234–240. <https://doi.org/10.1016/j.psychres.2016.04.039>
- World Health Organization. (2019). *International statistical classification of diseases and related health problems* (11th ed.). <https://icd.who.int/>

**How to cite this article:** Schumm, H., Steil, R., Lechner-Meichsner, F., Morina, N., Weise, C., Mewes, R., Kuck, S., Reuter, J., Giesebrecht, J., Cludius, B., & Ehring, T. (2023). Associations between sleep problems and posttraumatic stress symptoms, social functioning, and quality of life in refugees with posttraumatic stress disorder. *Journal of Traumatic Stress*, *36*, 1176–1183. <https://doi.org/10.1002/jts.22983>