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RESEARCH ARTICLE

Adapting to a major crisis: Sleep and mental health during two lockdowns

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Summary

The present study aimed at investigating the impact of the pandemic on sleep and mental health in healthy individuals (n = 78) as well as in psychiatric outpatients (n = 30) during the first and the second lockdown in Germany, in March and November 2020, respectively. Sleep quality and anxiety were worse in patients compared with controls during both lockdowns. Further, patients but not controls exhibited higher levels of depression and overall psychiatric symptomatology during the second lockdown. No differences were found in the perceived threat evoked by the pandemic. The data suggest that healthy individuals adapt flexibly to the difficult situation over the time course of the pandemic, whereas psychiatric patients seem to get worse, indicating difficulties in adapting to stressful circumstances.

KEYWORDS
lockdown, mental health, PSQI, psychiatric outpatients, SARS-Cov-2 pandemic, sleep quality

1 | INTRODUCTION

For many younger generations in Europe SARS-CoV-2 represented the first serious and global crisis, both healthwise and economically. The disease is highly contagious, invisible in its transmission and potentially lethal (WHO, 2022). The rate at which the infection increased since the beginning of 2020 has led many governments to enact drastic measures (lockdowns), restricting people's social lives and contributing to a general sense of insecurity. In short, the pandemic and its consequences on psychological well-being can be seen as a universal and long-lasting stressful life event.

As such, one would assume the pandemic to negatively impact sleep quality. Indeed, a multitude of studies has shown this to be the case (Blume et al., 2020; Casagrande et al., 2020; Cellini et al., 2020; Duran & Erkin, 2021; Franceschini et al., 2020; Scarpelli et al., 2021), although the degree to which sleep is affected varies strongly and systematically across samples. So far, the following risk factors for decreased sleep quality during the pandemic have been identified: working in health care (Abdulah & Musa, 2020; Alnofaiey et al., 2020; Badahdah et al., 2020; Herrero San Martin et al., 2020; Huang & Zhao, 2020; Y.-Q. Lin, Lin, et al., 2021a,b; Stojanov et al., 2020; Xiao et al., 2020a; Zhang et al., 2020), exposure to COVID-19 patients (Abdulah & Musa, 2020; Franceschini et al., 2020; Zhang et al., 2020), being of younger age (L. Lin, Lin, et al., 2021a,b; Marelli et al., 2021; Peszka et al., 2021), female gender (Franceschini et al., 2020; L. Lin, Lin, et al., 2021a,b; Marelli et al., 2021; Stanton et al., 2020), or a proneness to anxiety and depression (Casagrande et al., 2020; Franceschini et al., 2020; Xiao et al., 2020a,2020b; Yang et al., 2020; Zhao et al., 2021). A meta-analysis on 44 sleep studies during the pandemic (Jahrami et al., 2021) reports the greatest prevalence of disturbed sleep in COVID-19 patients with a pooled prevalence of 74.8%, followed by health care professionals (36%) and samples taken from the general population (32%). Since sleep impairments and an increased vulnerability to stress-vulnerability are generally elevated in psychiatric patients (Müller et al., 2016; van Oort et al., 2020), this population would be expected to be particularly affected by the disquieting circumstances evoked by the pandemic. Protective factors include social support (Xiao et al., 2020a,2020b) and higher education (Zhang et al., 2020). These findings, namely that personal exposure to COVID-19 and personal concern about an

infection increase the vulnerability to insomnia while social support is protective of good sleep suggests that the extent to which the disease is perceived as a threat may constitute a moderating variable underlying the observed effects on sleep quality.

The aim of the present study was to investigate the impact of perceived threat on sleep quality and bad dreaming as well as other variables of psychological well-being (psychological symptoms and distress, depressive symptoms and anxiety), comparing healthy controls with psychiatric outpatients who represent an especially stress-vulnerable group. A second aim was to investigate whether sleep, psychological well-being, and perceived threat from the pandemic would vary across the course of the pandemic. Data were collected during the first and the second lockdown in Germany.

2 | METHOD

The recruitment of participants and the study procedure was approved by the local ethics committee and are in accordance with the declaration of Helsinki (World Medical Association, 2013).

2.1 | Participants

The participants were recruited from the outpatient population of an emergency psychiatric hospital near Frankfurt (Vitos Hochtaunus gGmbH) and through an announcement at the website of the Goethe-University Frankfurt inviting students to participate and to pass on the invitation to their acquaintances. Patients were made aware of the study through their treating physicians and psychotherapists. All patients were stable enough to be suitable for outpatient treatment. The participants were told the study was about sleep and dreaming during the pandemic and informed consent was obtained.

The first data set (Lockdown 1) was collected during April 2020, the second set (Lockdown 2) during November 2021. Participants of Lockdown 1 were not allowed to take part in the Lockdown 2 survey. To ensure anonymity, all study material was sent by mail. A stamped return envelope without the sender's details was enclosed. Thus, no personal information from the study participants could be related to the returned data sets. Subject numbers were assigned a posteriori and only to returned data sets.

Lockdown 1: A total of 72 out of 130 contacted participants sent back their responses. Of those, 20 participants identified themselves as outpatients (patients). Five participants of the non-patient group (controls) returned incomplete data sets and had to be excluded from further analysis resulting in a final sample of 20 patients (age $M = 34.25$ years ($SD = 14.06$)) and 47 controls (age $M = 25.49$ years ($SD = 12.07$); for details see Table 1). Diagnoses of patients can be found in Table 1.

Lockdown 2: A total of 43 data sets out of 64 were returned, consisting of ten patients and 33 controls. Two data sets (controls) were incomplete and had to be excluded, resulting in a final sample of ten patients (age $M = 25.90$ years, $SD = 9.80$) and 31 controls (age $M = 28.37$, $SD = 8.11$); for details see Table 1). Diagnoses of patients can be found in Table 1.

2.2 | Questionnaires and dream diary

Sleep quality was assessed with the Pittsburgh Sleep Quality Index (PSQI; Buysse et al., 1989), Cronbach's alpha = .63. Psychological well-being was determined with the Beck's Depression Inventory II (BDI; Beck et al., 1996; Kühner et al., 2007), Cronbach's alpha = .93, the Beck's Anxiety Inventory (BAI; Beck et al., 1988), Cronbach's alpha = .94, and the Symptom Checklist 90 Standard (SCL-90-S; Franke, 2014), Cronbach's alpha = .98. Perceived threat was assessed through a self-constructed questionnaire comprising five questions pertaining to (1) the fear of infecting oneself, (2) fear that a close friend or relative will become infected, (3) extent of existential threat, i.e., job security, financial burden, health, (4) dismay about lockdown restrictions, and (5) loneliness. Responses were made on a 10-point Likert scale (0, not at all present to 10, very strongly present) and ratings were averaged to a mean score, Cronbach's alpha = .59. Sociodemographic information included alcohol and drug consumption. All participants (regardless of whether they were patients or controls) were asked about psychiatric treatment and diagnoses and thus assigned to the respective group.

The assessment of nightmare frequency was based on entries in a 14-day dream diary. Dreams were considered nightmares when they were accompanied by strong negative emotions with a startled awakening. “Bad dreams” were identified through question 5(h) of the PSQI, in accordance with Lin, Lin, et al. (2021)a,b.

2.3 | Statistical analyses

MANOVAs were computed to investigate an effect of group (patients versus controls) on sleep and psychiatric variables (SCL-90-S score, BDI- and BAI-score) as well as threat evoked by the pandemic. Extreme outliers (values lying three interquartile ranges above the third or below the first quartile of the data) were excluded for multivariate analyses of variance (SCL-90-S: #25, BDI: #2023, BAI: #25, #32, #47, #2008, see Figures S1–S5). Effect sizes were calculated using partial eta squared. Further, differences in the total frequency of nightmares were analysed with *t*-tests for independent samples. Differences in the presence of nightmares and bad dreams were analysed with Mann-Whitney U-tests. Non-parametric correlation coefficients (Spearman's rho) were calculated to test for associations between sleep quality, and psychological well-being and sociodemographic variables. Correlation analyses were conducted for the combined samples of Lockdown 1 and 2 to increase the statistical power. Correlations within groups were carried out to examine whether patients and controls differed in the pattern of associations, correlations within subgroups were also examined.

TABLE 1 Sociodemographic characteristics

	Lockdown 1			Lockdown 2		
	Patients (n = 20)	**Controls (n = 47)**	**Total**	**Patients (n = 10)**	**Controls (n = 31)**	**Total**
Age	34.25	25.49	28.10	25.90	28.37	27.75
M (*SD*)	(14.06)	(12.07)	(13.22)	(9.80)	(8.11)	(8.59)
	n (%)	*n* (%)	*N* (%)	*n* (%)	*n* (%)	*N* (%)
Sex						
Female	15 (75)	43 (91)	58 (87)	9 (90)	26 (87)[a]	35 (87)
Male	5 (25)	4 (9)	9 (13)	1 (10)	4 (13)	5 (13)
Educational level[b]						
No school leaving certificate	1 (5)	n.a.	1 (2)	n.a.	n.a.	1 (3)
Low	1 (5)	1 (2)	2 (3)	n.a.	n.a.	n.a.
Middle	6 (30)	3 (6)	9 (13)	n.a.	1 (3)	1 (3)
High school	9 (45)	38 (81)	47 (70)	5 (50)	9 (31)	14 (34)
University degree	3 (15)	5 (11)	8 (12)	5 (50)	19 (66)	24 (60)
Alcohol consumption per week[c]						
None	10 (50)	21 (47)	31 (48)	5 (50)	16 (53)	21 (52)
1 glass (wine/beer)	2 (10)	8 (18)	10 (15)	3 (30)	4 (13)	7 (18)
More than 1 glass	8 (40)	16 (35)	24 (37)	2 (20)	10 (34)	12 (30)
BMI (kg/m^2)[d]						
<25	11 (55)	43 (92)	54 (78)	8 (80)	23 (79)	31 (79)
25–29.9	7 (35)	3 (6)	10 (15)	1 (10)	5 (18)	6 (16)
30–34.9	1 (5)	n.a.	1 (2)	n.a.	n.a.	n.a.
>=35	1 (5)	1 (2)	2 (5)	1 (10)	1 (3)	2 (5)
Diagnosis[e]						
Depression	12[f] (60)			6 (60)		
Bipolar	1 (5)			1 (10)		
Anxiety	2 (10)			2 (20)		
Adjustment disorder	1 (5)					
Obsessive compulsive disorder	5 (25)			1 (10)		
Eating disorder	2 (10)			1 (10)		
Post-traumatic stress disorder	1 (5)					
Attention deficit hyperactivity syndrome	1 (5)			2 (20)		
Personality disorder	1 (5)			1 (10)		

n.a., not available.

[a] Gender information is missing for one of the patients.

[b] Information on educational level is missing for two patients.

[c] Information on alcohol consumption is missing for two controls of LOCKDOWN 1.

[d] Information on BMI is missing for two controls of LOCKDOWN 2.

[e] Multiple diagnoses per patient possible. Percentages were calculated based on the number of patients and result in a number greater than 100 due to multiple diagnoses.

[f] Including one diagnosis of disthymia.

3 | RESULTS

During Lockdown 1, error variances (Levene's test) were homogeneous for the PSQI score (p = .275), the BDI score (p = .773) and perceived threat (p = .180), the SCL-90-S global severity index (p = .080), but not for the BAI score (p = .028). Covariances were homogeneous, as assessed by Box's test (p = .623). As for Lockdown 2, error variances were homogeneous for perceived threat (p = .889)

but not for the other dependent variables (PSQI score: $p = .027$, SCL-90-S global severity index, BDI score and BAI score: $p < .001$). Covariances were also not homogeneous (Box's test: $p = .002$).

As shown in Table 2, multivariate ANOVAs resulted in significant effects for group during both Lockdown 1 ($p < .001$) and Lockdown 2, ($p = .003$). As all statistics (Pillai-Spur, Wilks-Lambda, Hotelling-Spur and Roy, see Table S1) showed similar results for both samples, the effects can be assumed to be relatively stable. Post-hoc univariate analyses of variance for each dependent variable and are reported below (3.1–3.2, see Table 2).

3.1 | PSQI global score and component scores

Post-hoc univariate analyses of variance found (as can be seen from Figure 1a) patients to report a significantly lower sleep quality compared with controls during Lockdown 1 ($F(1, 65) = 7.46$, $p = .008$, $\eta_p^2 = .10$) as well as during Lockdown 2 ($F(1, 39) = 5.34$, $p = .026$, $\eta_p^2 = .12$; see Table 2). During Lockdown 1, the difference is mainly attributable to the component scores for "subjective sleep quality" and "sleep disturbances" (Figure 1b). During Lockdown 2 differences are present for all component scores (Figure 1c), which, however, did not reach significance. Still on a descriptive level the differences between patients and controls are similar for both lockdowns. Table 3 lists means and standard errors for all component scales of the PSQI.

TABLE 2 Means, standard errors for patients and controls and one-way analyses of variance in variables of sleep and psychological well-being

Lockdown 1				
Measure	**Patients ($n = 20$) *M(SE)***	**Controls ($n = 47$) *M(SE)***	***F* (1, 66)**	**η_p^2**
PSQI score	6.60 (0.52)	5.02 (0.31)	7.46**[b]	.10
SCL–90-S GSI[a]	63.95 (2.64)	58.87 (1.80)	1.95[c]	.03
BDI score	13.15 (2.33)	12.45 (1.52)	0.06	<.10
BAI score	12.40 (1.90)	6.50 (0.94)	9.73**[d]	.14
SARS-CoV-2 threat	4.15 (0.47)	4.35 (0.22)	0.20	<.01
Lockdown 2				
Measure	Patients ($n = 10$) *M(SE)*	Controls ($n = 30$) *M(SE)*	*F* (1, 39)	η_p^2
PSQI score	7.10 (1.44)	4.73 (0.36)	5.34*	.12
SCL–90-S GSI	63.56 (5.52)[e]	50.84 (1.96)	12.51**	.25
BDI score	19.20 (4.10)	6.57 (1.28)	15.49***[f]	.29
BAI score	13.80 (3.14)	5.77 (0.75)	13.40***	.26
SARS-CoV–2 threat	4.30 (0.47)	4.01 (0.28)	0.27[g]	.01

*$p < .05$, **$p < .01$, *** $p < .001$ (two-sided).

[a]Reported means and standard errors are based on *t*-values, ANOVA was conducted with raw values.

[b]$n_{controls} = 46$, df (1, 65).

[c]$n_{controls} = 45$, df (1, 64).

[d]$n_{controls} = 44$, df (1, 63).

[e]$n = 9$.

[f]$n_{controls} = 29$, df (1, 38).

[g]$n_{controls} = 31$, df (1, 40).

3.2 | SCL-90-S, BDI, BAI and perceived threat of the pandemic

Analysis of between-subject effects found a significant effect of group on the global severity index of the SCL-90-S during Lockdown 2 ($F(1, 39) = 12.51$, $p = .001$, $\eta_p^2 = .25$), but not Lockdown 1 (see Table 2). Patients during Lockdown 1 and 2 scored significantly higher on the SCL-90-S global severity index (see Table S2 for means and standard errors of the SCL-90-S and its subscales).

Regarding scores for BDI-depression, in Lockdown 1, 45% of patients and 34% of controls reported symptoms indicative of at least a mild depression (BDI score >13; for details see Table S3), this difference did not reach significance, however. During Lockdown 2, a total of 60% of patients vs. 10% of controls reported to be at least mildly depressed, resulting in a significant effect of group ($t(1, 38) = 22.80$, $p < .001$, $\eta_p^2 = .38$; for means and standard errors see Table 2).

Regarding anxiety as measured by the BAI, increased levels of anxiety were observed for both lockdowns (Lockdown 1: ($F(1, 63) = 9.73$, $p = .003$, $\eta_p^2 = .14$; Lockdown 2: ($F(1, 39) = 13.40$, $p < .001$, $\eta_p^2 = .26$) with patients reporting higher levels of anxiety compared with controls (for means and standard errors see Table 2). In Lockdown 1, 65% of patients vs. 28% of controls reported symptoms indicative of at least a mild anxiety disorder; in Lockdown 2 this was the case for 70% of patients vs. 23% of controls (for details see Table S3).

Patients and controls did not differ regarding the perceived threat evoked by the pandemic during either Lockdown 1 (see Table 2). For details on means and standard errors for the individual items of the SARS-COV-2-threat questionnaire see Table 4.

3.3 | Nightmares and bad dreams

The overall number of recorded nightmares in the dream diaries was very low. During Lockdown 1, patients reported 196 dreams, three of which were nightmares (2%). Controls reported 482 dreams with 15 nightmares (3%). During Lockdown 2, patients contributed 71 dream reports including one nightmare (1%); controls reported 305 dreams, seven of which were nightmares (2%). During Lockdown 1, a total of three patients and eight controls reported at least one nightmare (see Table 5). During Lockdown 2, this applied to one patient and five controls. Statistically, the overall number of nightmares as

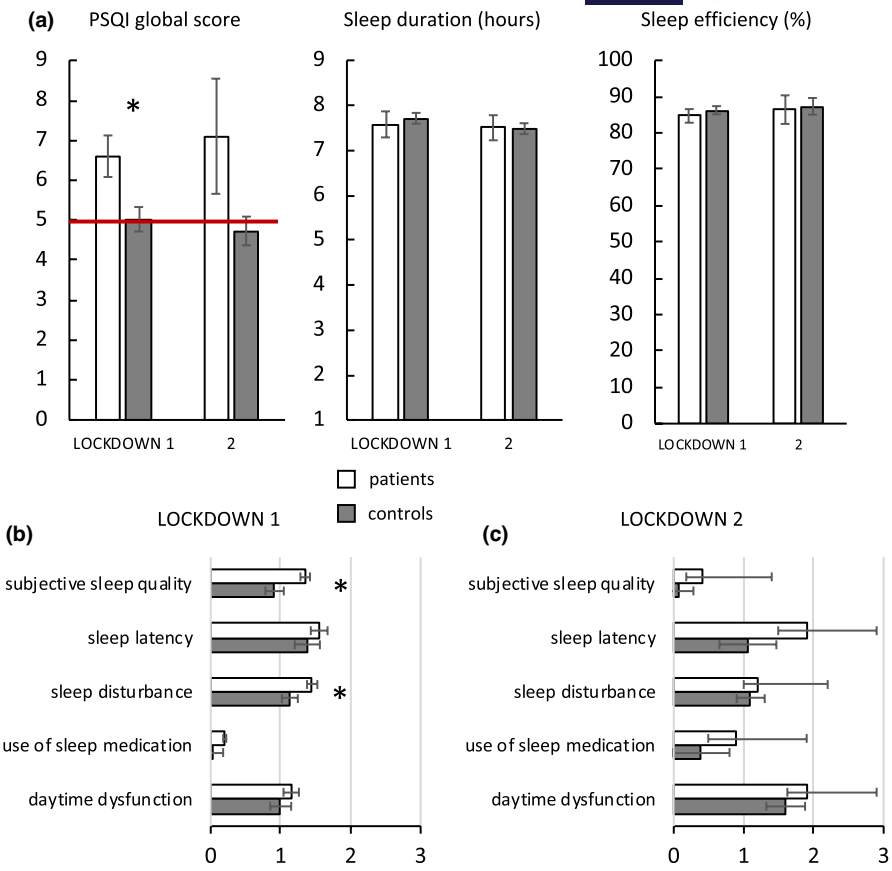

FIGURE 1 (a) PSQI score (values above 5 indicate clinically relevant sleep impairments), sleep duration in hours and sleep efficiency in percent, separately for Lockdown 1 and 2. Sleep component scores for Lockdown 1 (b) and Lockdown 2. (c) Subjective sleep quality with the levels: 0, very good; 1, good; 2, very poor; 3, very bad; and sleep disturbances and use of sleep medication with the levels: 0, not at all in the last 4 weeks; 1, less than once a week; 2, once or twice a week; 3, three or more last week; and daytime sleepiness with the levels: 0, no problems; 1, seldom problems; 2, some problems; 3, bad problems. Error bars indicate standard errors, asterisks indicate significant differences between patients and controls ($p < .05$)

TABLE 3 Mean and standard errors of the mean for the PSQI and component scores as well as *t*-values for the comparison of patients and controls

	Lockdown 1			Lockdown 2		
	Patients *N* = 20	Controls *N* = 47		Patients *N* = 10	Controls *N* = 31	
Variable	***M (SE)***	***M (SE)***	***p*[a]**	***M(SE)***	***M(SE)***	***p*[a]**
Subjective sleep quality[b]	1.35 (0.13)	0.91 (0.07)	***	0.40 (0.22)	0.06 (0.04)	*ns*
Sleep latency >30 min[c]	1.55 (0.18)	1.38 (0.12)	*ns*	1.90 (0.41)	1.06 (0.13)	*ns*
Time sleeping (hours)	7.58 (0.29)	7.71 (0.12)	*ns*	7.50 (0.28)	7.48 (0.12)	*ns*
Sleep efficiency (%)	84.70 (1.87)	86.26 (1.13)	*ns*	86.43 (3.94)	87.34 (2.30)	*ns*
Sleep disturbances[c]	1.45 (0.11)	1.13 (0.07)	*	1.20 (0.20)	1.10 (0.07)	*ns*
Sleep medication[c]	0.20 (0.16)	0.02 (0.02)	*ns*	0.90 (0.41)	0.39 (0.12)	*ns*
Daytime sleepiness[d]	1.15 (0.15)	1.00 (0.11)	*ns*	1.90 (0.28)	1.60 (0.16)	*ns*
PSQI score	6.60 (0.52)	5.02 (0.31)	**	7.10 (1.44)	4.73 (0.36)	*ns*
N Cut off >5	11 (55%)	20 (43%)		6 (60%)	9 (30%)	

*$p < .05$, **$p < .01$, *** $p < .001$ (two-sided), *ns* =non-significant.

[a]*t*-tests for unrelated samples were computed, after Bonferroni-correction ($p = .00625$) none of the comparisons between patients and controls would have reached significance.

[b]$n_{controls} = 46$; 0, very good; 1, good; 2, very poor; 3, very bad.

[c]Answer categories: 0, not at all in the last 4 weeks; 1, less than once a week; 2, once or twice a week; 3, three or more last week.

[d]0, no problems; 1, seldom problems; 2, some problems; 3, bad problems caused by daytime sleepiness.

well as the dichotomous variable "presence of nightmares" was not significant (Table 5).

The analysis of bad dreams based on question 5(h) of the PSQI revealed a significantly higher portion of patients (50%) than controls (21%) to have experienced a bad dream at least once a week during the past 4 weeks during Lockdown 1, $U(n_{patients} = 20, n_{controls} = 47) = 263.5$, $z = -2.99$, $p = .003$ (Table 5). During Lockdown 2, 30% of patients and 19% of controls reported at

TABLE 4 Means and standard errors for the SARS-COV-2 threat items and overall mean of all five items for Lockdown 1 and 2 separately for patients and controls

Lockdown 1	Patients $n = 20$	Controls $n = 47$		Total $N = 67$
Item	***M (SE)***	***M (SE)***	***p*[a]**	***M (SE)***
Fear of infecting oneself	2.75 (0.58)	2.70 (0.34)	*ns*	2.72 (0.29)
Fear of infection of a friend	5.70 (0.71)	5.87 (0.41)	*ns*	5.82 (0.36)
Existential threat	3.75 (0.66)	3.17 (0.39)	*ns*	3.34 (0.34)
Dismay about lockdown restrictions	4.95 (0.68)	5.72 (0.40)	*ns*	5.49 (0.35)
Loneliness	3.60 (0.70)	4.30 (0.35)	*ns*	4.09 (0.32)
Overall mean	4.15 (0.47)	4.35 (0.22)	*ns*	4.29 (0.21)
Lockdown 2	$n = 10$	$n = 31$		$N = 40$
	M (SE)	*M (SE)*	*p*[a]	*M (SE)*
Fear of infecting oneself	2.80 (0.68)	3.55 (0.38)	*ns*	3.37 (0.33)
Fear of infection of a friend	5.60 (0.93)	6.61 (0.40)	*ns*	6.37 (0.38)
Existential threat	2.60 (0.79)	2.65 (0.44)	*ns*	2.63 (0.38)
Dismay about lockdown restrictions	5.70 (1.03)	4.13 (0.44)	*ns*	4.51 (0.43)
Loneliness	4.80 (0.90)	3.10 (0.46)	*ns*	3.51 (0.42)
Overall mean	4.30 (0.47)	4.01 (0.29)	*ns*	4.08 (0.24)

ns, non-significant.

[a]*t*-tests for unrelated samples were computed to test differences between patients and controls.

least one bad dream per week. This contrast was not significant (see Table 5).

3.4 | Associations between sleep quality and demographic variables, psychiatric diagnosis, and measures of psychological distress

Table 6 shows correlation coefficients for sleep quality (PSQI global score), demographic variables, group status (patients vs. controls) and reported psychological distress (BDI, BAI, SCL-90-S) during Lockdown 1 and 2 combined. Patients had significantly higher PSQI-scores than controls (r_{Rho} (104) = .29, $p = .003$). In accordance with this finding, higher PSQI-scores were associated with greater overall SCL-90-S symptomatology (SCL-90-S: r_{Rho} (101) = .36, $p < .001$), symptoms of depression (r_{Rho} (102) = .35, $p < .001$) and anxiety (r_{Rho} (100) = .25, $p = .010$). Furthermore, measures of psychological distress were intercorrelated (.67 ≤r_{Rho}(100–101) ≤.81, $p \leq .001$). Perceived threat by the pandemic (see Table 6 for details) was unrelated to sleep quality (PSQI global score), but related to SCL-90-S symptomatology (GSI: r_{Rho} (103) = .31, $p = .001$), depression (r_{Rho} (104) = .43, $p < .001$), and anxiety (r_{Rho} (102) = .28, $p = .004$). Furthermore, perceived threat was negatively correlated with age (r_{Rho} (106) = −.25, $p = .009$) indicating that especially younger participants experienced the pandemic as dangerous.

Further analyses revealed that younger age was related to BAI-anxiety (r_{Rho} (28) = −.56, $p = .001$) and increased levels of perceived SARS-CoV-2 threat (r_{Rho} (28) = −.47, $p = .009$) in patients but not in controls (see Table 7 for details). For controls, low sleep quality was related to depression (r_{Rho} (72) = .31, $p < .001$) and higher age with a higher educational level (r_{Rho}(75) = .38, $p = .003$; see Table 7 for details).

4 | DISCUSSION

In Germany, the first lockdown took place in March 2020, with curfews, contact restrictions, travel bans, new hygiene policies and the closing of numerous stores and public services such as schools, kindergartens and government offices. The second lockdown in November 2020 was similar but less restrictive in terms of store and school closings, but was also perceived as chaotic because of frequently changing guidelines.

During the first lockdown period in Germany, our sample of psychiatric patients reported poorer PSQI sleep quality compared with controls. This was mainly due to lower subjective sleep quality and more frequent sleep disturbances. The same pattern of PSQI sleep quality was observed for the Lockdown 2 data. However, most likely due to the smaller number of participants, this difference was not significant. An effect of gender as a moderating variable was also not observed (See Table S4). The improved sleep quality in controls could be viewed as a sign of resilience, in that healthy sleep remains relatively unaffected by external stressors (Gao & Scullin, 2020). By contrast, the higher PSQI-scores in patients during both lockdowns indicate a lower sleep quality. The relative mild impairment of sleep quality in controls during Lockdown 1 and their inconspicuous values during Lockdown 2 may be viewed as a sign of resilience, in that healthy sleep is only temporarily affected by external stressors and

TABLE 5 Means, standard errors of the mean, and frequencies for number of nightmares and bad dreams during Lockdown 1 and 2 separately for patients and controls

	Lockdown 1					Lockdown 2				
	Patients	Controls				Patients	Controls			
Variable	*M(SE)*	*M(SE)*	*t*(63)	*p*	*d*	*M (SE)*	*M (SE)*	*t*(39)	*p*	*d*
Sum of nightmares[a]	0.15 (0.08)	0.33 (0.13)	0.92	.180	0.25	0.10 (0.10)	0.29 (0.12)	0.90	.375	0.33
	n (%)	*n* (%)	*U* Test	*Z*	*p*	*n* (%)	*n* (%)	*U* Test	*Z*	*p*
Nightmare present	3 (20%)	8 (18%)	431.50	−0.40	.687	1 (10%)	5 (16%)	144.50	−.519	.604
Bad dreams according to PSQI (item 5 [h]) more than once a week[b]	10 (50%)	10 (21%)	263.50	−2.99	.003	3 (30%)	6 (19%)	148	−0.23	.816

t-statistics for the comparison of the number of nightmares between patients and controls. *U*-statistic for the comparison of the number of patients and controls with nightmares and bad dreams.

[a]Lockdown 1: $n_{patients} = 20$, $n_{controls} = 45$; Lockdown 2: $n_{patients} = 10$, $n_{controls} = 31$

[b]Lockdown 1: $n_{patients} = 20$, $n_{controls} = 47$; Lockdown 2: $n_{patients} = 10$, $n_{controls} = 31$.

quick to return to pre-stress levels. The finding that sleep quality remains low across lockdowns in patients is more difficult to interpret. It may indicate that sleep quality remains unaffected because the psychiatric impact on sleep outweighs any additional stressors. Alternatively, psychiatric illness may increase the risk to develop a sleep disorder in times of crisis. Albeit descriptive data support the latter hypothesis, the cross-sectional design of the current study does not permit a definite conclusion.

As indicated by the SCL-90-S, patients were more burdened compared with controls during both lockdowns. A closer look at the SCL-90-S subscales reveals that specifically, during Lockdown 1, patients showed increased levels of paranoid thinking compared with controls (see Table S2). During Lockdown 2, this was the case for compulsiveness and psychoticism (see Table S2).

For the BDI scores measured during Lockdown 1, patients and controls were similarly affected (45% and 34%, respectively). By contrast, during Lockdown 2, 60% of patients and only 7% of controls reported feeling depressed to a clinically relevant degree. As the proportion of patients suffering from clinical depression was similar in both lockdowns (60%, each) this result was likely due to a deterioration of mood in patients and an improvement in controls. However, as the samples in Lockdown 1 and 2 were independent, this observation should be interpreted with caution. As with depression, patients showed more symptoms of anxiety during both lockdowns compared with controls, again indicating a higher burden for patients.

Taken together, the assessed questionnaire data suggest that controls were better able to adapt to the pandemic while patient's well-being tended to deteriorate. Our interpretation that controls adapt easier to difficult circumstances are in line with a study by Kohút and colleagues (2021), who found a decrease in COVID-19 related fears over the time course of the pandemic.

Regarding nightmares and bad dreams, the overall number of nightmares was rather low and did not reveal any difference between patients and controls in either lockdown. By contrast, reports of "bad dreams" revealed significant differences between both groups. While patients in both lockdowns reported high incidences of bad dreams, the proportion of bad dreams in controls was low in Lockdown 1 and similar to patients in Lockdown 2. Considering that even in pre-pandemic times bad dreams are highly frequent – Robert and Zadra report 73% (2008), the finding of only few bad dreams for controls in the Lockdown 1 sample is more noteworthy than the increase in the Lockdown 2 sample. Possibly, the Lockdown 1 data are indicative of an attempt to block out threatening cognitions to protect sleep. Here, it would be interesting to analyse the corresponding dream reports with respect to associations with SARS-Cov-2.

Concerning sleep quality, the hypothesis that threat evoked by the pandemic is related to sleep impairment as measured by the PSQI was not supported by the current data. Perceived threat due to the pandemic was comparable among patients and controls. The greatest concerns related to fears that a friend or relative would become infected as well as contact restrictions. However, perceived threat was related to overall symptomatology as indicated by the

TABLE 6 Non-parametric correlations (Spearman's-rho) of PSQI, diagnosis, age and gender with variables of psychological well-being for the whole sample (N^a = 102–108)

	Diagnosis	Age	Gender[b]	Educational level[c]	SCL–90-S score	BDI score	BAI score	SARS-CoV–2 threat
PSQI score	.29**	.04	.00	−.13	.36**	.35**	.25**	.18
Diagnosis		.14	−.14	−.15	.30**	.22*	.34**	−.01
Age		–	−.06	.19	−.27**	−.31**	−.24*	−.25**
Gender			–	.08	−.02	.03	−.03	.12
Educational level				–	−.31**	−.21*	−.04	−.03
SCL–90-S score					–	.81**	.76**	.31**
BDI score						–	.67**	.43**
BAI score								.28**

*$p < .05$, ** $p < .01$ (two-sided).

[a]Extreme values for SCL-90-S (#25), BDI score (#2023) and BAI score (#25, 32, 47, 2008) were excluded from the data set. [b]1, male; 2, female.

[b]1, no school leaving certificate; 2, low; 3, middle; 4, high school; 5, university degree.

TABLE 7 Non-parametric correlations (Spearman's-rho) of PSQI with age and gender with variables of psychological distress

Patients N = 29–30	Age	Gender[a]	Educational level[b]	SCL–90-S score[c]	BDI score[c]	BAI score[c]	SARS-CoV–2 threat
PSQI score	−.01	−.21	−.10	.40*	.25	.23	.21
Age		−.20	−.07	−.57**	−.61**	−.56**	−.47**
Gender			.24	−.04	−.07	.08	.27
Educational level				−.18	−.04	.10	−.04
SCL–90 score					.89**	.83**	.56**
BDI score						.74**	.49**
BAI score							.56**
Controls N = 70–76							
PSQI score	.02	.18	−.02	.24*	.31**	.13	.15
Age		.05	.38**	−.27*	−.25*	−.20	−.11
Gender			−.04	.07	.11	.02	.04
Educational level				−.28*	−.26*	.03	−.00
SCL–90 score					.75**	.67**	.18
BDI score						.56**	.40**
BAI score							.18

*$p < .05$, ** $p < .01$ (two-sided).

[a]1, male; 2, female.

[b]1, no school leaving certificate; 2, low; 3, middle; 4, high school; 5, university degree.

[c]Extreme values for SCL-90-S (#25), BDI score (#2023) and BAI score (#25, 32, 47, 2008) were excluded from the data set.

global severity index of the SCL-90, symptoms of BDI-depression, and BAI-anxiety. Thus, the more participants felt threatened by the pandemic, the more symptoms they reported. Furthermore, consistent with the results reported by Quaglieri and colleagues (2021), perceived threat was negatively related to age indicating that especially the younger participants felt threatened or, alternatively, the older ones remained more serene. We consider the former interpretation more likely, as it is in line with the findings reported by Peszka et al. (2021) who found sleep hygiene to be affected especially worsened in the young.

5 | LIMITATIONS

The main limitation of the present study is the small sample size, and the study of larger samples is highly desirable. In addition, to obtain independent samples from both lockdowns, participants who agreed to participate during the first lockdown were not allowed to participate in the second survey during Lockdown 2. In addition, gender is not evenly distributed, primarily due to the large number of psychology students participating in the study. Accordingly, the patient population of Lockdown 1 is older than

that of the control group. Therefore, the age and diagnosis variables in Lockdown 1 could be confounded. However, no correlation between age and diagnosis was found for the entire sample (Table 6, $r_{Rho} = .14$, n.s.). In addition, as samples of Lockdown 1 and 2 were independent, conclusions about longitudinal trends remain speculative.

The perceived threat of SARS-CoV-2 was queried using self-constructed items. The reliability of this measure is rather low (Cronbach's alpha = .59). This might be a result of the low sample size. Alternatively, it could be attributed to the small number of items, as reliability depends largely on the number of items and their heterogeneity (Dehne & Schupp, 2007). Nevertheless, the negative correlation with age appears to be consistent with previous publications on perceived threat during the pandemic (Quaglieri et al., 2021).

6 | CONCLUSION

To summarize, our data support a resilience or adjustment view for the group of healthy controls during a worldwide crisis (Gao & Scullin, 2020), in that sleep quality as well as psychiatric symptoms improved across the two lockdowns in the group of healthy controls. By contrast, patients reported lower sleep quality and higher load of psychiatric symptoms that intensify over the time course of the pandemic. Especially the young seem to be affected most by the pandemic. Taken together, these findings suggest that psychiatric patients, as well as the young, represent a vulnerable part of society that should be given special attention and support from the health care system.

CONFLICT OF INTEREST

None.

AUTHOR CONTRIBUTION

U.V. and J.K.-G. designed the study. L.-M.W., U.V. and J.K.-G. collected the data. U.V. and J.K.-G. analysed the data. U.V., A.K., S.W. and J.K.-G. wrote the manuscript. All of the authors discussed the results and commented on the manuscript.

DATA AVAILABILITY STATEMENT

Data available on request from the authors.

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SUPPORTING INFORMATION

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