



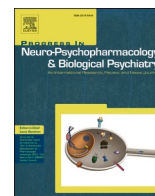
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Contents lists available at ScienceDirect

Progress in Neuropsychopharmacology & Biological Psychiatry

journal homepage: www.elsevier.com/locate/pnp

Psychologic distress and sleep quality among adults in Turkey during the COVID-19 pandemic

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ARTICLE INFO

Keywords:
 COVID-19
 Psychological distress
 Sleep quality
 Stress
 Sleep disturbances

ABSTRACT

Objective: The sudden novel coronavirus disease 2019 (COVID-19) pandemic has created a negative effect on the mental health of the public. In this study, in relation to the pandemic, psychological distress, sleep quality and affecting factors in adults were examined.

Methods: Using the convenience sampling method, the Pittsburgh Sleep Quality Index and questionnaires to determine psychological distress levels and sociodemographic characteristics were distributed online to 405 participants.

Results: The mean psychological distress score of the participants was 34.55 ± 8.07 , while their mean sleep quality score was 6.39 ± 3.31 . The prevalence of poor sleep quality was 55.1%. The psychological distress scores were higher among the men than the women, married participants than single ones, those with children than those without children and those who were employed than those who were not. The sleep quality of the single participants and the participants with low education levels was poorer. The sleep quality of those who left work in the pandemic period was poorer than those who were working from home/office and those who were already not employed before the pandemic. The sleep quality of those not working in the field of health was better than healthcare professionals and those not working at all. The scores for psychological distress were positively correlated with gender and negatively correlated with sleep quality levels.

Conclusion: Our findings showed that the COVID-19 pandemic had a negative effect on the psychological distress and sleep quality of adults. It is recommended for healthcare professionals to take the necessary psychosocial precautions.

1. Introduction

Coronaviruses (CoV) are a large virus family which causes various conditions from the common cold to more severe diseases such as the Middle East Respiratory Syndrome (MERS-CoV) and Severe Acute Respiratory Syndrome (SARS-CoV) (Sadati et al., 2020). In the world, by 6 November 2020, 48,534,508 individuals had been infected with COVID-19, while 1,231,017 had died (<https://covid19.who.int/>, 2020). The restriction precautions for the COVID-19 pandemic have focused on determining, treating and isolating infected individuals, contact tracing, quarantining and encouraging precautionary behaviors in the general population (Qian et al., 2020). Moreover, these precautions have interrupted the lives and work of people a lot, and thus, these restrictions may have significant effects on the health and prosperity of individuals (Arénliu, 2020; Zhang et al., 2020a).

It is important to understand that COVID-19 infection may lead to cognitive distress, anxiety and fear in the society (Shah et al., 2020). In the literature, it was reported that, in relation to the disease, a large proportion of the society would experience intense emotional adaptation reactions including contagion fear, long-term quarantine effects and death of relatives (Inchausti et al., 2020). Experiences gained from previously experienced pandemics have shown that, while the pandemic is going on, depressive symptoms, various degrees of anxiety disorders, posttraumatic stress disorders (Rajkumar, 2020) and different levels of psychological problems such as aggression, anxiety, sleep problems and attention deficit (Wang et al., 2020c) may develop among the general public. The COVID-19 pandemic creates concern among people especially in affected countries, and the media has great effects in increasing psychological distress (Fardin, 2020). Qiu et al. (Qiu et al., 2020) determined psychological distress in 35% of the participants in their

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<https://doi.org/10.1016/j.pnpbp.2021.110254>

Received 12 December 2020; Received in revised form 11 January 2021; Accepted 13 January 2021

Available online 22 January 2021

0278-5846/© 2021 Published by Elsevier Inc.

study. Psychological distress is defined as a broader manifestation of mental health-related problems that is characterized by depression and anxiety symptoms and known to continue to show severity with stress-related concerns (Liang et al., 2020). In the study by Wang et al. (2020a), 53.8% of survey participants assessed the psychological effect of the pandemic to be moderate or severe.

As COVID-19 is a disease that directly threatens life, concerns of getting infected and sleep disorders (like insomnia) were reported in the general population (Lin et al., 2020). Additionally, being confined at home increases the probability of uncomfortable sleep and insomnia through stress (Gupta et al., 2018). Sleep quality is an important indicator of health (Xiao et al., 2020a, 2020b). Therefore, it is important to determine the sleep quality of individuals. Studies have reported that, due to the pressure by COVID-19, insomnia and psychological distress levels in the general population are high (Huang and Zhao, 2020; Lin et al., 2020).

Determining the factors that affect psychological distress and insomnia in the pandemic process is important in terms of making a status determination and taking precautions. This study was conducted to determine psychological distress and sleep quality among adults in Turkey during the COVID-19 pandemic.

2. Methods

2.1. Participants

This is a cross-sectional and descriptive study. To minimize face-to-face interactions with the participants and reduce the spread of the disease, the data were collected through Google Forms on online platforms (e.g., Facebook, WhatsApp). The data were collected in seven days in October 2020. The population of the study consisted of individuals over the age of 18 who volunteered to participate in the study and were using social media (Facebook, Instagram, WhatsApp).

In sample calculation, to examine the prevalence of the issue, a formula was used to calculate the number of individuals to be included. If the number of individuals in the population is unknown, the formula $n = (t^2 \times (Pq) / d^2)$ is used (Sümbüloğlu K, Sümbüloğlu V, 2007). The number of participants was calculated as 384 using the method of sample calculation for unknown populations. The study included 405 individuals who filled out the online questionnaires. For the calculations, a confidence interval of 0.95%, standard deviation of 5% and 50% unknown prevalence was used.

$$n = (t^2 \times (Pq) / d^2)$$

p = Prevalence of the event (probability) (0.5).

q = Prevalence of the absence of the event (1 - p) (0.5).

t = Theoretical value found on the t table at a certain degree of freedom and determined error rate (1.96).

d^2 = Deviation to be achieved based on the prevalence of the event (5% deviation, as 0.05).

In the study, a questionnaire form prepared by the researcher, the Pittsburgh Sleep Quality Index and the Psychological Distress Scale were used.

2.2. Measurements

2.2.1. Questionnaire form

The questionnaire form that was prepared by the researchers in line with the literature (Al-Rabiaah et al., 2020; Conversano et al., 2020; Fu et al., 2020; Xiao et al., 2020a) included questions (15) on the socio-demographic characteristics of the participants including gender, age, educational status, marital status, number of children, chronic disease and presence of a neighbor/relative diagnosed with COVID-19.

2.2.2. Pittsburgh Sleep Quality Index (PSQI)

The scale was developed by Buysse et al. (Buysse et al., 1989) and adapted into Turkish by Agargun (1996). PSQI is a 19-item self-report scale that assesses sleep quality and disorders in the last one month. It consists of 24 questions including 19 self-report questions and 5 questions to be answered by a partner or roommate. The 18 questions of the scale that are scored consist of 7 components as Subjective Sleep Quality (C1), Sleep Latency (C2), Sleep Duration (C3), Habitual Sleep Efficiency (C4), Sleep Disturbances (C5), Use of Sleep-Promoting Medications (C6) and Daytime Dysfunction (C7). Each component is scored in the range of 0–3. The sum of the scores of the 7 components gives the total scale score. The total score varies in the range of 0–21. Total scores of higher than 5 show “poor sleep quality”. If the total score is 5 or lower, sleep quality is considered as “good”. The Turkish validity and reliability study of the scale was conducted by Ağargün et al., and its internal consistency coefficient was reported as 0.80 (Agargun, 1996).

2.2.3. Psychological distress scale

The scale which was developed as the Kessler Psychological Distress Scale by Kessler et al. (Kessler et al., 2002) was adapted into Turkish by Altun et al. (2019). The scale consists of 10 questions on non-specific psychological distress, and it aims to measure the level of depressive symptoms experienced within the last four weeks and currently. It is a 5-point Likert-type scale allowing answers from 1 (never) to 5 (always). The minimum possible score is 10, while the maximum score is 50. Higher scores indicate higher levels of psychological distress. The internal consistency coefficient of the scale was found as 0.95 (Altun et al., 2019).

2.3. Statistical analysis

The data were analyzed in the computer environment by using the SPSS (Statistical Package for the Social Sciences) package software. The demographic data were analyzed using frequency and percentage. Psychological distress and PSQI were analyzed using mean, standard deviation (SD). Correlations between psychological distress and PSQI were analyzed using multivariate regression model. The differences in the psychological distress and sleep quality levels based on sociodemographic characteristics were analyzed using two-way ANOVA and student t -test.

2.4. Ethical approval

A consent form was signed by all participants before they started the questionnaire. The study was approved by the Ethics Committee of İzmir Democracy University.

3. Results

3.1. Prevalence and demographic characteristics

In this study, 70.9% of the participants were female, 29.1% were male. While 6.7% of the participants were single, 82.2% had undergraduate or higher degrees. 48.4% were continuing to work from their workplace, 15.1% were continuing to work from home, and 36.5% were not working at a job. 69.4% did not have children. 65.7% were living in the city center. Among the participants, 71.9% were non-smokers, and 67.9% did not exercise. 17.5% had chronic diseases, while the relatives of 39.3% had been infected with COVID-19.

3.2. Psychological distress and sleep quality mean scores

Table 1 reports the mean (and SD) of the participants' levels in psychological distress and sleep quality. The mean psychological distress score of the participants was 34.55 ± 8.07 (high level), while their mean sleep quality score was 6.39 ± 3.31 . The prevalence of poor

Table 1

Descriptive statistics of participants' psychological distress and sleep quality (n = 405).

Scales	Mean ± SD	Min–Max	Range
Psychological distress	34.55 ± 8.07	11–50	10–50
PSQI	6.39 ± 3.31	0–16	0–21
PSQI (C1) subjective sleep quality	1.31 ± 0.68	0–3	0–3
PSQI (C2) sleep latency	1.31 ± 0.94	0–3	0–3
PSQI (C3) sleep duration	0.95 ± 0.92	0–3	0–3
PSQI (C4) habitual sleep efficiency	0.38 ± 0.82	0–3	0–3
PSQI (C5) sleep disturbances	1.25 ± 0.58	0–3	0–3
PSQI (C6) use of sleep-promoting medications	0.15 ± 0.49	0–3	0–3
PSQI (C7) daytime dysfunction	1.01 ± 0.88	0–3	0–3
Prevalence of poor sleep quality (≥5 points)	223 (%55.1)		

Abbreviation: SD, standard deviation PSQI, Pittsburgh Sleep Quality Index.

sleep quality was 55.1%. The mean scores in the dimensions of the scale was as subjective sleep quality 1.31 ± 0.68 ; sleep latency 1.31 ± 0.94 ; sleep duration 0.95 ± 0.92 ; habitual sleep efficiency 0.38 ± 0.82 ; sleep disturbances 1.25 ± 0.58 ; use of sleep-promoting medications 0.15 ± 0.49 , and daytime dysfunction 1.01 ± 0.88 .

3.3. Factors related to psychological distress and sleep quality

Table 2 shows whether there were differences in the psychological distress and sleep quality levels based on sociodemographic characteristics. In this study, the psychological distress scores were higher among the men than the women, those who were married than those who were single and those who had children than those who did not have children. Considering working status, the psychological distress levels of those who were already not working before the pandemic were significantly lower than those who were working from their workplaces and those

Table 2

Demographic characteristics of participants and comparison of psychological distress and sleep quality (n = 405).

Characteristics	n	Psychologic distress	PSQI
		Mean ± SD	Mean ± SD
Gender			
Women	287	33.69 ± 8.08	6.42 ± 3.23
Men	118	36.64 ± 7.70	6.33 ± 3.51
		t: -3.39	t: 0.251
		p:0.001*	p:0.802
Marital status			
Married	147	36.82 ± 7.52	3.19 ± 0.26
Single	258	33.25 ± 7.10	3.36 ± 0.20
		t:4.36	t:-2.32
		p:0.000*	p:0.021**
Education level			
Primary school and lower	72	33.48 ± 9.87	7.48 ± 4.01
High school and higher	333	34.78 ± 7.62	6.15 ± 3.09
		t:-1.23	t:3.11
		p:0.21	p:0.002*
Working status			
Continuing to work from the workplace	196	35.63 ± 7.73	6.45 ± 3.26
Who continue to work from home	61	35.98 ± 6.88	5.86 ± 3.03
Leave the job	30	33.13 ± 7.88	8.80 ± 4.35
Not working before the epidemic	118	32.37 ± 8.79	5.95 ± 2.99
		f: 5.14	f:6.76
		p:0.002*	p:0.000*
Occupation			
Non worker	126	31.79 ± 8.51	6.69 ± 3.63
Healthcare worker	103	34.09 ± 7.77	7.15 ± 3.07
Others	176	36.79 ± 7.26	5.73 ± 3.09
		f:15.32	f:6.85
		p:0.000*	p:0.001*

Abbreviation: SD, standard deviation PSQI, Pittsburgh Sleep Quality Index.

* $p \leq 0.001$, ** $p \leq 0.05$.

working from their homes. In other words, the psychological distress levels were higher in those who were working than those who were not. Considering the psychological distress levels based on occupation, these levels were higher in the participants who were healthcare personnel and those working at other professions in comparison to those who were not working. Considering factors affecting sleep quality, the sleep quality levels were poorer in the single participants than the married ones and in those with an educational level of high school or lower than those with undergraduate or higher degrees. The sleep quality of the participants who left work in the pandemic period was poorer in comparison to those working from home/office and those who were already not working before the pandemic. Considering sleep quality based on occupation, the sleep quality of those working outside the field of health was better in comparison to the healthcare professionals and those not working at all.

3.4. Factors predicting participants' psychological distress levels

The results of the regression analysis explaining the factors affecting the participants' psychological distress levels are presented in Table 3. The potential influencing factors showing statistically significant association with the t-test, ANOVA or correlation test were selected in the multivariate regression analyses. The predictive power of the regression model calculated using the Enter method was 28%. The scores for psychological distress were positively correlated with gender and negatively correlated with sleep quality levels.

4. Discussion

In this study, psychological distress in the COVID-19 pandemic period was found to be on a high level. Similar studies have been reported in studies conducted in the process of COVID-19. A study conducted in an Argentine population found that 62.4% of the participants showed symptoms of psychological distress (Badellino et al., 2020). Xiong et al. (2020) determined the rate of psychological distress in the general population to be from 34.43% to 38%. Domínguez-Salas et al.

Table 3

Predictive factors of participants' psychological distress.

Model	Unstandardized Coefficients		Standardized Coefficients	t	p
Variables	B (95% CI)	SE	β		
Constant	34.753	5.352		6.494	0.000
Age	0.098	0.060	1.632	0.103	0.103
Gender	2.967	0.778	0.167	3.811	0.000*
Education level	-0.351	0.931	-0.017	-0.377	0.706
Marital status	-1.392	0.991	-0.083	-1.406	0.161
Working status	-2.222	0.405	-0.036	-0.548	0.584
Sleep quality	-0.990	0.108	-0.406	-9.148	0.000*
PSQI (C1) subjective sleep quality	-2.808	0.586	-0.238	-4.792	0.000*
PSQI (C2) sleep latency	-1.055	0.414	-0.123	0.2550	0.011*
PSQI (C3) sleep duration	1.366	0.402	0.157	3.400	0.001*
PSQI (C4) habitual sleep efficiency	0.202	0.460	0.021	0.439	0.661
PSQI (C5) sleep disturbances	-2.609	0.695	-0.189	-3.751	0.000*
PSQI (C6) use of sleep-promoting medications	-1.788	0.727	-0.110	-2.458	0.014*
PSQI (C7) daytime dysfunction	-2.035	0.432	-0.224	-4.713	0.000*

Adj.R²: Adjusted R square; B: Partial regression coefficient; β: Standard partial regression coefficient; 95% CI: 95% confidence interval.* $p \leq 0.001$,

(Domínguez-Salas et al., 2020) determined psychological distress in 71.98% of their participants. In this study, the sleep quality of 55.1% of the participants was poor, and the participants' mean PSQI score was found as 6.39 ± 3.31 . In the study by Targa et al. (Targa et al., 2020) which compared the mean PSQI scores of adults before COVID-19 and in the pandemic period reported that sleep quality worsened (5.45 ± 3.14 to 6.18 ± 3.03). Xiao et al. (2020a, 2020b) showed that the reduction in the sleep quality of individuals in central China who were confined at home for 14 days was related to an increase in anxiety and stress (Xiao et al., 2020a). A study in Nepal reported that insomnia substantially increased in the pandemic period (Chandra et al., 2020). In the study conducted in China by Huang and Zhao (Huang and Zhao, 2020), the sleep quality of 18.2% of adults was reported as poor. The findings of our study were like those in the literature, where the psychological distress levels of the adults were found to be high, and their sleep quality was found to be low. It is believed that it may be useful to provide psychosocial support by approaching especially individuals with high psychological distress scores.

The psychological distress scores were found to be higher among the male participants than the female participants. Additionally, gender was included among the factors predicting psychological distress in the regression analysis. Liang (Liang et al., 2020) similarly determined that gender played a moderate role between psychological distress and posttraumatic stress disorders, and the psychological distress rate among men was higher. Tönbüil (Tönbüil, 2020) determined the psychological resilience of women to be higher. In some studies, as opposed to this finding, higher levels of stress were found in women than men in the COVID-19 period (Al-Rabiaah et al., 2020; Conversano et al., 2020; Zhang et al., 2020a, 2020b). In addition to this, it was reported that men may experience job loss and economic distress in relation to being compulsorily confined at home, and this may lead to an increase in psychological distress (Liang et al., 2020). It may be recommended to conduct comprehensive and in-depth studies to assess stress to be experienced based on gender differences.

According to the findings in this study, those who were married experienced more intense stress than those who were single. A study conducted in Wuhan determined that being married was associated with anxiety (Fu et al., 2020). Islam et al. (Islam et al., 2020) determined being married to be a risk factor for general anxiety and panic levels. Badellino et al. (Badellino et al., 2020) identified living with family/partner to be a risk factor for psychological distress. In their study on anesthesia specialists in the COVID-19 pandemic period, Jain et al. (Jain et al., 2020) found being married to be a risk factor for anxiety. Married individuals, who are more protected from mental problems in general, may have experienced domestic conflicts in the process of staying home. It is recommended for healthcare professionals to apply the necessary precaution interventions by keeping these possibilities in mind regarding the effects of the pandemic.

In the study, the psychological distress scores of those who had children were found to be higher than those who did not have children. In a study in Turkey, it was similarly found that the anxiety scores of those experiencing difficulty in looking after their children were higher (Hacimusalar et al., 2020). In addition to the stress caused by the pandemic, the parent-child relationship and the relationship between the parents also affect the mental health of the parents in such a difficult period, and a vicious cycle may be created by the mental health of the parents affecting the mental and bodily health of the children even more (Wu et al., 2020). It is thought that the factor of increased stress in parents with the closure of schools in the pandemic period may have increased psychological distress.

In this study, the psychological distress levels of the working participants were found to be higher than those of the non-working participants. Considering the relationship between occupation and psychological distress, the psychological distress levels of the healthcare professional and those in other professions were higher than those who were not working. Studies conducted with healthcare personnel

reported that stress, depression and anxiety increased in the pandemic process (Huang and Zhao, 2020; Xiao et al., 2020b). In the period when this study was conducted, the system of working from home was left to the initiative of the workplace, and there have been individuals who had to go to work. The psychological distress of those having to go to work may have increased with their concerns of getting the disease. Additionally, those who had to work from home may have had trouble in adapting to this unfamiliar process. It is believed that all these factors may have increased psychological distress, and it may be useful to develop online social support programs for under-risk groups in this process.

The single participants in this study had poorer sleep quality than the married participants. Deo et al. (2020) also determined sleep quality to be poorer in single individuals than married individuals. It is considered that the single participants may have felt social isolation more deeply, and this may have negatively affected their sleep quality.

The sleep quality levels were lower among the participants in this study who had low education levels. This result was compatible with a study in China on insomnia in the general population finding low educational levels to be associated with the probability of insomnia (Xiang et al., 2008). Zhang et al. (2020a, 2020b) determined insomnia on higher levels in those with a lower educational level among healthcare personnel. In similarity to our finding, Nathiy et al. (2020) observed that low educational levels were associated with insomnia (Nathiy et al., 2020). Education level was positively associated with higher awareness and compliance with prevention and management of the COVID-19 pandemic (Fu et al., 2020). For this reason, during the fight against the COVID-19 pandemic, the individuals with high educational levels might have turned towards healthy lifestyle behaviors such as sleep, nutrition, and exercise.

Considering the relationship between working status and sleep quality, the sleep quality of those who left work in the pandemic period was poorer in comparison to those working from home/office and those who were already not working before the pandemic. In a review examining sleep problems in the pandemic period, it was reported that some employment-related factors affected sleep quality (Tasnim et al., 2020). For example, it was found that low-income individuals had a higher risk of sleep disorders in comparison to their high-income colleagues (Fu et al., 2020). While a study reported that leaving work in the pandemic period created a high risk for mental problems (Rodríguez-rey et al., 2020), the concern of individuals about their source of income and the negative effect on their income were associated with sleep disorders (Gaur et al., 2020).

It was found that the participants who were not working and those who were working as healthcare personnel had poorer sleep quality. There are studies in the literature showing that sleep quality is poor among healthcare personnel working in the frontlines in the diagnosis, treatment and monitoring of COVID-19 patients (Qi et al., 2020; Wang et al., 2020b). Additionally, in this study, a significant relationship was found between sleep quality (including subjective sleep quality, sleep duration, sleep latency, sleep disturbances and general self-assessed sleep quality) and psychological distress. There was no significant relationship between the habitual sleep efficiency and sleep quality of the adult participants. The negative effect of poor sleep quality on mental status has been proven in several studies conducted on the general population and risk groups such as healthcare specialists and students (Gupta et al., 2018; Liu et al., 2020; Xiao et al., 2020a, 2020b). Thus, it may be stated that, as psychological distress levels increase, sleep problems such as difficulty in falling asleep or frequent awakening will be experienced more frequently.

4.1. Limitations

This study had some limitations. As the study was carried out with the method of online questionnaire, the psychological distress and sleep quality levels of those who could not access the questionnaire could

not be assessed. The data obtained in the study are limited to the statements in the scales that were used in the study and the self-reports of the participants. As the results of the study are limited to the sample, they may not be generalized to the entire society.

5. Conclusion

This study examined the psychological distress levels and sleep quality levels of adults in a Turkish population during the COVID-19 pandemic period and influential factors. The findings of this study provide a scientific foundation in psychological interventions aimed at reminding researchers, healthcare providers and government officials to take precautions.

Author statement

No conflict of interest exists in the submission of this manuscript, and manuscript is approved by all authors for publication. I would like to declare on behalf of my co-authors that the work described was original research that has not been published previously.

Ethical statement

A consent form was signed by all participants before they started the questionnaire. The study was approved by the Ethics Committee of X University.

Declaration of Competing Interest

None.

Acknowledgments

We thank all the study participant.

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