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The Effects of COVID-19 Pandemic on Pregnant Women: Perceived Stress, Social Support and Sleep Quality

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ABSTRACT

Background This cross-sectional study aims to identify the relationship between perceived stress, social support and sleep quality and the effects of the COVID-19 pandemic on pregnant women's perceived stress, social support and sleep quality.

Methods The target population of the study was pregnant women who applied to the Family Health Center. After the sample calculation was performed, the study involved 166 participants. The data, which were quantitative in nature, were collected through a web-based, online questionnaire administered within a determined period. Data collection tools included the Multidimensional Scale of Perceived Social Support (MSPSS), the Perceived Stress Scale (PSS), and the Pittsburgh Sleep Quality Index (PSQI).

Results Of all the participating pregnant women, 88% reported to have poor sleep quality during the COVID-19 pandemic. A moderate, negative relationship was found between the Pittsburgh Sleep Quality Index and the Multidimensional Scale of Perceived Social Support and a weak, positive relationship with the Perceived Stress Scale. While statistically significant differences were found between the pregnant women's perceived stress according to their psychological perceptions and perceptions about daily life ($P < 0.05$), no significant differences were found between the perceived social support level and sleep quality index.

Conclusion It was considered that pregnant women's perceived social support levels, sleep quality, and perceived stress levels were affected during the COVID-19 pandemic.

Key words COVID-19; perceived stress; pregnancy; sleep quality; social support

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Abbreviations: COVID-19, coronavirus disease 2019; MERS, Middle East Respiratory Distress Syndrome; MSPSS, Multidimensional Scale of Perceived Social Support; SARS, Severe Acute Respiratory Distress Syndrome; PSQI, Pittsburgh Sleep Quality Index; PSS, Perceived Stress Scale; WHO, World Health Organization

Coronavirus disease 2019 (COVID-19), which was first detected in Wuhan, China at the end of 2019, was declared as a pandemic by the World Health Organization (WHO) on 11th March 2020 due to the factors such as its rapid spread between the countries and high morbidity and mortality rates (3,4%); the first case in Turkey was also reported on 11th of March 2020.[1–3] As of the 4th of April 2020, a curfew was implemented for people aged below 20. After the first curfew declared at the weekend, 11-12 April 2020, curfews were implemented at the weekends and during national and religious holidays. According to the data obtained on the 25 April 2020, the current number of cases in Turkey was 868.565; the current number of recoveries was 3845, and the number of deaths was 2706. In the statements by the Ministry of Health, city-specific case information is limited. The average daily number of cases was 2548 and the number of deaths was 95 in Turkey when the survey was administered. According to the data provided by the Ministry of Health, Adana was the 8th city where the cases were most common and the 6th city where the number of deaths was the highest.[4]

Individuals with weak immune system are at high risk of COVID-19. Poor sleep quality and stress are important factors that weaken the immune system.[5] With the effects of the suppression of T cell activities and other physiological changes experienced, pregnancy increases being prone to viral infections and could affect the disease prognosis negatively. Hence, pregnant women are considered to be at risk of COVID-19.[6, 7] An analysis of the data about previous epidemics such as H1N1 Influenza, Severe Acute Respiratory Distress Syndrome (SARS), and Middle East Respiratory Distress Syndrome (MERS) indicates that the morbidity and mortality rates of pregnant women were more severe in comparison to the women who were not pregnant. No studies have so far made such comparison for COVID-19.[8–11]

Pandemic periods have negative effects on individuals' sleep quality. A study conducted during the COVID-19 pandemic reported that individuals had high anxiety and low sleep quality levels.[12] Sleep problems caused by the physiological effect of pregnancy could demonstrate an increase during pandemic periods. Pregnant women experience fear and anxiety such as

fear of infection, effects on delivery plans, and harm to the baby. In these periods, pregnant women tend to have preferences such as postponing going to hospital due to the fear of infection, terminating the pregnancy due to intensive stress, or receiving an elective cesarean section.[13, 14] Social support has an important place in decreasing problems such as stress and anxiety.[15] Increased social support is associated with less stress and anxiety in pregnant women.[16]

An analysis of the literature shows that studies are generally about pregnant women's anxiety levels during the pandemic. Anxiety affects and is affected by many concepts. Social support and sleep quality, which are extremely important concepts during pregnancy, are also related to anxiety. The literature includes no studies that made a holistic evaluation of pregnant women's social support, sleep quality, and stress experienced during the pandemic period. In this regard, this descriptive study aims to determine the relationship between perceived stress, social support and sleep quality and the effects of the COVID-19 pandemic on pregnant women's perceived stress, social support and sleep quality.

MATERIALS AND METHODS

Study design

This empirical study adopted a cross-sectional design. Data were collected online through Google Forms. The link to the questionnaire was sent to the participating individuals through e-mails, WhatsApp, and other social media channels between 25th April 2020 and 30th April 2020, and the responses received from the participants in this period were accepted.

Research hypothesis

1. Social support perception, perceived stress level, and sleep quality are associated with each other.
2. Pregnant women's perceived social support levels, sleep quality, and perceived stress levels are affected during the COVID-19 pandemic.

Target population and the sample

The target population of the study was the pregnant women who applied to a Family Health Center in Adana, a city located in southern Turkey. The pregnant women who met the research criteria were involved in the sample. The current number of pregnant women registered in the center was 291. The sample was selected using the sampling formula with a known population.

Research data on the prevalence of poor sleep quality in pregnant women (51.9%) reported in the study conducted by Kostanoğlu et al. (2019) were utilized, and the sample size was identified as 166.[14]

$$n = N .t .t .p.q / d.d .(N-1) + t.t.p.q$$

$$n = 291x1.96x1.96x0.50x0.50/0.05x0.05(291-1) + 1,96.1,96.0,50.0,50$$

Inclusion Criteria:

- Being literate,
- Being 18 and over,
- Agreeing to participate in the study.

Exclusion Criteria:

- Having a risky pregnancy requiring hospitalization,
- Not completing the questionnaires.

Data collection

Data collection was performed in an online environment. The data, which were all quantitative in nature, were collected through a web-based questionnaire administered online within a determined period. The invitation to participate in the study was sent to the e-mail, WhatsApp and other social media addresses of the pregnant women. The individuals who were directed to the link giving information about the study initially saw the informed consent form. Those who consented moved to the phase of filling in the questionnaire form and participated in the study. Completing the online form took about 5 to 10 minutes.

Data were collected through the Structured Socio-demographic Form prepared by the researchers in line with the related literature, the Multidimensional Scale of Perceived Social Support (MSPSS), the Perceived Stress Scale (PSS), and the Pittsburgh Sleep Quality Index (PSQI). The forms were sent to the participants online.

The socio-demographic form

The socio-demographic form consists of two parts. The first part of the form included 18 questions that aimed to collect data about the participants' general health and psychosocial and obstetric features. The second part of the form included six questions that aimed to collect data about perceptions about how pregnant women are affected by the COVID-19 pandemic. Perceptions were about how it changed daily life, fear of birth, expectations about future, sleep quality and anxiety level. The participants were asked to rate how these perceptions changed during the pandemic process by indicating too much, medium, low or none. Data were reencoded due to the scattered statistical data. Hence, the responses were categorized as too much, medium-low and none.

The Multidimensional Scale of Perceived Social Support (MSPSS)

The scale was developed by Zimet et al. (1988). The Turkish validity and reliability of the scale were first

performed by Eker et al. (1995) and revised by Eker et al. (2001). The 12-item scale is composed of three subscales as family, friends, and significant other. The total score is taken as a basis in the scale that is responded on a 7-point Likert scale (I totally disagree- I totally agree). While the scores to be received from the subscales range between 4 and 28, the score to be received from the whole scale ranges between 12 and 84. Higher scores indicate higher perceived social support.[17]

The Perceived Stress Scale (PSS)

The 5-point Likert scale that is composed of 14 items (Never-Very Frequently) was developed by Kamarck and Mermelstein (1983), and its reliability and validity were performed by Eskin et al. (2013). Items 4, 5, 6, 7, 9, 10, and 13 are scored reversely. The total score is taken as a basis, and the maximum score to be received from the scale is 56. The increase in the scale total score indicates an increase in the perceived stress level.[18]

The Pittsburgh Sleep Quality Index (PSQI)

The 18-item and 4-point Likert scale was developed by Buysse et al. (1989), and its Turkish reliability and validity were performed by Ağargün et al. (1996). The self-report scale included 18 items and 7 components (subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction). The scale is assessed based on the total score. Each item is scored from 0 to 3. The total score is obtained by adding the scores of the 7 components. The scale total score ranges between 0 and 21. Increased scores indicate poorer sleep quality. A total score of < 5 indicates "good sleep" and that of > 5 indicates "poor sleep."[19]

Data analysis

Data were analyzed using SPSS 22 (Statistical Programme for Social Science) package programming.[20] The comparison of the participants' personal and obstetric features by sleep quality was done using Chi-square; distribution of scale scores by sleep quality and the relationships between the scales were performed using Independent t-test and correlation; the analysis of the distribution of scale scores by personal and obstetric features was done using independent t-test and one-way ANOVA; and the analysis of the distribution of being affected by the COVID-19 pandemic was done using One-way ANOVA tests. Post-hoc analysis of multiple comparisons was performed using the Tukey HSD test. Statistical significance was taken $P \leq 0.05$ in the analyses.

Ethical considerations

Ethics committee approval was received from Çukurova University Medical Faculty Non-invasive Research Ethics Committee (Number: 50243401/2020-14).

RESULTS

Table 1 demonstrates the pregnant women's descriptive and obstetric features. The average age of the participants was 29.65 ± 4.79. Of all participants, 56.6% worked, 69.9% had an education level of university and above, 90.4% had social security, 53% had medium income level, and 95.2% had a nuclear family. The participants reported that the COVID-19 pandemic affected their psychology (55.4%), daily life (67.5%), and anxiety (55.4%) at too much; they were also found to experience medium-low level of effects on expectations about future (68.7%), sleep quality (41%), and fear of birth (69.9%) (Table 1).

The participants' MSPSS mean score was 64.07 ± 17.84; the PSS mean score was 27.78 ± 5.63; and the PSQI mean score was 7.95 ± 2.19. An analysis of the PSQI scores showed that while 12% of the participants experienced good sleep, 88% experienced poor sleep. The participants' sleep latency was found 29.13 ± 24.83 minutes on average, and their sleep duration was 8.35 ± 1.74 hours. No significant differences were found between the perceived social support by sleep quality ($P < 0.05$).

The correlation analyses performed for identifying the relationship between the scales showed that while there was a moderate, negative relationship between PSQI and MSPSS ($P < 0.05$, $r = –0.318$), there was a weak, positive relationship with PSS ($P < 0.05$, $r = 0.176$). The PSQI was found to decrease as the perceived social support increased, indicating that the sleep quality improved. The PSQI was found to increase as the perceived stress increased, indicating that the sleep quality got worse. A significant relationship was found between sleep duration and perceived stress level ($P < 0.05$). The results of the correlation analyses that were performed to analyze the relationship between the MSPSS and the PSS indicated a weak, negative relationship ($P < 0.05$). In other words, the stress level was found to decrease with the increase in perceived social support (Table 2).

Table 3 demonstrates the distribution of scale total scores according to the participants' perceptions about being affected by the COVID-19 pandemic. Advanced post hoc analysis was performed to determine the results. The Tukey HSD test was used in the post hoc analysis.

Firstly, sleep quality, perceived stress, and social support levels were determined according to

Table 1. Findings about the participants' descriptive and obstetric features and their perceptions about various effects of the COVID-19 pandemic (*n* = 166)

Age (years), mean ± SD			
29.65 ± 4.79			
	n (%)		*n* (%)
Education level		Number of living children	
Secondary school	10 (6.0)	One	98 (59.0)
High School	40 (24.1)	Two	56 (33.7)
University and above	116 (69.9)	Three and more	10 (6.0)
Working		Type of pregnancy	
Working	94 (56.6)	Natural pregnancy	146 (88.0)
Not working	72 (43.4)	Assisted reproductive techniques	20 (12.0)
Social security		Wanting the pregnancy	
Yes	150 (90.4)	Planned pregnancy	140 (84.3)
No	16 (9.6)	Unplanned pregnancy	26 (15.7)
Income level perception		Pregnancy trimester	
Good	66 (39.8)	1st Trimester	18 (10.8)
Medium	88 (53.0)	2nd Trimester	70 (42.2)
Low	12 (7.2)	3rd Trimester	78 (47.0)
History of a psychiatric disease		Health problem history in pregnancy	
None	150 (90.4)	None	136 (81.9)
Depression	10 (6.0)	Vaginal bleeding	8 (4.8)
Obsessive-compulsive disorder	4 (2.4)	Threatened abortion	4 (2.4)
Anxiety	2 (1.2)	Preeclampsia	4 (2.4)
		Hyperemesis gravidarum	4 (2.4)
		Other (hydronephrosis, fetal problems, pancreatitis)	10 (6.1)
Presence of a chronic disease		Psychological perceptions of the COVID-19 pandemic	
None	158 (95.2)	Too much	92 (55.4)
Migraine	4 (2.4)	Medium-low	66 (39.8)
Thyroid	4 (2.4)	None	8 (4.8)
Family type		Perceptions of the COVID-19 pandemic on daily life	
Nuclear family	158 (95.2)	Too much	112 (67.5)
Extended family	8 (4.8)	Medium-low	54 (32.5)
Current habits		Perceptions of the COVID-19 pandemic on anxiety level	
None	148 (89.2)	Too much	92 (55.4)
Smoking	18 (10.8)	Medium-low	74 (44.6)
Partner support		Perceptions of the COVID-19 pandemic on expectations about future	
Always	130 (78.3)	Too much	40 (24.1)
Sometimes	20 (12.0)	Medium-low	114 (68.7)
Never	16 (9.6)	None	12 (7.2)
Marriage relationships		Perceptions of the COVID-19 pandemic on sleep quality	
Good	126 (75.9)	Too much	59 (35.5)
Medium	30 (18.1)	Medium-low	68 (41.0)
Poor	10 (6.0)	None	39 (23.5)
Number of pregnancies		Perceptions of the COVID-19 pandemic on fear of birth	
One	104 (62.7)	Too much	30 (18.1)
Two	50 (30.1)	Medium-low	116 (69.9)
Three and more	12 (7.2)	None	20 (12.0)

psychological perceptions. While the pregnant women's perceived stress level demonstrated significant differences according to their psychological perceptions ($P < 0.05$), no significant differences were found between the perceived social support level and sleep quality index. According to the psychological perception, the perceived stress levels of pregnant women who were very much affected by the COVID-19 pandemic were

Table 2. Relationship between Pittsburgh Sleep Quality Index (PSQI), Multidimensional Scale of Perceived Social Support (MSPSS) and Perceived Stress Scale (PSS) (*n* = 166)

	PSQI		PSS		MSPSS	
	r	*P*	*r*	*P*	*r*	*P*
PSQI	1	–	0.176	0.023	–0.318	0.020
PSS	0.176	0.023	1	–	–0.194	0.012
MSPSS	–0.318	0.020	–0.194	0.012	1	–

Pearson correlation.

Table 3. Effects of pregnant women's perceptions about being affected by the COVID-19 pandemic on stress, social support, and sleep quality (*n* = 166)

	Psychological perceptions					
	Too much [a]	Medium-low [b]	None [c]			
	Mean ± SD	Mean ± SD	Mean ± SD	*F*	*P*	Tukey HSD test
PSQI	7.86 ± 2.09	8.00 ± 2.28	8.50 ± 2.67	0.536	0.720	
MSPSS	62.84 ± 18.02	65.03 ± 18.35	70.25 ± 8.98	0.789	0.456	
PSS	29.78 ± 4.95	25.27 ± 5.69	25.50 ± 3.42	15.225	< 0.001	a) > b)**, a) > c)**
	Perceptions on daily life					
	Too much	Medium-low	None			
	Mean ± SD	Mean ± SD	Mean ± SD	*t*	*P*	
PSQI	7.89 ± 2.20	8.07 ± 2.17	†	0.248	0.619	
MSPSS	63.26 ± 18.21	65.74 ± 17.09	†	0.698	0.405	
PSS	28.80 ± 5.14	25.66 ± 6.06	†	12.034	< 0.001	
	Perceptions on anxiety level					
	Too much	Medium-low	None			
	Mean ± SD	Mean ± SD		*t*	*P*	
PSQI	7.82 ± 2.08	8.10 ± 2.31	†	1.381	0.411	
MSPSS	63.58 ± 18.07	64.67 ± 17.66	†	0.355	0.697	
PSS	29.32 ± 5.13	25.82 ± 5.68	†	2.823	< 0.001	
	Perceptions on expectations about future					
	Too much [a]	Medium-low [b]	None [c]			
	Mean ± SD	Mean ± SD	Mean ± SD	*F*	*P*	Tukey HSD test
PSQI	7.95 ± 2.08	8.05 ± 2.26	7.00 ± 1.70	1.258	0.287	
MSPSS	60.15 ± 23.94	64.92 ± 16.21	69.00 ± 5.22	1.566	< 0.001	a) < b)**, a) < c)**
PSS	31.75 ± 4.90	26.94 ± 5.27	22.50 ± 3.23	20.258	< 0.001	a) > b)**, a) > c)**
	Perceptions about sleep quality					
	Too much [a]	Medium-low [b]	None [c]			
	Mean ± SD	Mean ± SD	Mean ± SD	*F*	*P*	Tukey HSD test
PSQI	8.33 ± 1.79	8.07 ± 2.04	7.15 ± 2.75	3.735	0.026	a) > c)*, b) > c)*
MSPSS	61.49 ± 20.53	63.80 ± 18.27	68.43 ± 10.95	1.808	0.167	
PSS	28.06 ± 5.88	28.19 ± 5.88	26.64 ± 5.06	1.054	0.351	
	Perceptions on fear of birth					
	Too much [a]	Medium-low [b]	None [c]			
	Mean ± SD	Mean ± SD	Mean ± SD	*F*	*P*	Tukey HSD test
PSQI	8.46 ± 2.02	8.00 ± 2.09	6.90 ± 2.69	3.249	0.041	a) > c)*, b) > c)*
MSPSS	58.73 ± 19.51	66.03 ± 16.94	60.70 ± 19.12	2.442	0.090	
PSS	27.86 ± 7.13	27.81 ± 5.52	27.50 ± 3.70	0.030	0.921	

One way ANOVA, Independent *t* test. *$P < 0.05$, **$P < 0.001$. †Not suitable for analyses.

higher than those who were affected at medium-low levels (Table 3).

Secondly, sleep quality, perceived stress and social support levels were determined according to perceptions about daily life. While statistically significant differences were found between the pregnant women's perceived stress level according to their perceptions about daily life ($P < 0.05$), no significant differences were found between the perceived social support level and sleep quality index. According to perceptions about daily life, the perceived stress levels of pregnant women who were very much affected by the COVID-19 pandemic were higher than those who were affected at medium-low levels (Table 3).

Thirdly, sleep quality, perceived stress and social support were determined according to perceptions about anxiety level. While statistically significant differences were found in the pregnant women's perceived stress level according to their perceptions about anxiety level ($P < 0.05$), no significant differences were found between the perceived social support level and sleep quality index. According to perceptions about anxiety level, the perceived stress levels of pregnant women who were very much affected by the COVID-19 pandemic were higher than those who were affected at medium-low levels (Table 3).

Fourthly, sleep quality, perceived stress and social support were determined according to perceptions about expectations about future. While statistically significant differences were found between the pregnant women's perceived stress and social support levels according to their expectations about future ($P < 0.05$), no significant differences were found in terms of the sleep quality index. According to expectations about future, the perceived stress levels of pregnant women who were very much affected by the COVID-19 pandemic were higher than those who were affected at medium-low levels (Table 3).

Fifthly, sleep quality, perceived stress and social support levels were determined according to perceptions about sleep quality. While statistically significant differences were found in the sleep quality index according to perceptions about sleep quality ($P < 0.05$), no significant differences were found in the perceived social support and stress level. According to the sleep quality perception, the sleep quality index of pregnant women who were very much affected by the COVID-19 pandemic was higher than those who were affected at medium-low levels (Table 3).

Sixthly, sleep quality, perceived stress and social support levels were determined according to perceptions about fear of birth. While statistically significant differences were found in the sleep quality index according to the perceptions about fear of birth ($P < 0.05$), no significant differences were found between the perceived social support and stress level. According to perceptions about fear of birth, the sleep quality of pregnant women who were very much affected by the COVID-19 pandemic was higher than those who were affected at medium-low levels (Table 3).

DISCUSSION

This study primarily contributes to the limited literature on the perceived social support, perceived stress and sleep quality of pregnant women during the pandemic. The results show that pregnant women are affected by the pandemic period. Especially perceived social support was found to decrease considerably during the pandemic.

The literature indicates that individuals could experience problems such as stress, anxiety, depression, and sleep disorders during the COVID-19 pandemic.[21, 22] Huang and Zhao (2020) reported that 20% of individuals experienced sleep problems in this period.[12] Social distancing and decreased social support levels experienced during the COVID-19 pandemic are reported to be risk factors for stress.[23] The decrease in sleep quality in pregnancy is a frequently encountered problem.[24] The COVID-19 pandemic is considered to trigger this problem more. This study conducted during the pandemic found that pregnant women had medium-level perceived stress and social support and poor sleep quality. An analysis of the studies that evaluated sleep quality in pregnancy shows that pregnant women experience poor sleep quality at a proportion of 38.8% to 82.6%.[14, 25–28] This study found the proportion of poor sleep quality as 88% among the participating pregnant women. Sufficient sleeping duration was defined as sleeping 7–9 h/day.[29] Ko et al. (2014) reported that the PSQI score of pregnant women was 7.33 ± 2.11 on average, and the duration of daily sleep was 8.59 ± 1.67. This study found the PSQI score of pregnant women as 7.95 ± 2.19 and sleep duration as 8.35 ± 1.74 on average.[24]

Li at al. (2016) found a negative relationship between women's stress level and sleep quality.[26] This study also found that pregnant women's perceived stress levels increased during the pandemic, which led to a decrease in their sleep quality. Giurgescu et al. (2015) reported that pregnant women who had higher perceived stress levels had lower social support.[30] This study found that the perceived stress level scores were higher in those who had inadequate partner support.

This study found that the participating pregnant women had poor sleep quality and a moderate level

of perceived social support and stress. A moderate, negative relationship was found between sleep quality and the perceived social support and a weak, positive relationship with the perceived stress scale. It was found that COVID-19 affected the pregnant women's sleep quality, perceived social support and stress levels negatively and moderately. The stress level was found to be higher in women who thought that the pandemic period affected their daily life and psychological status. The pregnant women's sleep quality decreased with the increase in the perceived stress level, and the stress level decreased and sleep quality increased with the increase in the social support level. Hence, pregnant women who had high social support were found to be affected less in the pandemic process and experience stress and poor sleep quality less frequently. Little is known about the stress in pregnancy during contagious diseases and/or quarantine. On the other hand, the effects of stress and anxiety during pregnancy and labor are well documented. Lebel et al. (2020) reported that they found dramatically increased anxiety and depression symptoms in comparison to similar pre-pandemic pregnancy cohorts. Higher depression and anxiety symptoms were associated with higher anxiety due to the COVID-19 threat about the mother's and the baby's life as well as worries about experiencing tension in partner relationships and social isolation. The same study associated lower psychological symptoms with higher levels of perceived social support, support efficiency.[31] This study similarly found that the perceived stress levels of pregnant women increased due to the COVID-19 pandemic, which affected pregnant women's daily life, anxiety, and expectations about the future. Many pregnant women felt insecure and anxious in this difficult process. As these findings indicate that these women need more support and assurance provided by health professionals both during pregnancy and in the labor and postpartum periods, pregnant women should be supported in terms of social, psychological, and medical aspects.

Limitations of the study

This study has some limitations, but it has important contributions and recommendations to the literature. Firstly, the study was conducted in Adana, a city in the south of Turkey. Results cannot be generalized to all pregnant women. Secondly, the study was conducted in the pandemic period. Pregnant women's sleep quality, perceived stress, and social support levels before and during the pandemic could have been investigated. However, this study does not provide any information about it. A clearer comparison of the effects of the pandemic process could be made better through prospective cohort studies. Researchers planning such a study are recommended to consider assessing pregnant women in different periods. Considering that the pandemic continues, this study is important in terms of providing preliminary data for other studies to be conducted. Thirdly, some demographic characteristics of pregnant women such as the economy were affected during the pandemic. It has questioned how they define their overall economic status in the research. In the study, it was not questioned how the pandemic affected their economy. Parameters such as economy are associated with anxiety, sleep or social support. Researchers are recommended to question factors such as the economy. Fourthly, a small group of participants mentioned the presence of psychiatric illness. Although this factor does not have a statistical relationship with sleep quality, perception of social support and perceived stress level, it is a weakness of the study. It is recommended to add this factor as an exclusion criterion for furthermore studies. Finally, the study has various biases due to the online data collection method. Participants who were illiterate, who did not have a phone or computer, or internet connection could not be reached. The questionnaire forms were prepared in plain language without technical terms. Even so, explanatory information could not be provided if the participants might need it.

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