Original Article / *Özgün Makale*

DOI: 10.4274/jtsm.galenos.2022.66376

Journal of Turkish Sleep Medicine 2023;10:54-59

Comparison of Sleep Disturbances Among Women with and without a History of COVID-19 Infection

COVID-19 Enfeksiyonu Geçiren ve Geçirmeyen Kadınlar Arasındaki Uyku Bozukluklarının Karşılaştırılması

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Abstract

Objective: This study was conducted to compare sleep disturbances between women with and without a history of Coronavirus disease-2019 (COVID-19) infection.

Materials and Methods: In this descriptive study, the "Pittsburgh Sleep Quality Index" was used to evaluate sleep problems. The research sample was calculated as 120: 1. group 60 (with a history of COVID-19) and 2. group 60 (without a history of COVID-19) using the G*Power 3.1 method. A total of 141 women were interviewed in case of data loss. Due to the ongoing pandemic, the forms were filled in via google form in the social media environment. The data were analyzed with Statistical Package for Social Sciences for the Windows 22.0 program.

Results: The mean age of the women involved in the study was 22.241±6.593 (min: 18, max: 58). Women with a history of COVID-19 experience occasional sleep problems several times a week and have difficulty falling asleep. Statistically significant differences were found between the sleep quality of women with and without a history of COVID-19. Subjective sleep quality, sleep latency, habitual sleep efficiency, use of sleeping medication, daytime dysfunction, and total sleep quality scores were found to be higher in women with a history of COVID-19.

Conclusion: Sleep quality is lower in women with a history of COVID-19. During the COVID-19 pandemic, sleep quality should be evaluated, and sleep problems should be identified and treated within a short period. It is recommended to develop methods of coping with anxiety and stress experienced, especially during the COVID-19 pandemic and to raise awareness on this issue among people with a COVID-19 history.

Keywords: COVID-19, sleep quality, women

Öz

Amaç: Bu araştırmanın amacı Koronavirüs hastalığı-2019 (COVID-19) geçiren ve geçirmeyen kadınlar arasındaki uyku bozukluklarının karşılaştırılmasıdır.

Gereç ve Yöntem: Tanımlayıcı olarak planlanan bu çalışmada uyku problemlerinin değerlendirilmesi için "Pittsburgh Uyku Kalitesi İndeksi" kullanılmıştır. Araştırma örneklemi G*Power 3.1 yöntemiyle birinci grup 60 (COVID-19 geçiren), ikinci grup 60 (COVID-19 geçirmeyen) olmak üzere 120 olarak belirlenmiştir. Kayıplar göz önüne alınarak toplamda 141 kadın ile görüşülmüştür. Pandeminin devam etmesi sebebi ile formlar sosyal medya ortamında Google form ile doldurulmuştur. Araştırma verileri Statistical Package for Social Sciences for Windows 22.0 programı ile analiz edilmiştir.

Bulgular: Çalışmaya katılan kadınların yaş ortalaması 22,241±6,593 (min: 18, maks: 58) idi. COVID-19 geçiren grup arasında uyku problemlerini haftada birkaç kez sıklıkla ve ara sıra görüldüğü, kadınların uykuya dalmada zorluk yaşadıkları tespit edildi. COVID-19 geçiren ve geçirmeyen kadınlar arasında uyku kalitesinin değerlendirilmesi sonucunda gruplar arasında istatistiksel olarak anlamlı farklar tespit edildi. COVID-19 geçiren kadınlar arasında öznel uyku kalitesi, uyku latansı, alışılmış uyku etkinliği, uyku ilacı kullanımı, gündüz uyku işlev bozukluğu ve toplam uyku kalitesi puanlarının daha yüksek olduğu tespit edildi.

Sonuç: COVID-19 geçiren kadınlar arasında uyku kalitesi daha düşüktür. COVID-19 sürecinde uyku kalitesinin değerlendirilmesi ve uyku problemlerinin kısa sürede belirlenerek tedavi edilmesi önemlidir. Özellikle COVID-19 sürecinde yaşanılan kaygı ve stresle baş etme yöntemlerinin geliştirilmesi ve tanı alan kişilerin bu konuda da farkındalıklarının sağlanması önerilmektedir.

Anahtar Kelimeler: COVID-19, uyku kalitesi, kadın

Introduction

Sleep is defined as the state of temporary, partial, and periodic loss of the organism's communication with the environment (1). People spend an average of 1/3 of their life sleeping. It would not be a correct assessment to consider sleep only as a time outside of daily life because it is a vital necessity that forms the basis of a healthy and long life (1-3). Considering the

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Received/Geliş Tarihi: 06.05.2022 **Accepted/Kabul Tarihi:** 02.08.2022

average life expectancy, this ratio is equivalent to the significant years of human life. Recent studies have reported that the average life expectancy in our country is 78.6 (4). This means that a person spends an average of 26.2 years sleeping, which corresponds to a significant period.

Sleep quality is the individual's feeling rested, fit, and ready for a new day after waking up. Sleep quality includes both quantitative aspects of sleep like sleep latency, sleep duration, frequency of waking up at night, and subjective aspects like sleep depth and restfulness (3). In determining sleep quality, there are important criteria such as environmental factors, occupational conditions, stress, presence of disease, and sleep routine of the person. Studies have reported that sleep disorders are more common in people with chronic diseases and occupational groups working on shifts (3,5).

It is suggested that sleep problems may have developed in women after the Coronavirus disease-2019 (COVID-19) pandemic that emerged in Wuhan, China. The reasons for this can be listed as the increase in the workload, uncertainties, worrying about the family, barriers to accessing health facilities, and the increase in the household burden of non-working women due to family members staying at home (6). This increasing workload, social, and health concerns in women turn into a stress factor and eventually lead to sleep disturbances.

The study aims to examine sleep disturbances and affecting factors in women during the COVID-19 pandemic.

Materials and Methods

Research Design and Sampling

The study is in descriptive design. The research sample was determined as 120 people: 1. group 60 (those with a history of COVID-19) and 2. group 60 (those without a history of COVID-19) using the G*Power 3.1 method [ratio var1/var 0: 0.3647827, α=0.03, power (1-β err prob) = 0.95]. The variance rate was determined by calculating the variance analysis values in the reference study (7). The data were collected online due to the ongoing pandemic and high case numbers. Due to the unknown population, the non-probability and easy sampling method was used thanks to being fast and easy. The research was conducted with volunteer participants who approved the information text at the top of the form in accordance with the Helsinki Declaration criteria. Considering the possibility of data loss, 143 people who met the inclusion criteria of the research were reached. Due to the incomplete form, 2 women were excluded from the study, and thus the sample consisted of 141 participants.

Inclusion Criteria

Inclusion criteria for the study were being female between the ages of 20 and 65, speaking and understanding Turkish, having a history of COVID-19 (group 1), not having a history of COVID-19 (group 2), having no sleep problems before the COVID-19 pandemic, not having been diagnosed with any psychiatric disorder before the pandemic, and being a volunteer. In addition, women included in the 1. Group were required to have been infected with COVID-19 a minimum of three and a maximum of 6 months ago.

Exclusion Criteria

Exclusion criteria were withdrawing from the study at any time and filling in the survey forms incompletely.

Data Collection Tools

In this descriptive study, data were collected in two stages using a 30-item "Participant Information Form" and a 24-item "Pittsburgh Sleep Quality Index (PSQI)", which were created by the researchers scanning the literature and consulting experts.

Participant Information Form: The form consists of a total of 33 questions prepared by making use of the literature. Some of the questions are multiple choice and some are open-ended. This form includes: questions to inquire about his sociodemographic history, his status of passing COVID-19, his thoughts on the COVID-19 pandemic, sleep patterns and sleep problems.

The Pittsburgh Sleep Quality Index: PSQI was developed by Buysse et al. (8) and adapted into Turkish by Yücel Ağargün et al. (9). PSQI is a 19-item self-report scale that evaluates sleep quality and disturbance over one month. On the scale consisting of 24 questions, 19 questions are self-report questions, and 5 questions are answered by the spouse or roommate. The 18 questions scored consist of 7 components: Subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbance, use of sleeping medication, daytime dysfunction. Each component is evaluated over 0-3 points, and the total score yields the scale score. The total score ranges from 0 to 21, and a total score greater than 5 indicates "poor sleep quality". The Cronbach's alpha reliability of the scale is 0.875. The Cronbach's alpha reliability of this study was found to be 0.777.

Statistical Analysis

The data form created by the researchers was converted online via Google Forms due to the pandemic. The online form link was forwarded to women via WhatsApp and e-mail. The data were evaluated with the Statistical Package for the Social Sciences (SPSS)-22 program, error controls, tables, and statistical analyzes were made. In statistical evaluations, numbers and percentage values were given, and normality analyzes were made. Normality control of continuous variables was evaluated with the Shapiro-Wilk test. Student's t-test was used to compare the mean of the groups according to the variables conforming to the normal distribution. The Mann-Whitney U test was used to compare the groups in the variables that did not conform to the normal distribution. The statistical significance level was taken as 0.05 in all analyzes.

Ethical Aspect of Research

Prior to the research, ethics committee approval (number: E-46418926-050.01.04--47573 date: 12.07.2021) was obtained from the Non-Interventional Ethics Committee of the

University of Health Sciences, and forms were sent to women who volunteered to participate in the study. Thus, the Helsinki Declaration Principles and Publication Ethics were complied with at all stages of the research.

Results

The mean age of the women in the study was found to be 22.24±6.59 (min: 18, max: 58). The descriptive characteristics of the women in the study are given in Table 1.

According to Table 1, While there was no significant relationship between women's occupation, marital status, education level, perceived income level, alcohol use, presence of chronic diseases, use of medication, and the status of getting infected with COVID-19, a significant relationship was found between smoking and the status of getting infected with COVID-19 (Table 1). The rate of smoking is higher in the group without a history of COVID-19.

According to Table 2, no significant relationship was found between the state of having sleep problems, the frequency of sleep problems, the effect of sleep problems on physical activities, waking up at night, and the status of having a history of COVID-19. However, having sleep problems, the frequency of sleep problems, and the frequency of waking up at night are more common in the group with a history of COVID-19. There is a statistically significant relationship between having difficulty falling asleep and having a history of COVID-19 ($p<0.05$). Difficulty falling asleep is more common among the group with a history of COVID-19.

According to Table 3, evaluation of sleep quality of women according to their status of having a history of COVID-19 revealed significant differences between subjective sleep quality, sleep latency, habitual sleep efficiency, use of sleeping medication, daytime dysfunction, and total sleep quality scores. Sleep problems were found to be more common among women who had COVID-19, and their sleep quality decreased ($p<0.05$).

Discussion

COVID-19 infection was declared a Public Health Emergency by the World Health Organization on January 30, 2020 (10). The crisis experienced in the early stages of the pandemic, the uncertainties about the process, and the lack of a vaccine and a proven treatment caused serious concerns. The ongoing pandemic causes the emergence of many diseases after being infected. The aim of this study is to determine the effects of getting COVID-19 on sleep quality.

The mean age of the women involved in the study was 22.24. Since the number of students participating in the study was high (77.3%), the age group of women was low, most of them were single, and their education level was high. The rate of smoking was higher in those without a history of COVID-19. Studies have revealed a relationship between smoking and respiratory tract infections, hypertension, diabetes, obesity, and chronic obstructive pulmonary disease (11-13). Especially in studies conducted during the COVID-19 period, it is recommended to

Table 1. Distribution of women's socio-demographic characteristics by having a history COVID-19

		1. Group with a history of COVID-19		2. Group without a history of COVID-19		Total		p
		n	%	n	%	n	%	
Occupation	Housewife/retired	5	8.1	3	3.8	8	5.7	-
	Working	11	17.7	13	16.5	24	17.0	X^2=1,287
	Student	46	74.2	63	79.7	109	77.3	p=0.525
Marital status	Married	9	14.5	11	13.9	20	14.2	X^2=0,010
	Single	53	85.5	68	86.1	121	85.8	p=0.554
Education status	Secondary school	2	3.2	1	1.3	3	2.1	-
	High school and equivalent	6	9.7	3	3.8	9	6.4	X^2=2,742
	Bachelor's + master + PhD	54	87.1	75	94.9	129	91.5	p=0.254
Perceived income	Income less than expenses	19	30.6	34	43.0	53	37.6	-
	Income equal to expenses	32	51.6	36	45.6	68	48.2	X^2=2,670
	Income more than expenses	11	17.7	9	11.4	20	14.2	p=0.263
Smoking	Yes	7	11.3	21	26.6	28	19.9	X^2=5,104
	No	55	88.7	58	73.4	113	80.1	**p=0.019**
Alcohol use	Yes	7	11.3	13	16.5	20	14.2	X^2=0.761
	No	55	88.7	66	83.5	121	85.8	p=0.266
Presence of chronic disease	Yes	7	11.3	10	12.7	17	12.1	X^2=0.061
	No	55	88.7	69	87.3	124	87.9	p=0.508
Use of medication	Yes	11	17.7	14	17.7	25	17.7	X^2=0.000
	No	51	82.3	65	82.3	116	82.3	p=0.584

X^2: Chi-square analysis, COVID-19: Coronavirus disease-2019

Table 2. Comparison of sleep problems between groups								
		Group with a history of COVID-19		Group without a history of COVID-19		Total		p
		n	%	n	%	n	%	
Having sleep problems	Never	21	33.9	18	22.8	39	27.7	-
	Occasionally	34	54.8	55	69.6	89	63.1	X^2=3,260
	Always	7	11.3	6	7.6	13	9.2	p=0.196
Frequency of sleep problems	Everyday	6	10.5	3	4.3	9	7.1	-
	Several times a week	35	61.4	38	54.3	73	57.5	X^2=3,586
	Once a month	16	28.1	29	41.4	45	35.4	p=0.166
Having difficulty falling asleep	Yes	31	50.0	25	31.6	5	39.7	X^2=4,888
	No	31	50.0	54	68.4	85	60.3	**p=0.021**
The effect of sleep problem on daily activities	Yes	37	59.7	54	68.4	91	64.5	X^2=1,143
	No	25	40.3	25	31.6	50	35.5	p=0.186
Waking up at night	Yes	39	62.9	45	57.0	84	59.6	X^2=0.509
	No	23	37.1	34	43.0	57	40.4	p=0.295
Believing that sleeping problem will be over when COVID-19 ends	Yes	23	37.1	28	35.4	51	36.2	X^2=0.041
	No	39	62.9	51	64.6	90	63.8	p=0.489

X^2: Chi-square analysis, COVID-19: Coronavirus disease-2019

Table 3. Comparison of sleep quality by having a history of COVID-19							
	Group with a history of COVID-19 (n=62)		Group without a history of COVID-19 (n=79)				
Groups	Mean	SD	Mean	SD	t	SD	p
Subjective sleep quality	2,871	0.338	2,342	0.618	6,067	139	**0.000**
Sleep latency	2,903	0.298	2,570	0.547	4,321	139	**0.000**
Sleep duration	0.081	0.275	0,127	0.335	-0.874	139	0.383
Habitual sleep efficiency	3,000	0.000	2,949	0.221	1,805	139	**0.045**
Sleep disturbance	2,290	0.458	2,152	0.483	1,729	139	0.086
Use of sleeping medication	2,790	0.410	2,367	0.581	4,859	139	**0.000**
Daytime disfunction	2,871	0.338	2,544	1,084	2,286	139	**0.013**
Total sleep quality	16,726	1,439	14,924	2,969	4,389	139	**0.000**

Independent groups t-test, SD: Standard deviation, COVID-19: Coronavirus disease-2019

quit smoking due to the risk of disease (14). In our study, the reason for the high rate of smoking among women without a history of COVID-19 may be due to the low age scale of the participant group and therefore the low incidence of chronic diseases.

Uncertainties in the COVID-19 period, anxiety, isolation, depression, panic attacks, sleep disorders, fear of death, and illness cause many diseases in individuals. Sleep is a biological function and an active behavior and is vital for the brain and body health of individuals of all ages. Quality sleep increases the health, quality of life, bodily functions, autonomy, and safety of individuals (15,16). Sleep problems were reported to cause insomnia, mood disorder, cognitive dysfunction, depression, anxiety, attention deficit, and memory problems (17). In this study, the effects of COVID-19 on sleep problems were evaluated. The women included in the study did not have any sleep problems prior to COVID-19. Although the examination of the sleep problems experienced by women during the COVID-19 period did not reveal significant differences between the groups, sleep problems were more common among women with a history of COVID-19. It was determined that the group with a history of COVID-19 occasionally experienced sleep problems several times a week and had difficulty falling asleep. There was no significant difference between the groups in terms of perceived subjective sleep difficulties (Table 2).

Literature has citations that curfew and isolation process to reduce the spread of infection in the COVID-19 pandemic, uncertainties, fear of being infected, anxiety, boredom, and feelings of uncertainty affect daily living standards and sleep quality (18-20). Some studies have shown a bidirectional relationship between sleep problems and mood changes in terms of anxiety and depression (17,21,22). Although mood fluctuations in the COVID-19, called a public health crisis, are considered normal, they can be the precursors of various clinical

conditions such as psychological distress, anxiety characterized by somatization forms, and major depressive disorders (23). During the COVID-19 period, post-traumatic stress disorder is seen at a rate of 7% in women, the sleep quality of women with stress disorders has increased, and night-waking problems have increased (24). The results of our study, which evaluated the sleep quality between groups with and without a history of COVID-19, showed statistically significant differences between the groups. Subjective sleep quality, sleep latency, habitual sleep efficiency, use of sleeping medication, daytime dysfunction, and total sleep quality scores were found to be higher in women with a history of COVID-19. It is important to detect and treat the complaints seen in individuals after COVID-19 in the early period. Long-term sleep problems reduce the quality of life of individuals and trigger many disorders. It is thought that controlling stress and anxiety, supporting methods of coping with stress, and eliminating sleep problems in the early period will be a significant step in the COVID-19 period.

Conclusion

The study showed that women with COVID-19 had lower sleep quality. COVID-19 infection disrupts sleep quality, and sleep problems trigger many diseases. It is pivotal to evaluate the sleep quality of individuals with a history of COVID-19 and to identify and treat sleep problems in a short time. It is recommended to develop methods of coping with anxiety and stress experienced especially during the COVID-19 pandemic and to raise awareness on this issue among those with a history of COVID-19.

Ethics

Ethics Committee Approval: Ethics committee approval (number: E-46418926-050.01.04--47573 date: 12.07.2021) was obtained from the University of Health Sciences, Hamidiye Scientific Research Ethics Committee.
Informed Consent: Forms were sent to women who volunteered to participate in the study.
Peer-review: Internally peer-reviewed.

Authorship Contributions

Design: S.D., H.Ö., Data Collection or Processing: S.D., H.Ö., Analysis or Interpretation: S.D., H.Ö., Literature Search: S.D., H.Ö., Writing: S.D., H.Ö.
Conflict of Interest: No conflict of interest was declared by the authors.
Financial Disclosure: The authors declared that this study received no financial support.

References

1. Karakaş SA, Gönültaş N, Okanlı A. The quality of sleep of nurses who works shift workers. ERÜ Sağlık Bilimleri Fakültesi Dergisi 2017;4:17-26.
2. Üstün Y, Çınar Yücel Ş. Hemşirelerin uyku kalitesinin incelenmesi. Maltepe Üniversitesi Hemşirelik Bilim ve Sanatı Dergisi 2011;4:29-38.
3. Çoban S, Yılmaz H, Ok G, Erbüyün K, Aydın D. Investigation of Sleep Disorders in Intensive Care Nurses. J Turk Soc Intens Care 2011;9:59-63.
4. World Health Organization (WHO). Life expectancy and Healthy life expectancy, 2020 data by country. Available from: URL: https://apps.who.int/gho/data/node.main.688
5. Selvi FF, Karakaş SA, Boysan M, Selvi Y. Effects of shift work on attention deficit, hyperactivity, and impulsivity, and their relationship with chronotype. Biological Rhythm Research 2015;46:53-61.
6. Sohrabi C, Alsafi Z, O'Neill N, Khan M, Kerwan A, Al-Jabir A, Iosifidis C, Agha R. World Health Organization declares global emergency: A review of the 2019 novel coronavirus (COVID-19). Int J Surg 2020:76;71-6.
7. Selçuk Arpınar M. A Study on the Effect of Socio-Demographic Features on Sleep Quality. BNEJSS 2020;6:144-57.
8. Buysse DJ, Reynolds CF 3rd, Monk TH, Berman SR, Kupfer DJ. The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. Psychiatry Res 1989;28:193-213.
9. Yücel Ağargün M, Kara H, Anlar Ö. Pittsburgh Uyku Kalitesi İndeksi'nin Geçerliği ve Güvenirliği. Türk Psikiyatri Dergisi 1996;7:107-15.
10. Özcan H, Çakmak S, Salman E. Complementary and Alternative Medicine Methods Used for Sleep Disturbance in Menopause. JTSM 2020;3:207-13.
11. van Zyl-Smit RN, Brunet L, Pai M, Yew WW. The convergence of the global smoking, COPD, tuberculosis, HIV, and respiratory infection epidemics. Infect Dis Clin North Am 2010;24:693-703.
12. O'Leary SM, Coleman MM, Chew WM, Morrow C, McLaughlin AM, Gleeson LE, O'Sullivan MP, Keane J. Cigarette smoking impairs human pulmonary immunity to Mycobacterium tuberculosis. Am J Respir Crit Care Med 2014;190:1430-6.
13. Miyashita L, Suri R, Dearing E, Mudway I, Dove RE, Neill DR, Van Zyl-Smit R, Kadioglu A, Grigg J. E-cigarette vapour enhances pneumococcal adherence to airway epithelial cells. Eur Respir J 2018;51:1701592. doi: 10.1183/13993003.01592-2017
14. van Zyl-Smit RN, Richards G, Leone FT. Tobacco smoking and COVID-19 infection. Lancet Respir Med 2020;8:664-5.
15. Wang S, Zhang Y, Ding W, Meng Y, Hu H, Liu Z, Zeng X, Wang M. Psychological distress and sleep problems when people are under interpersonal isolation during an epidemic: A nationwide multicenter cross-sectional study. Eur Psychiatry 2020;63:e77. doi: 10.1192/j.eurpsy.2020.78
16. Ramar K, Malhotra RK, Carden KA, Martin JL, Abbassi-Feinberg F, Aurora NR, Kapur VK, Olson EJ, Rosen CL, Rowley JA, Shelgikar AV, Trotti LM. Sleep is essential to health: an American Academy of Sleep Medicine position statement. J Clin Sleep Med 2021;17:2115-9.
17. Kay DB, Dzierzewski JM. Sleep in the Context of Healthy Aging and Psychiatric Syndromes. Sleep Med Clin 2015;10:11-5.
18. Sepúlveda-Loyola W, Rodríguez-Sánchez I, Pérez-Rodríguez P, Ganz F, Torralba R, Oliveira DV, Rodríguez-Mañas L. Impact of Social Isolation Due to COVID-19 on Health in Older People: Mental and Physical Effects and Recommendations. J Nutr Health Aging 2020;24:938-47.
19. Franceschini C, Musetti A, Zenesini C, Palagini L, Scarpelli S, Quattropani MC, Lenzo V, Freda MF, Lemmo D, Vegni E, Borghi L, Saita E, Cattivelli R, De Gennaro L, Plazzi G, Riemann D, Castelnuovo G. Poor Sleep Quality and Its Consequences on Mental Health During the COVID-19 Lockdown in Italy. Front Psychol 2020;11:574475. doi: 10.3389/fpsyg.2020.574475
20. Lebrasseur A, Fortin-Bédard N, Lettre J, Raymond E, Bussières EL, Lapierre N, Faieta J, Vincent C, Duchesne L, Ouellet MC, Gagnon E, Tourigny A, Lamontagne MÈ, Routhier F. Impact of the COVID-19 Pandemic on Older Adults: Rapid Review. JMIR Aging 2021;4:e26474. doi: 10.2196/26474
21. Jansson-Fröjmark M, Lindblom K. A bidirectional relationship between anxiety and depression, and insomnia? A prospective study in the general population. J Psychosom Res 2008;64:443-9.

22. Sivertsen B, Salo P, Mykletun A, Hysing M, Pallesen S, Krokstad S, Nordhus IH, Øverland S. The bidirectional association between depression and insomnia: the HUNT study. Psychosom Med 2012;74:758-65.

23. American Psychological Association. APA Dictionary of Psychology. (cited 4 September 2021).

Available from: URL: https://dictionary.apa.org/psychological-distress

24. Liu N, Zhang F, Wei C, Jia Y, Shang Z, Sun L, Wu L, Sun Z, Zhou Y, Wang Y, Liu W. Prevalence and predictors of PTSS during COVID-19 outbreak in China hardest-hit areas: Gender differences matter. Psychiatry Res 2020;287:112921. doi: 10.1016/j.psychres.2020.112921