Self-isolation of Healthcare Workers during COVID-19 Pandemic in a Tertiary Care Center – Association between their Sleep Quality, Anxiety Status and Social Capital

Avik Kumar Layek[1], Nilanjana Ghosh[2], Jagadish Biswas[3], SpandanBhaduri[4]

[1]Tutor, Department of Psychiatry, North Bengal Medical College, Sushruta Nagar, Tiknikata, Dist- Darjeeling, [2]Assistant Professor, Department of PSM, North Bengal Medical College, Sushruta Nagar, Tiknikata,Dist- Darjeeling, [3]Assistant Professor, Department of FMT, North Bengal Medical College, Sushruta Nagar, Tiknikata,Dist- Darjeeling, [4]Professor, Department of General Medicine, North Bengal Medical College, Sushruta Nagar, Tiknikata,Dist- Darjeeling

Abstract

With the rapid spread of COVID-19 since its inception a year back, the frontline healthcare workers, who underwent isolation and quarantine following possible exposure, faced multiple psychiatric problems like deterioration of sleep quality and anxiety manifestations. Different demographic variables were found to be associated with their occurrence, as well as inter-relation between them were found to be common. We tried to examine the role of social support system as well to the appearance of such problems in the present study. After getting the ethical clearance, willing healthcare workers during their isolation and quarantine were presented questionnaires consisting of Socio-demographic proforma, Self-rating Anxiety Scale (SAS), Personal Social Capital Scale 16 (PSCS) and Pittsburgh Sleep Quality Index (PSQI). Data taken were analysed with independent t test and Fishers exact chi square test, Pearson's correlation analysis and linear regression analysis. Majority of the subjects were married Hindu female from urban background, mostly doctor and nurse by profession. Independent T test revealed significant association between gender and anxiety status as well as between marital status and sleep quality. Positive correlation between the PSCS scores and the SAS scores ($r=0.652$, $P<0.01$) and negative correlations between the PSCS and PSQI scores and between the SAS and PSQI score were found albeit being statistically insignificant. Significant association was found between the SAS score and social bridging component of PSCS (Fishers exact chi sq. value 0.54 and $p = 0.003$). Anxiety score was significantly affected when the socio-demographic factors like gender, religion, marital status and scores of sleep quality (PSQI) and social capital (PSCS) were considered together as seen in the linear regression analysis.

Key words: *Healthcare workers, Anxiety, Sleep quality, Social capital, COVID-19.*

Introduction

The novel coronavirus disease (COVID-19) has been proliferating extensively across the globe since its commencement in Wuhan city and adjacent area of China in December 2019[1,2]. World Health Organization declared this a pandemic by 11th March, 2020[3]. Till now around 106 million people have been affected globally with around 2.3 million deaths and a massive hit to the structure of economy and health sectors of varied number of sovereign states[4]. The situation in India has been dire as well with nearly 10 million cases and the number of COVID-19 related mortalities nearing 155 thousands as of now[5].The stretched medical facilities as well as the resources are on the verge of having a toll at the individual level.

Corresponding author:
Dr. Jagadish Biswas
Assistant Professor, Department of FMT
North Bengal Medical College, Sushruta Nagar,
Tiknikata, Dist- Darjeeling, Pin -734012

The Healthcare workers, in spite of being the vanguard, are unable to avert the psychological impacts of these pandemics as we have seen in this one and the previous epidemics like the SARS outbreak in the East Asia and the MERS outbreak in the Middle East. Among the HCWs, personnel involved in direct crisis intervention viz. those in isolation wards, fever clinics, the Intensive Care Unit (ICU) and other related departments are more vulnerable to others. Excess workload, scarce personal protective equipment, media sensation, perceived scarcity of support system can be attributed as possible precipitants of certain impacts[6-9]. Higher chance of getting infected is another contributor to this cause as well.

A fear of role reversal as in becoming a patient may harbinger stigma, coping problem, botheration and a sense of separation among the medical staff [10]. Because of the high transmission rate, the absolute mortality owing to COVID-19 is much more than that caused by Severe Acute Respiratory Syndrome (SARS) and Middle East Respiratory Syndrome (MERS) combined despite having a low mortality rate (2%) [11].

As per studies done throughout the world, psychiatric disorders like anxiety, depression, acute stress reaction and posttraumatic stress disorder have been seen to be common in the survivors of acute infectious diseases, such as SARS[12-14]. Based on the essence, studies were done to assess the psychological impact of cohabitating this disease among the healthcare workers[6,15,16]. Indian studies also digged into the physical and psychological effects of outbreaks of serious infectious diseases on the medical staff, particularly when associated with increased workload and the stress associated with the risk of infection of such a magnitude[17,18].

Regarding different psychological abnormalities sleep quality is a key indicator. It can keep optimal immune activity to combat infection along with improving functionality regarding patient care[19]. Different socio-cultural factors can influence sleep and psychological wellbeing[20]. One such factor is the social support ie the care and support one can perceive to get from other people[21]. It has established role to enhance psychological health and sleep function[22,23].

As felt by the medical staff, anxiety is one of the chief negative emotion during infectious disease epidemic[24]. Lack of effective vaccine and definitive treatment protocol barring symptomatic one has made COVID-19 pandemic a distinct stressor to impact people of both high and low anxiety traits in the early stages. Many studies showed that heightened anxiety state and perceived stress impact sleep quality to a great extent[25-27].

These variables of anxiety, sleep quality, and social support and their interactions among the healthcare workers during isolation and quarantine following COVID 19 exposure are analyzed in the current study.

Methodology

It was a descriptive study with cross sectional design done among the health care workers who went for isolation/ quarantine from different set ups like COVID-19 screening OPD and isolation wards of North Bengal Medical College, the largest rural tertiary care hospital in Darjeeling district located in the corridor connecting the North-East India with the rest. The study subjects were taken by complete enumeration. The quarantined health care workers during the data collection period of 6 months from April 2020 to October 2020 were included in the study. Permission was taken from the Quarantine Committee and Institutional Ethics Committee of NBMC&H.

Health care workers including doctors and nursing staffs who were in self-isolation and quarantine during COVID-19 pandemic following exposure were taken into the study. Those who were willing and had no documented prior mental illlness or were not on any medications for anxiety and depression were included. Complete data from 80 participants could be collected as per the stipulated time and criteria.

The subjects were corresponded the self-reported questionnaires with maintenance of strict anonymity through email and phones. Demographic and social data from the study participants including age, gender, education, marital status were collected in a semistructuredproforma.Individual social support was assessed by Personal Social Capital Scale 16 (PSCI 16)[28]. Similarly, anxiety and sleep quality were assessed by Self-rating Anxiety Scale (SAS)[29] and Pittsburgh Sleep Quality Index (PSQI)[30] respectively. Data was collected after briefly pre-sensitizing them about the

purpose and benefits of study. Queries were addressed and confidentiality ensured.

Result

A total of 80 subjects were studied among whom 6 were kept in Institutional quarantine, 2 were in Isolation and all others were in self- isolation. Majority of study subjects were females (57.2%), Hindus(65%), married (73.2%) and from urban background (78.7%). They belonged to age range of 24 to 41 years with mean age 25.7 ± 4.6 years. All were literate and majority were doctors and nursing staffs. Everyone was employed and free from any co-morbid conditions in past barring 7 people who were taking medicines for hypertension.

Different socio-demographic parameters were compared with the anxiety, sleep and social capital scores to yield for any association. Independent T test revealed significant association between gender and anxiety status among study subjects (Table 1). Marital status and sleep disorder states were also found to be significantly associated with p = 0.000 (Table 2).

Table 1: Association between Gender distribution and Anxiety states among study subjects (n=80)

		Levene's test for equality of variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig (2 tailed)	Mean diff	St. error diff	95% Confidence Interval of the Difference	
									Lower	Upper
Anxiety var.	EVA	33.63	0.000	2.217	78	.030	3.6	1.62	0.36777	6.83223
	EVNA			2.217	56.56	.031	3.6	1.62	0.34837	6.85163

EVA – Equal variances assumed, EVNA - Equal variances assumed

Table 2: Association between Marital Status and Sleep Quality among study subjects (n=80)

		Levene's test for equality of variances		t-test for Equality of Means						
		F	Sig.	t	df	Sig (2 tailed)	Mean diff	St. error diff	95% Confidence Interval of the Difference	
									Lower	Upper
Sleep quality	EVA	41.09	0.000	0.594	78	.554	0.5	0.84	-1.17649	2.17649
	EVNA			1.060	77.48	.293	0.5	0.47	-0.43943	1.43943

EVA – Equal variances assumed, EVNA - Equal variances assumed

The levels of anxiety, sleep quality and social support among the study participants were measured using the Self-Rating Anxiety Scale (SAS), the Pittsburgh Sleep Quality Index (PSQI), and the Personal Social Capital Scale (PSCS) respectively. Results clearly indicated status of quarantined health care workers regarding the various scales aimed to help formulate operationally feasible remedial measures in accordance.Pearson's correlation analysis was used to identify the correlations between the results from the responses of the medical staff. There was a significant positive correlation between the PSCS scores and the SAS scores (r=0.652, P<0.01). Negative correlations between the PSCS scores and the PSQI scores and between the SAS score and PSQI score were found, though these were not statistically significant. Table 3 summarizes these results.

Table 3: Pearson's correlation analysisshowing relationships between the Personal Social Capital Scale (PSCS), the Self-Rating Anxiety Scale (SAS), and the Pittsburgh Sleep Quality Index (PSQI) of the quarantined healthcare workers during COVID-19

	Mean	St Dev	SSRS	SAS	PSQI
SSRS	35.2	6.1	1		
SAS	38.6	7.4	0.652**	1	
PSQI	8.9	3.0	-0.048	-0.120	1

** *P*<0.01. The data shown represent the scores of the questionnaires

Results need to be interpreted keeping in mind the small sample size and inadequacy of reporting due to ambiguity in understanding question clarity as face to face interview was not possible.

Clustering between SAS and PSCS scores were seen to be fair (Figure 1). Significant association was found between the SAS score (a cut off mark 36 is taken) and social bridging component of PSCS (Fishers exact chi sq. value 0.54 and p = 0.003) whereas no significant association was found with PSCS bonding component (cut off mark 15 for each components respectively).

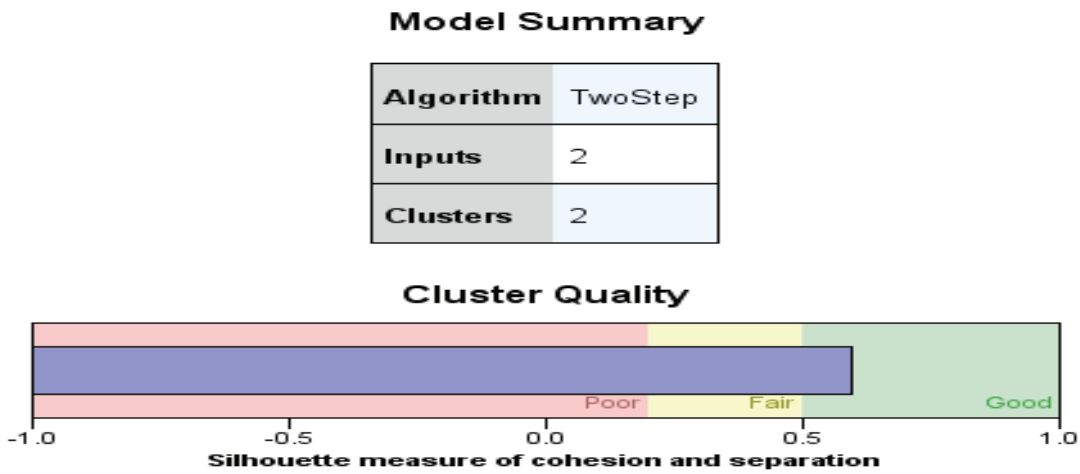

Figure 1: Clustering between SAS and PSCS scores

However on applying multiple linear regression to see interplay of factors with the outcome, it was seen that anxiety score was significantly affected when the socio-demographic factors like gender, religion, marital status and scores of sleep quality (PSQI) and social support (PSCS) were considered together (Table 4).

Table 4: Linear regression results of association of SAS with other factors

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics		
					R Square Change	F Change	df1
1	.794a	.630	.604	4.79052	.630	23.847	5
a. Predictors: (Constant - SAS), PSCS, PSQI, Gender, Marital status, Religion							

Coefficientsa

Model		Unstandardized Coefficients		Standardized Coefficients	T	Sig.	95.0% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	16.597	6.010		2.762	.007	4.611	28.582
	Gender	-3.134	1.255	-.207	-2.497	.015	-5.637	-.631
	Religion	-4.038	1.195	-.311	-3.379	.001	-6.421	-1.655
	Marital status	1.529	1.653	.082	.925	.358	-1.767	4.825
	PSQI score	-.081	.237	-.030	-.341	.734	-.553	.391
	PSCS score	.883	.102	.708	8.631	.000	.679	1.087
a. Dependent Variable: SAS score								

Discussion

Characteristic demographic finding of a younger population consisting of mainly females is found in most of the prior studies in this topic[15-17,27]. Being in the frontline, eagerness to participate and gender difference especially in the nursing staffs can be cited as possible reason for this finding. Also in our study it was found that the women HCW were more commonly associated with subjective anxiety symptoms. Occupational exhaustion, domestic labor inequality, dilemma regarding family responsibility can attribute to such distribution[31]. The same pattern was seen in this study when sleep quality was found to be significantly associated with marital status. Our study corroborates to contemporary Chinese study[32] that no significant association was found between isolated HCW of different departments or designation in contrast to few other studies[6,33].

The findings from this study showed that the sleep quality of the medical staff was low with a mean PSQI score of 8.583. There were several factors that may have resulted in reduced sleep quality in the medical staff. Workload, apprehension about the uncertain situation, irregular duty hours can all lead to such lowering[27]. The findings from this study showed that social support of the medical staff did not directly affect their sleep quality, but it might have influence this by altering subjective anxiety level. Socialsupport can help medical staff reduce anxiety levels, as friends or family members provide social and emotional support andshare empathy. Social

interactions reduce negative emotions such as anxiety and can improve mood[15,27].When medical staff have a wide social network, social support can help to reduce stress by reducing the perception of the threat of stressful events and the physiological response and inappropriate behavior that can result from stress[6,32]. Our study corroborates to the information in having significant association on PSCS bridging score (Inter-familial) over anxiety, than that of PSCS bonding score (Intra-familial). Social support contributes to improving self-efficacy, leading to more understanding, respect, encouragement, courage, and a sense of professional achievement[27]. Anxiety affectssleep quality because anxious people often find it difficult to fall asleep and may wake up frequently during sleep. Also, the combination of anxiety with sleep disorders may make it difficult to fall asleep. The fact that stress is closely related to sleep quality has been confirmed by a previous study. Increased stress can increase the levels of vigilance regarding the environment, which will reduce sleep quality[1,19]. This is corroborated in our study applying multiple regression to see interplay of factors with the outcomes combining anxiety, sleep quality and social factors. Even though all medical staff experience pressure at work, people who have high social capitaland therefore low anxiety levels are able to control their emotions better and try to sleep regularly after work. Anxiety has been shown to increase sensitivity because it reduces positive behaviors and initiative[27].

Conclusion

The study concludes that anxiety and sleep disorders are commonly encountered in health care workers who are in quarantine for COVID 19 pandemic. High anxiety states and low anxiety states, the two major subgroups identified as operating on anxiety scale is significantly associated with social support system , more interfamily than intrafamily emphasizing need for physical distancing rather than social distancing. As anxiety scales are positively corelated with social support hence need to stay connected is reiterated even during COVID times mainly though social media or other technological innovations. Moreover anxiety states as outcome is seen to significantly vary when interplay of all factors of social support, sleep disorders are considered together as is case in daily life. Hence it can be concluded that all quarantined health care workers were suffering from interplay of anxiety, sleep and social support disturbances during these COVID times which in turn was causing their functionality level to alter.

Limitations- The study could not be conducted face to face due to the prevalent situation and hence bias and guarded response may have been possible. Sample size could have been increased but increased workload was a restraint. Scales were preformed with little areas of customization and tool validation as COVID 19 is a new term for one and all.

Conflict of Interest- Nil

Funding – Self funded

Acknowledgements- Study acknowledges all study participants who amidst the tough times and work could give time for wholeheartedly participating in the study.

Ethical Clearance – Ethical clearance taken from the Ethics committee of North Bengal Medical College Hospital.

Referrences

1. Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N,et al. Factors associated with Mental Health Outcomes among Health Care Workers exposed to Coronavirus Disease 2019. JAMA Netw Open [Internet]. 2020 Mar 2[cited 2021 Jan 10];3(3):e203976. doi: 10.1001/jamanetworkopen.2020.3976. PMID: 32202646; PMCID: PMC7090843.
2. Zhu N, Zhang D, Wang W, Li X, Yang B, Song J,et al; China Novel Coronavirus Investigating and Research Team. A Novel Coronavirus from Patients with Pneumonia in China, 2019. N Engl J Med. 2020 Feb 20;382(8):727-733. doi: 10.1056/NEJMoa2001017. Epub 2020 Jan 24. PMID: 31978945; PMCID: PMC7092803.
3. World Health Organization. Zeneva, Switzerland: WHO; 2020. Statement on the Second Meeting of the International Health Regulations (2005) Emergency Committee Regarding the Outbreak of Novel Coronavirus (2019-nCoV); [updated 2020 Jan 30; cited 2021 Jan 10]; [about 4 screens]. Available from: https://www.who.int/news/item/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov)

4. Worldometer [Internet]. United States: 2021. COVID-19 coronavirus pandemic; [updated 2021 Feb 7, cited 2021 Feb 7]; [1 screen]. Available from: https://www.worldometers.info/coronavirus/ (Last updated: February 7, 2021, 5:09 GMT)
5. Worldometer [Internet]. United States: 2021. COVID-19 coronavirus pandemic: World/ Countries/ India; [updated 2021 Feb 7, cited 2021 Feb 7]; [1 screen]. Available from: https://www.worldometers.info/coronavirus/country/india/ (Last updated: February 7, 2021, 5:09 GMT)
6. Cai H, Tu B, Ma J, Chen L, Fu L, Jiang Y, Zhuang Q. Psychological Impact and Coping Strategies of Frontline Medical Staff in Hunan Between January and March 2020 During the Outbreak of Coronavirus Disease 2019 (COVID-19) in Hubei, China. Med Sci Monit [Internet]. 2020 Apr 15;26:e924171. doi: 10.12659/MSM.924171. PMID: 32291383; PMCID: PMC7177038.
7. Lee SM, Kang WS, Cho AR, Kim T, Park JK. Psychological impact of the 2015 MERS outbreak on hospital workers and quarantined hemodialysis patients. Compr Psychiatry. 2018 Nov;87:123-7. doi: 10.1016/j.comppsych.2018.10.003. Epub 2018 Oct 13. PMID: 30343247; PMCID: PMC7094631.
8. Tam CW, Pang EP, Lam LC, Chiu HF. Severe acute respiratory syndrome (SARS) in Hong Kong in 2003: stress and psychological impact among frontline healthcare workers. Psychol Med. 2004 Oct;34(7):1197-204. doi: 10.1017/s0033291704002247. PMID: 15697046.
9. Styra R, Hawryluck L, Robinson S, Kasapinovic S, Fones C, Gold WL. Impact on health care workers employed in high-risk areas during the Toronto SARS outbreak. J. Psychosom. Res. 2008; 64: 177-83
10. Rana W, Mukhtar S, Mukhtar S. Mental health of medical workers in Pakistan during the pandemic COVID-19 outbreak. Asian J Psychiatr. 2020 Jun;51:102080. doi: 10.1016/j.ajp.2020.102080. Epub 2020 Apr 7. PMID: 32283512; PMCID: PMC7139243.
11. Mahase E. Coronavirus covid-19 has killed more people than SARS and MERS combined, despite lower case fatality rate. BMJ. 2020 Feb 18;368:m641. doi: 10.1136/bmj.m641. PMID: 32071063.
12. Wu KK, Chan SK, Ma TM. Posttraumatic stress, anxiety, and depression in survivors of severe acute respiratory syndrome (SARS). J Trauma Stress. 2005 Feb;18(1):39-42. doi: 10.1002/jts.20004. PMID: 16281194; PMCID: PMC7166878.
13. Hawryluck L, Gold WL, Robinson S, Pogorski S, Galea S, Styra R. SARS control and psychological effects of quarantine, Toronto, Canada. Emerg Infect Dis. 2004 Jul;10(7):1206-12. doi: 10.3201/eid1007.030703. PMID: 15324539; PMCID: PMC3323345.
14. Wu KK, Chan SK, Ma TM. Posttraumatic stress after SARS. Emerg Infect Dis. 2005 Aug;11(8):1297-300. doi: 10.3201/eid1108.041083. PMID: 16102324; PMCID: PMC3320475..
15. Rajkumar RP. COVID-19 and mental health: A review of the existing literature. Asian J Psychiatr. 2020 Aug;52:102066. doi: 10.1016/j.ajp.2020.102066. Epub 2020 Apr 10. PMID: 32302935; PMCID: PMC7151415.
16. Spoorthy MS, Pratapa SK, Mahant S. Mental health problems faced by healthcare workers due to the COVID-19 pandemic-A review. Asian J Psychiatr. 2020 Jun;51:102119. doi: 10.1016/j.ajp.2020.102119. Epub 2020 Apr 22. PMID: 32339895; PMCID: PMC7175897.
17. Mohindra R, Ravaki R, Suri V, Bhalla A, Singh SM. Issues relevant to mental health promotion in frontline health care providers managing quarantined/isolated COVID19 patients. Asian J Psychiatr. 2020 Jun;51:102084. doi: 10.1016/j.ajp.2020.102084. Epub 2020 Apr 7. PMID: 32289728; PMCID: PMC7138416.
18. Chatterjee SS, Bhattacharyya R, Bhattacharyya S, Gupta S, Das S, Banerjee BB. Attitude, practice, behavior, and mental health impact of COVID-19 on doctors. Indian J Psychiatry. 2020 May-Jun;62(3):257-265. doi: 10.4103/psychiatry.IndianJPsychiatry_333_20. Epub 2020 May 15. PMID: 32773868; PMCID: PMC7368446.
19. Lange T, Dimitrov S, Born J. Effects of sleep and circadian rhythm on the human immune system. Ann N Y Acad Sci. 2010 Apr;1193:48-59. doi: 10.1111/j.1749-6632.2009.05300.x. PMID: 20398008.
20. Yao KW, Yu S, Cheng SP, Chen IJ. Relationships between personal, depression and social network factors and sleep quality in community-dwelling older adults. J Nurs Res. 2008 Jun;16(2):131-9.

doi: 10.1097/01.jnr.0000387298.37419.ff. PMID: 18528819.

21. Brugha TS: Social networks and social support. Curr Opin Psychiat. 1990;3: 264–8.
22. Gabriele P, Luca P. The relation of perceived and received social support to mental health among first responders: A meta-analytic review. Journal of Community Psychology. 2010;38:403-17. 10.1002/jcop.20371.
23. Kent de Grey RG, Uchino BN, Trettevik R, Cronan S, Hogan JN. Social support and sleep: A meta-analysis. Health Psychol. 2018 Aug;37(8):787-798. doi: 10.1037/hea0000628. Epub 2018 May 28. PMID: 29809022.
24. Peng EY, Lee MB, Tsai ST, Yang CC, Morisky DE, Tsai LT, et al. Population-based post-crisis psychological distress: an example from the SARS outbreak in Taiwan. J Formos Med Assoc. 2010 Jul;109(7):524-32. doi: 10.1016/S0929-6646(10)60087-3. PMID: 20654792; PMCID: PMC3106105.
25. Dahlgren A, Kecklund G, Akerstedt T. Different levels of work-related stress and the effects on sleep, fatigue and cortisol. Scand J Work Environ Health. 2005 Aug;31(4):277-85. doi: 10.5271/sjweh.883. PMID: 16161710.
26. Chen X, Zhang Y, Xu X, Wang W, Yan H, Li S, Yang N. Mediating Roles of Anxiety, Self-Efficacy, and Sleep Quality on the Relationship Between Patient-Reported Physician Empathy and Inflammatory Markers in Ulcerative Colitis Patients. Med Sci Monit. 2019 Oct 21;25:7889-7897. doi: 10.12659/MSM.917552. PMID: 31634896; PMCID: PMC6820358.
27. Xiao H, Zhang Y, Kong D, Li S, Yang N. The Effects of Social Support on Sleep Quality of Medical Staff Treating Patients with Coronavirus Disease 2019 (COVID-19) in January and February 2020 in China. Med Sci Monit. 2020 Mar 5;26:e923549. doi: 10.12659/MSM.923549. PMID: 32132521; PMCID: PMC7075079.
28. Chen X, Stanton B, Gong J, Fang X, Li X. Personal Social Capital Scale: An Instrument for Health and Behavioral Research. Health education research.2008; 24: 306-17. 10.1093/her/cyn020.
29. Zung WW. The measurement of affects: depression and anxiety. Mod Probl Pharmacopsychiatry. 1974;7(0):170-88. doi: 10.1159/000395075. PMID: 4153516..
30. Carpenter JS, Andrykowski MA. Psychometric evaluation of the Pittsburgh Sleep Quality Index. J Psychosom Res. 1998 Jul;45(1):5-13. doi: 10.1016/s0022-3999(97)00298-5. PMID: 9720850.
31. Jolly S, Griffith KA, DeCastro R, Stewart A, Ubel P, Jagsi R. Gender differences in time spent on parenting and domestic responsibilities by high-achieving young physician-researchers. Ann Intern Med. 2014 Mar 4;160(5):344-53. doi: 10.7326/M13-0974. PMID: 24737273; PMCID: PMC4131769.
32. Liang Y, Chen M, Zheng X, Liu J. Screening for Chinese medical staff mental health by SDS and SAS during the outbreak of COVID-19. J Psychosom Res. 2020 Jun;133:110102. doi: 10.1016/j.jpsychores.2020.110102. Epub 2020 Mar 21. PMID: 32224344; PMCID: PMC7139244.
33. Lai J, Ma S, Wang Y, Cai Z, Hu J, Wei N,et al. Factors Associated With Mental Health Outcomes Among Health Care Workers Exposed to Coronavirus Disease 2019. JAMA Netw Open. 2020 Mar 2;3(3):e203976. doi: 10.1001/jamanetworkopen.2020.3976. PMID: 32202646; PMCID: PMC7090843.