Prevalence of sleep disturbance and anxiety due to the COVID-19 pandemic in Saudi Arabia

ABSTRACT

Introduction: In the COVID-19 pandemic, physical and psychological health are of immense concern for the governing bodies and health policymakers in the period of lockdown and self-isolation. An in-depth analysis is required to recognize the changes in mental health among the public of different geographical areas. Objective: The study aimed to investigate the sleep quality and anxiety among the population in Saudi Arabia during the lockdown period from March to June 2020. Material and Methods: We conducted a cross-sectional study and surveyed the population in Saudi Arabia during the lockdown. We analyzed the anxiety and sleep quality in a population with variable socio-demographic profiles. We assessed anxiety using the self-rating anxiety scale (SAS) questionnaire and tested the sleep quality by using the Pittsburgh sleep quality index (PSQI) questionnaire. We analysed the questionnaire responses to determine the relationships between anxiety, stress, sleep disturbances by using SPSS, and considered the p-value<0.05 statistically significant. Results: We collected 397 questionnaires from the participants. The respondents were mostly of youth age (19-24 years), 66.5% of respondents were male, while there were 33.5% females. Most of the participants did not contact any COVID-19 patients (75.1%, n=298). The finding revealed that most people did not consider associated anxiety as a worrying disorder as the vast majority were normal with only 12.6% had mild-to-moderate anxiety and almost 1% had moderate-to-severe anxiety. While correlating the sleep patterns disturbance in individuals who had contact with COVID-19 patients, there was a significant sleep disturbance. The disturbance of sleep was in having problems falling sleep (p-value=0.024), having bad/horrible dreams (p-value=0.017), feeling cold at sleeping (p-value=0.038), and difficulty staying active during eating or driving (p-value=0.012). There was a significant correlation with anxiety related to the COVID-19 contact and problems affecting the routine work (p-value=0.001). Conclusion: There is a significant correlation with anxiety related to the contact with COVID-19 positive patients and problems affecting the routine work among operational professionals. The sleep quality is poor due to the stay-at-home order, having a disorganized working schedule, and deprived lifestyle. The awareness regarding the publics’ mental health related to the pandemic needs to be implemented and psychological guidelines ought to be available for the public. Health measures through the promotion of lifestyle modifications, mindful body practices, meditation, and home exercise can reduce stress and improve the quality of sleep.

Keywords: Mental Health; Coronavirus Infections; Anxiety Disorders; Pandemics; Psychological Distress; Sleep Deprivation.
INTRODUCTION

The COVID-19 has a significant impact on the physical and mental health of human beings globally. According to the World Health Organization (WHO), symptoms of COVID-19 have different categories; fever, dry cough, and tiredness and a small percentage of patients with severe COVID-19 might have a hyperinflammatory cytokine storm syndrome. On top of COVID-19 clinical worsening to the patients; it has a considerable impact on the psychological health of the general population. There is a significant negative impact on mental health among health professionals, doctors, nurses during the COVID-19 pandemic. There is a significant impact of poor quality of sleep, cognition, high level of anxiety, and deprived mental wellbeing.

In Saudi Arabia, there had been strict lockdown measures and self-isolate the population to prevent the spread of the infection as guided by the WHO. As COVID-19 is highly contagious, social distancing and self-isolation were the best preventive measure to decrease the risk of infection spread. However, these precautionary procedures have a significant impact on emotional and mental wellbeing such as the development of chronic insomnia. These effects can vary from simple mood changes, depression, aggression, minor anxiety to very severe forms of mental issues such as severe depression, bipolar disorder, and suicidal thoughts. The presence of social boundaries because of the lockdown, severe educational/work-related interference due to COVID-19, and poorer self-reported physical health were significantly associated with sleep disturbance. Additionally, lower perceived social support, lower COVID-19-specified support, and younger age were significantly associated with suicidal thoughts. Some individuals with mild illness, suspected cases of infection, and people who had been in close contact with patients or a potentially high-risk environment were isolated at home. The home isolation is a psychological burden, and even the individual does not have clinical symptoms and remains physically well, they often suffer from negative psychological effects. Better sleep quality has a positive influence on the immune system and reduces the chance to get infected. Thus, psychological health and sleep quality are important factors to be investigated during the COVID-19 pandemic.

The current study explores the anxiety level and sleep disturbances due to the COVID-19 pandemic in Saudi Arabia. As the self-isolation and lockdown was a royal order, the public followed the strict implementation rules in Saudi Arabia. These psychological effects are observed mainly during the lockdown and self-isolation at home because of the spread of COVID-19. The finding will help to estimate the mental health burden of the Saudi public during the COVID-19 pandemic. The recommendations will help the public, health professionals, and policymakers to develop strategies to overcome the sleep and anxiety related to pandemics.

MATERIAL AND METHODS

We designed a cross-sectional study and targeted the population of Saudi Arabia, who was under isolation at home from March to June 2020 during the COVID-19 pandemic. We collected data through a Google Doc questionnaire after consent. During these four-month form was available for participants to fill in and data was collected. The study included adult individuals who had isolation for 2 weeks at home, either they were in contact with COVID-19 patients or not. We performed a convenience sampling to survey the participants of this study. We did not include any infected patients who are hospitalized or under the care of physicians because of COVID-19.

For sample size calculation, we used Raosoft (sample size calculator) to generate the sample size of this research. The minimum recommended sample size was 377 with a confidence level of 95%, the margin of error of 5%, and the response distribution 50%. To compensate for the missing information, incomplete forms, and other negative contributing factors, the authors added around 5% extra hence, the needed sample size was at least 400 participants.

A self-rated questionnaire is considered the most appropriate way to measure anxiety. Cronbach’s alpha for the total scale was 0.81, which is similar to previous reliability values (0.867) reported in the Chinese population. The participants completed a self-reported questionnaire, which comprised three sections. It related the first section to the socio-demographic data for each participant and disease-related information, which contained 10 questions including gender, age, marital status, work, contact with patients, fever, psychological symptoms, psychological history, and COVID-19 symptoms.

The second section was about sleep quality, which comprised of 16 questions. Pittsburgh sleeps quality index (PSQI) is a validated questionnaire and an effective instrument used to measure the quality and patterns of sleep in adults. It differentiates “poor” from “good” sleep by measuring seven areas: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction over the last month. The client self-rates each of these seven areas of sleep. It bases the scoring of answers on a 0 to 3 scale, where 3 reflects the negative extreme on the Likert scale. Cronbach’s alpha for the total scale was 0.83, which is similar to previous reliability values and the internal consistency of this questionnaire was previously determined to be 0.87.

The third section concerned anxiety which comprised 20 questions with Likert scale answers (a little of the time, sometimes, good part of the time, most of the time). We collected data in Arabic for the convenience of information collection, and we translated it from Arabic to English for data analysis. We utilized the Zung self-rating anxiety scale (SAS) as a method of measuring levels of anxiety in patients who have anxiety-related symptoms. The scale focused on the most common general anxiety disorders; coping with stress typically post-traumatic stress disorders. The Cronbach’s alpha for internal consistency of this questionnaire was 0.8 and previously determined to be 0.803.

We built the questionnaire in a Google Forms to make the collection of data easier during lock-down during the COVID-19 pandemic. Medical experts and researchers reviewed the answers to make the questionnaire valid and reliable.
the developed questionnaire at the college of medicine Riyadh for validity. We also assessed it for content validity in terms of content, scope, depth, and appropriateness of each item of the questionnaire. We distributed the questionnaire through the WhatsApp groups, Facebook, and emails. Participants answered the questionnaires anonymously and provided consent to take part in the study. Upon completion of data collection, we downloaded data on an Excel sheet and transformed it into the SPSS sheet.

We analyzed the questionnaire responses to determine the relationships between anxiety, stress, sleep disturbances by using SPSS, and considered the p-value<0.05 statistically significant. We calculated p-value with linear regression models with the t-value from a two-sided t-test for cross-sectional analysis.

RESULTS

We collected 402 questionnaires, but there were some questionnaires with incomplete information. Hence, we excluded five surveys before the analysis. We selected 397 questionnaires for data analysis and measured the prevalence of sleep disorder according to the Pittsburg sleep quality index in people who isolate themselves to prevent the COVID-19. We measured sleep patterns disturbances and anxiety disorders prevalence during the lockdown period caused by COVID-19. Table 1 presents the socio-demographic characteristics of the participants.

The respondents were between 19-24 years old age (n=161, 40.6%) and 66.5% of respondents were male while there were 33.5% females. Most of the participants did not contact any COVID-19 patients (75.1%, n=298). Table 2 is showing the measure of sleep disorders in people who isolate themselves to prevent the COVID-19 was according to the Pittsburg sleep quality index (PSQI).

While correlating the sleep patterns disturbance in individuals who had contact with COVID-19 patients, there was a significant sleep disturbance. Table 3 shows the disturbance of sleep to have problems falling asleep (p-value=0.024), having bad/horrible dreams (p-value=0.017), feeling cold at sleeping (p-value=0.038), and difficulty to stay active during eating or driving (p-value=0.012). There was a significant correlation between anxiety related to the COVID-19 contact and problems affecting the routine work (p-value=0.001).

Measuring the anxiety rate of people who isolate themselves at home to prevent the spread of COVID-19 was assessed using SAS. Table 4 showed the main findings and revealed that anxiety to most people was not considered as a worrying disorder as the vast majority were normal with only 12.6% had mild-to-moderate anxiety and almost 1% had moderate-to-severe anxiety. We linked general anxiety to old age (p=0.021), but the younger population noticed to be less prone to have anxiety disorders.

SAS differentiates the scores based on four categories, (20-44, normal), (45-59, mild-to-moderate anxiety), (60-74, moderate-to-severe anxiety), and (75-80, extreme anxiety). Analysis of each participant’s scores reported in Table 5.

DISCUSSION

During the COVID-19 pandemic, physical and psychological health are of immense concern for the public, health professionals, governing bodies, and health policymakers during the period of lockdown16. The self-isolation from all aspects of life, such as work, socializing, entertainment, and other various activities can negatively affect the population. There are multiple associated factors to affect mental health such as anxiety, panic disorder, insomnia, depressions, low mood, irritability, and emotional distress7,10.

The results revealed that the pandemic has a negative impact in terms of sleep disturbances and anxiety among the general population in Saudi Arabia19. There was a significant correlation with anxiety and disturbances related to sleep while having contact with the COVID-19 positive patients20,21. Among all the reported mental health issues, we found sleep deprivation because of fear of pandemic and these finding are consistent with the previous studies in China22. The sleep disturbance could vary from mild to severe sleep deprivation.

Lockdown related to the COVID-19 pandemic had a major impact on the daily lives of people around the world23. In terms of sleep quality, the results showed that the population in Saudi Arabia had poor sleep quality and we link this to sleeping habits. Such results are similar to studies done in China and research endorsed in COVID-19-related psychological interventions should be promoted for better mental health24,25.

This investigation shows that relaxed school timetables, disorganized work schedules, and more time spent at home have led people to sleep more hours on average. Hence, the poor sleep quality came from the poor lifestyle and the fact that there are no obligations where the individual must stay at home all the time26.

| Characteristics | Category | Frequency | Percent |
|-----------------|----------|-----------|---------|
| Age (years)     | Less than 18 | 36 | 9.1 |
|                  | 19-24 | 161 | 40.6 |
|                  | 25-29 | 95 | 23.9 |
|                  | 30-34 | 44 | 11.1 |
|                  | More than 35 | 61 | 15.4 |
| Gender          | Male | 264 | 66.5 |
|                  | Female | 133 | 33.5 |
| Nationality     | Saudi | 360 | 90.7 |
| Marital status  | Non-Saudi | 36 | 9.1 |
|                  | Single | 253 | 63.7 |
| Occupation status | Working | 94 | 23.1 |
|                  | Non-working | 293 | 76.4 |
| Dealing with patients | No | 298 | 75.1 |
|                  | Yes | 99 | 24.9 |
| Fever           | No | 383 | 96.5 |
|                  | Yes | 14 | 3.5 |
| Respiratory symptoms | No | 370 | 93.2 |
|                  | Yes | 27 | 6.8 |
| Item                                             | Category                        | Frequency | Percent |
|-------------------------------------------------|---------------------------------|-----------|---------|
| After how many minutes you sleep                 | 1.00                            | 51        | 12.8    |
|                                                 | 2.00                            | 135       | 34.0    |
|                                                 | 3.00                            | 97        | 24.4    |
|                                                 | 4.00                            | 114       | 28.7    |
|                                                 | Less than 4                      | 21        | 5.3     |
|                                                 | 4-5                             | 49        | 12.3    |
| How many hours you sleep                         | 6-7                             | 168       | 42.3    |
|                                                 | 8-9                             | 109       | 27.5    |
|                                                 | More than 9                      | 50        | 12.6    |
|                                                 | Never                           | 121       | 30.5    |
| Did you have in last week a problem of more than 30 minutes to sleep | Less than 1                      | 103       | 25.9    |
|                                                 | 1-2 times a week                 | 83        | 20.9    |
|                                                 | 3 or more times a week           | 90        | 22.7    |
|                                                 | Never                           | 145       | 36.5    |
| Do you wake up at night                          | Less than 1                      | 88        | 22.2    |
|                                                 | 1-2 times a week                 | 76        | 19.1    |
|                                                 | 3 or more times a week           | 88        | 22.2    |
|                                                 | Never                           | 310       | 78.1    |
| Breathing problems during sleeping               | Less than 1                      | 56        | 14.1    |
|                                                 | 1-2 times a week                 | 19        | 4.8     |
|                                                 | 3 or more times a week           | 12        | 3.0     |
|                                                 | Never                           | 310       | 78.1    |
| Cough at sleeping                                | Less than 1                      | 47        | 11.8    |
|                                                 | 1-2 times a week                 | 20        | 5.0     |
|                                                 | 3 or more times a week           | 20        | 5.0     |
|                                                 | Never                           | 218       | 54.9    |
| Feeling Cold at Sleeping                         | Less than 1                      | 83        | 20.9    |
|                                                 | 1-2 times a week                 | 65        | 16.4    |
|                                                 | 3 or more times a week           | 31        | 7.8     |
|                                                 | Never                           | 268       | 67.5    |
| Fever at Sleeping                                | Less than 1                      | 60        | 15.1    |
|                                                 | 1-2 times a week                 | 42        | 10.6    |
|                                                 | 3 or more times a week           | 27        | 6.8     |
|                                                 | Never                           | 182       | 45.8    |
| Bad dreams                                       | Less than 1                      | 113       | 28.5    |
|                                                 | 1-2 times a week                 | 70        | 17.6    |
|                                                 | 3 or more times a week           | 32        | 8.1     |
|                                                 | Never                           | 342       | 86.1    |
| Drugs for Sleeping                               | Less than 1                      | 20        | 5.0     |
|                                                 | 1-2 times a week                 | 15        | 3.8     |
|                                                 | 3 or more times a week           | 20        | 5.0     |
|                                                 | Never                           | 284       | 71.5    |
| Difficulty in Wake up During Eating or Driving   | Less than 1                      | 52        | 13.1    |
|                                                 | 1-2 times a week                 | 42        | 10.6    |
|                                                 | 3 or more times a week           | 19        | 4.8     |
|                                                 | Never                           | 284       | 71.5    |
| Difficulty in Wake up During Eating or Driving   | Less than 1                      | 52        | 13.1    |
|                                                 | 1-2 times a week                 | 42        | 10.6    |
|                                                 | 3 or more times a week           | 19        | 4.8     |
|                                                 | Never                           | 139       | 35      |
| Do your problems affect your work                | Sometimes                        | 174       | 43.8    |
|                                                 | Frequently                       | 53        | 13.4    |
|                                                 | Always                           | 31        | 7.8     |
|                                                 | Excellent                        | 81        | 20.4    |
|                                                 | Very Good                        | 166       | 41.8    |
| How was Your Sleeping Last Month                 | Accepted                         | 103       | 25.9    |
|                                                 | Bad                              | 47        | 11.8    |
Our study found that 11.8% population felt more nervous and anxious than usual. We linked the general anxiety to old age ($p=0.021$), but the younger population noticed to be less prone to have anxiety disorders. Although previous studies have suggested that the population’s level of anxiety increases with the spread of infectious diseases, the current study did not establish this concern in the included participants. The study found that anxiety-related symptoms are obvious in the COVID-19 patients and non-COVID-19 patients.

There are many therapeutic options recommended to overcome pandemic related anxiety, insomnia; such as providing passable safety and protective arrangements to reduce the probability of infection. Few studies recommended adoptions of cognitive behavioural therapy that are realistic to contrivance for the changed work schedules and those with severe anxiety disorder. Timely provision of attentiveness for mental health, especially for healthcare workers or a person at risk for the COVID-19, should be prioritized. The authors suggested enhancing home exercises for muscle relaxation to reduce anxiety and improve sleep quality during the COVID-19 pandemic.

Based on the study findings, it is imperative to establish a protocol for psychological interventions that need to be incorporated by the ministry of health (MOH) fighting the COVID-19 pandemic for the general population. There must be national policy and procedures for psychological intervention for the vulnerable population for general anxiety disorder and depression (known psychiatric patients).

The health provider must introduce guidelines in the form of leaflets or booklets for the general population to guide them on how to cope with a stressful situation. The authors of the study suggested the flowchart for boosting sleep for the individuals to follow (Figure 1). Health measures through the promotion of lifestyle modifications, mindful body practices, meditation, and home exercise can reduce stress and improve the quality of sleep.
the vulnerable community to enhance mental health. It is a real challenge for health policymakers to design a strategy for mental health for the general population and establish the results of interventions.

The current study is of certain limitations, the study was a cross-sectional study; thus, the results are difficult to be generalized. The participants were recruited using the WhatsApp platform, selection bias is highly considered when studying the results. Further research might help to analyze sleep disturbance and pattern of sleep disorders through a mixed-method study design. An in-depth analysis is required to explore the factors associated with the quality of sleep and pattern.

CONCLUSION

To prevent the spread of COVID-19 pandemics, the Saudi government applies strict rules such as self-isolation at home; the establishment of quarantine institutions, social distancing advertisements, and prohibiting all gathering activities, physical and psychological health are of immense concern for the governing bodies and health policymakers in the period of lockdown and self-isolation. The study was meant to investigate the sleep quality and anxiety among the population in Saudi Arabia during the COVID-19 lockdown period. The study revealed that the general population was not affected in terms of anxiety development, despite the global concern. However, there was a significant correlation with anxiety related to the contact with COVID-19 positive patients and problems affecting the routine work among operational professionals. The sleep quality became poor because of the long stay-at-home, having a disorganized working schedule, and deprived lifestyle.

The awareness regarding the publics' mental health related to the pandemic needs to be implemented and psychological guidelines ought to be available for the public. Health measures through the promotion of lifestyle modifications, mindful body practices, meditation, and home exercise can reduce stress and improve the quality of sleep. There must be a monitoring of the psychological consequences for outbreaks on health professionals and the establishment of early-targeted mental health interventions.

CONFLICTS OF INTERESTS

The authors have no conflicts of interest to declare.

REFERENCES

1. Forte G, Favienc F, Tambelli R, Casagrande M. COVID-19 pandemic in the Italian population: validation of a post-traumatic stress disorder questionnaire and prevalence of PTSD symptomatology. Int J Environ Res Public Health. 2020 Jun;17(11):4151.
2. Guo J, Feng XL, Wang XH, Van Ixendoorn MH. Coping with COVID-19: exposure to COVID-19 and negative impact on livelihood predict elevated mental health problems in Chinese adults. Int J Environ Res Public Health. 2020 Jun;17(11):3857.
3. Janeway D. The role of psychiatry in treating burnout among nurses during the Covid-19 pandemic. J Radiol Nurs. 2020 Sep;39(3):176-8.
4. Kang L, Ma S, Chen M, Yang J, Wang Y, Li R, et al. Impact on mental health and perceptions of psychological care among medical and nursing staff in Wuhan during the 2019 novel coronavirus disease outbreak: a cross-sectional study. J Psychiatr Res. 2020 Jul;127:1-7.
5. Gualano MR, Lo Moro G, Voglino G, Bert F, Siliquini R. Effects of COVID-19 lockdown on mental health and sleep disturbances in Italy. Int J Environ Res Public Health. 2020 Jul;17(13):4779.
6. Huang Y, Zhao N. Generalized anxiety disorder, depressive symptoms and sleep quality during COVID-19 outbreak in China: a web-based cross-sectional survey. Psychiatry Res. 2020 Jun;288:112954.
7. Yang L, Yu Z, Xu Y, Liu W, Liu L, Mao H. Mental status of patients with chronic insomnia in China during COVID-19 epidemic. Int J Soc Psychiatry. 2020 Dec;66(8):821-6.
8. Peri E, Di Mattei V, Perego G, Ferrari F, Mazzetti M, Taranto P, et al. The psychological impact of epidemic and pandemic outbreaks on healthcare workers: rapid review of the evidence. Curr Psychiatry Rep. 2020;22(8):43.
9. Li DJ, Ko NY, Chen YL, Wang PW, Chang YP, Yen CF, et al. COVID-19-related factors associated with sleep disturbance and suicidal thoughts among the Taiwanese public: a Facebook survey. Int J Environ Res Public Health. 2020 Jul;17(12):4779.
10. Zambrilli E, Canavini M, Gambini O, D’Agostino A. Delirium and sleep disturbances in COVID-19: a possible role for melatonin in hospitalized patients?. Sleep Med. 2020 Jun;70:111.
11. Zachary Z, Brianna F, Brianna L, Garrett P, Jade W, Alyssa D, et al. Self-quarantine and weight gain related risk factors during the COVID-19 pandemic. Obes Res Clin Pract. 2020 Mar;14(3):210-6.
12. Li W, Yang Y, Liu ZH, Zhao YJ, Zhang Q, Zhang L, et al. Progression of mental health services during the COVID-19 outbreak in China. Int J Biol Sci. 2020;16(10):1732-8.
13. Dunstan DA, Scott N. Norms for Zung’s self-rating anxiety scale. BMJ Psychiatry. 2020 Feb;2090.
14. Fu W, Wang C, Zou L, Guo Y, Lu Z, Yan S, et al. Psychological health, sleep quality, and coping styles to stress facing the COVID-19 in Wuhan, China. Transl Psychiatry. 2020 Jul;10(1):225.
15. Parodi IG, Poeta MG, Assini A, Schirinz A, Del Sette P. Impact of quarantine due to COVID infection on migrants: a survey in Genova, Italy. NeuroL Sci. 2020 Aug;41(8):2025-7.
16. Vaskhney M, Patel JT, Ratnnda N, Sarin SK. Initial psychological impact of COVID-19 and its correlates in Indian Community: an online (FEEL-COVID) survey. PLoS One. 2020 May;15(5):e023874.
17. Becker SP, Gregory AM. Editorial perspective: perils and promise for child and adolescent sleep and associated psychopathology during the COVID-19 pandemic. J Child Psychol Psychiatry. 2020 Jul;61(7):757-9.
18. Beck F, Leger D, Pressard L, Peretti Watel P, Verger P. COVID-19 health crisis and lockdown associated with high level of sleep complaints and hypnagogic uptake at the population level. J Sleep Res. 2020 Jun 28; [Epub ahead of print]. DOI: https://doi.org/10.1111/jsr.13119.
19. Sher L. COVID-19, anxiety, sleep disturbances and suicide. Sleep Med. 2020 Jul;70:124.
20. To ZH, He JW, Zhou N. Sleep quality and mood symptoms in conscripted frontline nurse in Wuhan, China during COVID-19 outbreak: a cross-sectional study. Medicine (Baltimore). 2020 Jun;99(26):e20769.
Prevalence of sleep disturbance and anxiety due to the COVID-19 pandemic in Saudi Arabia

21. Wang S, Xie L, Xu Y, Yu S, Yao B, Xiang D. Sleep disturbances among medical workers during the outbreak of COVID-2019. Occup Med (Lond). 2020 Jul;70(5):364-9.

22. Lin K, Yang BX, Luo D, Liu Q, Ma S, Huang R, et al. The mental health effects of COVID-19 on healthcare providers in China. Am J Psychiatry. 2020 Jul;177(7):635-6.

23. Sun S, Lin D, Operario D. Need for a population health approach to understand and address psychosocial consequences of COVID-19. Psychol Trauma. 2020 Aug;12(8):S25-S7.

24. Sheng X, Liu F, Zhou J, Liao R. Psychological status and sleep quality of nursing interns during the outbreak of COVID-19. Nan Fang Yi Ke Da Xue Xue Bao. 2020 Mar;40(3):346-50.

25. Xue Z, Lin L, Zhang S, Gong J, Liu J, Lu J. Sleep problems and medical isolation during the SARS-CoV-2 outbreak. Sleep Med. 2020 Jun;70:112-5.

26. Yadav SR, Kumar R, Kumar A, Ish P, Gupta N, Chakrabarti S. Sleepless in COVID-19: how not to lose sleep in lockdowns. Montaldi Arch Chest Dis. 2020 Jun;90(2).

27. Itena E, Baglioni C, Espie CA, Ellis J, Gavriloff D, Holzinger B, et al. Dealing with sleep problems during home confinement due to the COVID-19 outbreak: practical recommendations from a task force of the European CBT-I Academy. J Sleep Res. 2020 Aug;29(4):e13052.

28. Hall H. The effect of the COVID-19 pandemic on healthcare workers’ mental health. JAAPA. 2020 Jul;33(7):45-8.

29. Liu K, Chen Y, Wu D, Lin R, Wang Z, Pan L. Effects of progressive muscle relaxation on anxiety and sleep quality in patients with COVID-19. Complement Ther Clin Pract. 2020 May;39:101132.

30. Wu L, Guo X, Shang Z, Sun Z, Jia Y, Sun L, et al. China experience from COVID-19: mental health in mandatory quarantine zones urgently requires intervention. Psychol Trauma. 2020 Aug;12(Suppl 1):S3-S5.

31. Xiao H, Zhang Y, Kong D, Li S, Yang N. Social capital and sleep quality in individuals who isolated for 14 days during the coronavirus disease 2019 (COVID-19) outbreak in January 2020 in China. Med Sci Monit. 2020 Mar;26:e920923.

32. Hao F, Tan W, Jiang L, Zhang L, Zhao X, Zou Y, et al. Do psychiatric patients experience more psychiatric symptoms during COVID-19 pandemic and lockdown? A case-control study with service and research implications for immunopsychiatry. Brain Behav Immun. 2020 Jul;87:100-6.

33. La Torre G, Raffone A, Peruzzo M, Calabrese I, Cocchiara RA, D'Egidio V, et al. Yoga and mindfulness as a tool for influencing affectivity, anxiety, mental health, and stress among healthcare workers: results of a single-arm clinical trial. J Clin Med. 2020 Apr;9(4):1037.

34. Wu K, Wei X. Analysis of psychological and sleep status and exercise rehabilitation of front-line clinical staff in the fight against COVID-19 in China. Med Sci Monit Basic Res. 2020 May;26:e924085.