Peertechz

CLINICAL GROUP

GLOBAL JOURNAL OF Infectious Diseases and Clinical Research OPEN ACCESS JOURNAL

ISSN: 2455-5363 DOI: https://dx.doi.org/10.17352/gjidcr

Research Article

Sleep quality of inpatients with a positive diagnosis of COVID-19

Sevil Güler[1]*, Seda Şahan[2] and Gökçe Demir[3]

[1]Faculty of Health Sciences, Department of Nursing, Erciyes University, Kayseri, Turkey

[2]Faculty of Health Sciences, Department of Nursing, Bakırçay University, İzmir, Turkey

[3]Faculty of Health Sciences, Department of Nursing, Ahi Evran University, Kırşehir, Turkey

Received: 23 November, 2022
Accepted: 30 November, 2022
Published: 01 December, 2022

***Corresponding author:** Dr. Sevil GÜLER, PhD, Associate Professor, Department of Nursing, Faculty of Health Sciences Erciyes University, Kayseri, Turkey, Tel: 90 352 207 66 66 / 28568; Fax: 90 352 437 92 81, E-mail: sevilbicer@erciyes.edu.tr

ORCiD: https://orcid.org/0000-0002-9971-9861

Keywords: COVID-19; Sleep quality; Positive patient; Nursing care

Abstract

Background: Low sleep quality and sleep disturbances are reported to be higher during the COVID-19 pandemic period. This study aimed to evaluate the sleep quality of hospitalized patients with COVID-19 and the factors that affect their sleep quality.

Materials and methods: Patients with COVID-19 who were hospitalized at the pandemic clinic of a University Training and Training Hospital between 15 May-15 September 2020 were included. The study included 150 patients who agreed to participate in the study, who were hospitalized in the COVID-19 clinics in a Training and Research Hospital. Adult patients over the age of 18 who had been accepted to participate in were enrolled in the study. The patients who had any diagnosed sleep-related disorders or neurological and psychiatric diseases were excluded. Data were collected using the Personal Information Form, Pittsburgh Sleep Quality Index.

Results: The patient's PSQI score average was significantly higher in females, illiterate, married, and individuals with the first three days of diagnosis of disease. During their 75.2% hospitalization time, sleep patterns deteriorated and 90.0% of those patients also deteriorated 1-3 days after hospitalization. Given the conditions that caused sleep disorders during the time hospitalized, there were causes such as respiratory distress (41.3%), hospital environment (36.1%) and pain (32.0%). The requirements that patients need most to improve their sleep quality during the hospital period may be said to be good management of disease symptoms (36.4%), increased social support systems (33.3%), and communication with health staff (20.0%).

Conclusion: For sleep disorders in hospitalized patients with a positive (+) diagnosis of COVID-19, it can be said that 71.3% of the patients have poor sleep quality.

Introduction

Coronavirus disease - 2019 (COVID-19), first time in 2019 It appeared in Wuhan, China in December. Disease. It soon spread across the world on March 11, 2020. It has been declared a pandemic by the World Health Organization [1].

Millions of people have been affected by the Coronavirus disease-2019 (COVID-19) caused by the severe acute respiratory syndrome-coronavirus-2. It has been shown that novel infectious diseases, such as severe acute respiratory syndrome affect sleep by increasing anxiety, depression and stress levels in the general population [2]. The negative impact of social life, the uncertainty of the duration and the departure of the epidemic, and the economic reasons that have occurred have led to increased levels of stress and anxiety in individuals [3]. Especially those who are in the risk group, have experienced a peak level of anxiety as they see the number of facts and deaths that occur in the country and the world, thinking that they may be sick and/or die. Stress and anxiety disorders have also brought sleep disorders [4].

Sleep impairment was reported to be frequent in patients with COVID-19 (10), which may be due to isolation, physical discomfort and psychological factors such as fear, anxiety, or depression [5]. Poor sleep quality during hospitalization

Citation: Güler S, Şahan S, Demir G (2022) Sleep quality of inpatients with a positive diagnosis of COVID-19. Glob J Infect Dis Clin Res 8(1): 015-019.
DOI: https://doi.org/10.17352/2455-5363.000053

in COVID-19 patients was reported as associated with a slow recovery from lymphopenia and an increased need for intensive care [6].

The SARS-CoV-2 virus affects the prefrontal cortex, basal ganglions, and hypothalamus in the brain, which are essential in regulating sleep. Therefore, the prevalence of sleep disorders seen in the pandemic COVID-19 is the prevalence of social and social lives of people in addition to emotional stressor factors, it develops due to asymptomatic viral infection [7].

COVID-Somnia (Coronasomnia) is a term used to identify sleep disorders seen during a pandemic. [8]. During the COVID-19 pandemic, several studies have been carried out to investigate sleep disorders. Sleep deprivation prevalence was between 2.3% and 76.6% in the study [9]. The factors associated with COVID-19-specific sleep are listed as concerns about the disease in patients with COVID-19, uncertainty due to the pandemic, lack of testing, and negative attitude toward control measures such as mask wear.

In a different study, 843 participants were surveyed; 69.4% of respondents had a change in sleep pattern, less than half (44.7%) had a relaxing sleep 45.6% of them reported that they were more sleepy than before the quarantine [10]. The frequently reported changes in sleep were found as sleep failure (divided sleep) (42.3%), involuntary sleep (35.2%), difficulty in falling asleep (30.9%) and late bedtime (30%) COVID-19-suspectedcted participants have indicated that they have had more nightmares [11].

In a meta-analysis of 54.231 participants from thirteen countries, Epworth Sleep structure was evaluated using scales such as "Sleepiness Scale, Pittsburgh Sleep Quality Index, Insomnia Severity Index, Athens Insomnia Scale"; the overall population of sleep disorder prevalence 32.3%; 36% for health workers; 74.8% for patients with COVID infection was found [12]. Concerns about the disease in patients with COVID-19 are listed as a negative attitude to control measures such as pandemic uncertainty, lack of testing, and mask wear [13].

COVID-19 positive (+) with the physical health of diagnosed patients identifying sleep problems in maintaining and developing spiritually good behavior will be a guide to the effective planning of nursing care. This study aimed to evaluate the sleep quality of hospitalized patients with COVID-19 and the factors that affect their sleep quality.

Materials and methods

Patients with COVID-19 who were hospitalized at the pandemic clinic of a University Training and Training Hospital between 15 May - 15 September 2020 were included. The study included 150 patients who agreed to participate and were hospitalized in the COVID-19 clinics in a Training and Research Hospital. Adult patients over the age of 18 who had been accepted to participate in were enrolled in the study. The patients who had any diagnosed sleep-related disorders or neurological and psychiatric diseases were excluded. Data were collected using the Personal Information Form, Pittsburgh Sleep Quality Index (PSQI).

The patients completed the Pittsburgh sleep quality index (PSQI) after the first night of admission to minimalizing the hospital factors (e.g., light exposure, sound exposure and disturbance by staff) that could be the reason for poor sleep quality during hospitalization. The questionnaires were performed face-to-face in patients' rooms. Clinicians wore personal protective equipment and the patients wore surgical masks during the survey which took a maximum of 15 minutes.

Developed by Buysse and his friends (1991), PUKI is the self-notification scale that evaluates sleep quality and deformity over the past month [14]. The PSQI questionnaire which consisted of seven parts a total of 18 items, including sleep quality, sleep duration, sleep latency, habitual sleep efficiency, sleep disturbances, use of sleeping medications, and daytime dysfunction was used to measure the sleep quality of the patients. Each part was scored from 0 - 3 and the total score ranged from 0 - 21. A high score is accepted as indicating poor sleep quality. The Turkish validity and reliability of the measurement tool were carried out by Agargun and his friends [15].

Data analysis

The data has been analyzed by transferring it to IBM SPSS Statistics 25 in a computer environment. When evaluating data, the frequency distribution for categorical variables, the identifier statistics for numerical variables (mean, standard deviation, median, IQR), " In groups-to-group comparisons, the independent sample t-test was used for two-group comparisons, and ANOVA was used for more than two group comparisons. Dunnet test was used for the groups with a difference to understand from which group the difference originated.

Ethical consideration

This study was performed by the Declaration of Helsinki and was approved by the University Human Research Ethics Committee (protocol number: 2022 - 112). Permission from the COVID-19 Scientific Research Assessment Commission of the Turkish Ministry of Health has been obtained. All patients provided signed informed consent to participate in the study.

Results

63.0% of patients are female, age averages are 54.32±12.44, 50.0% are primary school graduates, 83.3% are married, 28.6% have 1 child and 55.3% represent their economic status as a medium. 42.0% of patients were admitted to the hospital in the first three days after receiving a COVID-19-positive diagnosis. The PSQI score average was significantly higher in females, illiterate, married and individuals with the first three days of diagnosis of disease ($p < 0.05$) (Table 1).

During their 75.2% hospitalization time, sleep patterns deteriorated and 90.0% of those patients also deteriorated 1-3 days after hospitalization. 95% of the patients reported that they slept during the night and day hours, and 38.6% reported that they were traveling on social media during periods of insomnia (Table 2). Given the conditions that caused sleep

Citation: Güler S, Şahan S, Demir G (2022) Sleep quality of inpatients with a positive diagnosis of COVID-19. Glob J Infect Dis Clin Res 8(1): 015-019.
DOI: https://doi.org/10.17352/2455-5363.000053

disorders during the time hospitalized, there were causes such as respiratory distress (41.3%), hospital environment (36.1%), and pain (32.0%). The requirements that patients need most to improve their sleep quality during the hospital period may be said to be good management of disease symptoms (36.4%), increased social support systems (33.3%) and communication with health staff (20.0%), respectively (Table 2).

When Table 3 is examined, the average of the total score of PSQI of patients is 7.84 ± 0.64 (min: 0.00; max: 15.00) and 71.3% of the patients are found to be poor sleep quality (Table 3).

Discussion

The COVID-19 pandemic had a negative effect on adult sleep quality. Sleep is an essential physiological activity for maintaining physical and mental health and good quality of life. Degradation in the normal sleep cycle leads to inadequate sleep and long-term awakening, resulting in insomnia, nightmares, daytime instability, and fatigue [16].

During the COVID-19 pandemic, many studies have been carried out to examine sleep disorders [17]. In the studies, age, gender, education level, physical and mental health, COVID-19, associated stressor factors, and profession (especially being a health worker) were identified as factors related to a sleep disorder. In our study, sleep quality was determined as bad in females, illiterate, married, and individuals with the first three

Table 1. Demographic characteristics of participants and comparison of PSQI points averages.

Variables	Min.- Max.	x. ± SS	PSQI		
The average age	25 - 88	54,32 ± 12,44	X ± SS		
	n	%		Test	*p*
Gender					
Female	96	64.0	7.107 ± 2.985	t: 2.076	0.041
Male	54	36.0	6.188 ± 3.053		
Training status					
Not a literary	18	12.0	8.20 ± 4.68[a*]	F: 5.699	0.003
Elementary school	75	50.0	6.43 ± 2.03[b*]		
High school	45	30.0	6.01 ± 3.38[b*]		
Pre-license	4	2.6	6.00 ± 3.29[b*]		
License	8	5.4	5.57 ± 2.51[c*]		
Status					
Married	125	83.3	8.82 ± 1.45	t: 2.092	0.048
Single	25	16.7	7.16 ± 3.48		
Number of children					
0	20	13.3	8.37 ± 3.41	F: 0.911	0.843
1	43	28.6	8.13 ± 1.16		
2	58	16.6	9.17 ± 1.78		
3 and more	4	2.5	9.23 ± 2.51		
Perceived economic situation					
Low	25	16.6	9.48 ± 2.13	F: 0.387	0.604
Medium	83	55.3	8.59 ± 2.17		
High	23	15.3	8.12 ± 1.14		
COVID-19 is the day after receiving a positive diagnosis					
1-3. days	63	42.0	13.18 ± 3.53[a*]	F: 9.274	0.000
4-6. days	46	30.6	12.64 ± 2.24[a*]		
7-10. days	38	25.3	11.76 ± 3.70[b*]		
11. days and more	3	2.1	8.76±3.54[c*]		

*While the same letters indicate a lack of difference, different letters indicate the presence of difference. Dunnet test was used.

Table 2: Sleep-related characteristics of patients.

Sleep patterns deteriorate during hospitalization	*n*	%
Yes	113	75.2
No	31	24.8
How many days after he was hospitalized, his sleep patterns deteriorated		
1-3. days	135	90.0
4-6. days	15	10.0
The time that usually sleeps in the hospital		
Day time	10	6.6
Night	45	30.0
Day + night	95	63.4
How to sleep was spent in a time that wasn't sleeping		
Watch TV	53	35.3
Social media navigation	58	38.6
Make phone calls	13	8.6
Contact someone to talk to them at the hospital	20	13.3
Reading a book	6	4.2
The condition that caused sleep disorders during the time in the hospital *		
High fever	29	19.3
Cough	41	27.3
Respiratory distress	62	41.3
Use of oxygen mask	19	12.6
Treatment hours	29	19.3
Fear of death	22	14.6
Stress	26	17.3
Social isolation	18	12.0
Pain	48	32.0
Hospital environment	54	36.1
The most needed requirement to improve your sleep quality during the time spent in the hospital		
Social support (family, friend, relative)	50	33.3
Contact health personnel	30	20.0
Management of disease symptoms	55	36.7
Suitable ventilation	15	10.0

*more than one answer is given.

Table 3: Distribution of patient PSQI components and total point averages.

PSQI Subscales	Min	Max	X ± SS
Subjective sleep quality	0.00	2.00	1.27 ± 0.84
Sleep latency	0.00	4.00	2.47 ± 0.89
Sleep duration	0.00	3.00	0.74 ± 0.88
Sleep efficiency	0.00	3.00	0.98 ± 1.20
Sleep disturbances	0.00	2.00	1.76 ± 0.78
Use of sleeping medication	0.00	3.00	1.28 ± 1.05
Daytime dysfunction	0.00	3.00	2.66 ± 1.00
Total	0.00	15.00	7.84 ± 0.64
PSQI quality of sleep	**n**	**%**	
≤ 5 (good sleep quality)	43	28.7	
> 5 (poor sleep quality)	107	71.3	

Citation: Güler S, Şahan S, Demir G (2022) Sleep quality of inpatients with a positive diagnosis of COVID-19. Glob J Infect Dis Clin Res 8(1): 015-019.
DOI: https://doi.org/10.17352/2455-5363.000053

days of disease diagnosis. A study from Brazil reported that monthly income, occupation, gender, age, and marital status had effects on sleep quality [18].

Hospitalized patients are trying to adapt to changes due to the new situation they are in while dealing with the effects of their illness. These changes may also affect the quality of patients' sleep [19]. A study conducted on 7236 participants in China during the pandemic concluded that 18% of the general population experienced poor sleep quality. In addition, patients with COVID-19 are expected to have reduced sleep quality due to symptoms associated with contracting the disease [20].

In our study, factors that cause insomnia during the time hospitalized in the hospital outlook causes such as respiratory distress, hospital environment, and pain. According to the findings of our study and the literature, it can be said that this may be related to the uncertainty, social isolation, and the more intense symptoms experienced in the patient's illness during the time spent in the hospital. In this context, patients can be given orientation from their initial hospitalization to the hospital, reduced anxiety by providing information about the general process, and exposure to the clinical and treatment team in which they are treated.

Sleep hygiene is defined as policies and practices that improve sleep quality. Sleep hygiene training is also frequently used to deal with sleep disorders. In this context, watching TV or reading books in bed makes it difficult to fall asleep using technology [21]. In our study, the majority of patients were found to sleep during the night and day hours, and to be able to sleep; they were able to navigate social media and watch television during periods of insomnia.

In addition, the requirements that patients need most to improve their sleep quality during their stay in the hospital are, in order, the management of disease symptoms, communication with healthcare staff, and social support.

Conclusion

Patients with COVID-19 positive (+) diagnosis show that their sleep deterioration occurs after the first three days; about three-quarters of them have poor sleep quality, and cases that cause sleep disorders are caused by complaints such as symptoms, hospital environment, and pain. Hospitalized patients are trying to adapt to changes due to the new situation they are in while dealing with the effects of their illness. Patients should be trained, informed, and provided hospital orientation and sleep hygiene training with effective communication methods from patient hospitalization to stool.

References

1. Shanafelt T, Ripp J, Trockel M. Understanding and Addressing Sources of Anxiety Among Health Care Professionals During the COVID-19 Pandemic. JAMA. 2020 Jun 2;323(21):2133-2134. doi: 10.1001/jama.2020.5893. PMID: 32259193.

2. Liguori C, Pierantozzi M, Spanetta M, Sarmati L, Cesta N, Iannetta M, Ora J, Mina GG, Puxeddu E, Balbi O, Pezzuto G, Magrini A, Rogliani P, Andreoni M, Mercuri NB. Subjective neurological symptoms frequently occur in patients with SARS-CoV2 infection. Brain Behav Immun. 2020 Aug;88:11-16. doi: 10.1016/j.bbi.2020.05.037. Epub 2020 May 19. PMID: 32416289; PMCID: PMC7235586.

3. Pieh C, Budimir S, Probst T. Corrigendum to "The effect of age, gender, income, work, and physical activity on mental health during coronavirus disease (COVID-19) lockdown in Austria" [Journal of Psychosomatic Research 136 (2020) 110186]. J Psychosom Res. 2020 Dec;139:110278. doi: 10.1016/j.jpsychores.2020.110278. Epub 2020 Oct 16. Erratum for: J Psychosom Res. 2020 Sep;136:110186. PMID: 33075602; PMCID: PMC7709081.

4. Yang Y, Zhu JF, Yang SY, Lin HJ, Chen Y, Zhao Q, Fu CW. Prevalence and associated factors of poor sleep quality among Chinese returning workers during the COVID-19 pandemic. Sleep Med. 2020 Sep;73:47-52. doi: 10.1016/j.sleep.2020.06.034. Epub 2020 Jul 14. PMID: 32771927; PMCID: PMC7358171.

5. Guo Q, Zheng Y, Shi J, Wang J, Li G, Li C, Fromson JA, Xu Y, Liu X, Xu H, Zhang T, Lu Y, Chen X, Hu H, Tang Y, Yang S, Zhou H, Wang X, Chen H, Wang Z, Yang Z. Immediate psychological distress in quarantined patients with COVID-19 and its association with peripheral inflammation: A mixed-method study. Brain Behav Immun. 2020 Aug;88:17-27. doi: 10.1016/j.bbi.2020.05.038. Epub 2020 May 19. PMID: 32416290; PMCID: PMC7235603.

6. Zhang J, Xu D, Xie B, Zhang Y, Huang H. Poor-sleep is associated with slow recovery from lymphopenia and an increased need for intensive care in hospitalized patients with COVID-19: A retrospective cohort study. Brain Behav Immun .2020;88:50-58. Link: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7274970/

7. Banerjee D, Viswanath B .Neuropsychiatric manifestations of COVID-19 and possible pathogenic mechanisms: insights from other coronaviruses. Asian J Psychiatry 54: 102350. Link: https://pubmed.ncbi.nlm.nih.gov/33271682/. 2020.

8. Gupta R, Pandi-Perumal SR. COVID-Somnia: How the Pandemic Affects Sleep/Wake Regulation and How to Deal with it? Sleep Vigil. 2020;4(2):51-53. doi: 10.1007/s41782-020-00118-0. Epub 2020 Dec 3. PMID: 33289005; PMCID: PMC7711056.

9. Tasnim S, Rahman M, Pawar P, Chi X, Yu Q, Zou L. Epidemiology of sleep disorders during COVID-19 pandemic: A systematic scoping review. MedRxiv.2020; 1: 1-49. Link: https://www.medrxiv.org/content/10.1101/2020.10.08.20209148v1

10. Pérez-Carbonell L, Meurling IJ, Wassermann D, Gnoni V, Leschziner G, Weighall A, Ellis J, Durrant S, Hare A, Steier J. Impact of the novel coronavirus (COVID-19) pandemic on sleep. J Thorac Dis. 2020 Oct;12(Suppl 2):S163-S175. doi: 10.21037/jtd-cus-2020-015. Erratum in: J Thorac Dis. 2021 Feb;13(2):1302. PMID: 33214921; PMCID: PMC7642637.

11. Jahrami H, BaHammam AS, Bragazzi NL, Saif Z, Faris M, Vitiello MV. Sleep problems during the COVID-19 pandemic by population: a systematic review and meta-analysis. J Clin Sleep Med. 2021 Feb 1;17(2):299-313. doi: 10.5664/jcsm.8930. PMID: 33108269; PMCID: PMC7853219.

12. Chen R, Chou KR, Huang YJ, Wang TS, Liu SY, Ho LY. Effects of a SARS prevention programme in Taiwan on nursing staff's anxiety, depression and sleep quality: a longitudinal survey. Int J Nurs Stud. 2006 Feb;43(2):215-25. doi: 10.1016/j.ijnurstu.2005.03.006. Epub 2005 May 31. PMID: 15927185; PMCID: PMC7094227.

13. Chan JF, Yuan S, Kok KH, To KK, Chu H, Yang J, Xing F, Liu J, Yip CC, Poon RW, Tsoi HW, Lo SK, Chan KH, Poon VK, Chan WM, Ip JD, Cai JP, Cheng VC, Chen H, Hui CK, Yuen KY. A familial cluster of pneumonia associated with the 2019 novel coronavirus indicating person-to-person transmission: a study of a family cluster. Lancet. 2020 Feb 15;395(10223):514-523. doi: 10.1016/S0140-6736(20)30154-9. Epub 2020 Jan 24. PMID: 31986261; PMCID: PMC7159286.

14. 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 May;28(2):193-213. doi: 10.1016/0165-1781(89)90047-4. PMID: 2748771.

Citation: Güler S, Şahan S, Demir G (2022) Sleep quality of inpatients with a positive diagnosis of COVID-19. Glob J Infect Dis Clin Res 8(1): 015-019.
DOI: https://doi.org/10.17352/2455-5363.000053

15. Ağargün MY, Kara H, Anlar Ö. Pittsburgh Uyku Kalitesi İndeksi'nin Geçerliği ve Güvenirliği. Türk Psikiatri Dergisi 7:107-115. Link: https://www.turkpsikiyatri.com/turkceOzet?Id=327.1996.

16. Otsuka Y, Kaneita Y, Itani O, Nakagome S, Jike M, Ohida T. Relationship between stress coping and sleep disorders among the general Japanese population: a nationwide representative survey. Sleep Med. 2017 Sep;37:38-45. doi: 10.1016/j.sleep.2017.06.007. Epub 2017 Jun 24. PMID: 28899538.

17. Gupta R, Pandi-Perumal SR. COVID-Somnia: How the Pandemic Affects Sleep/Wake Regulation and How to Deal with it? Sleep Vigil. 2020;4(2):51-53. doi: 10.1007/s41782-020-00118-0. Epub 2020 Dec 3. PMID: 33289005; PMCID: PMC7711056.

18. Lima MG, Barros MBA, Szwarcwald CL, Malta DC, Romero DE, Werneck AO, Souza Júnior PRB. Association of social and economic conditions with the incidence of sleep disorders during the COVID-19 pandemic. Cad Saude Publica. 2021 Apr 30;37(3):e00218320. English, Portuguese. doi: 10.1590/0102-311X00218320. PMID: 33950076.

19. Yang Y, Zhu JF, Yang SY, Lin HJ, Chen Y, Zhao Q, Fu CW. Prevalence and associated factors of poor sleep quality among Chinese returning workers during the COVID-19 pandemic. Sleep Med. 2020 Sep;73:47-52. doi: 10.1016/j.sleep.2020.06.034. Epub 2020 Jul 14. PMID: 32771927; PMCID: PMC7358171.

20. Huang Y, Zhao N. Mental health burden for the public affected by the COVID-19 outbreak in China: Who will be the high-risk group? Psychol Health Med. 2021 Jan;26(1):23-34. doi: 10.1080/13548506.2020.1754438. Epub 2020 Apr 14. Retraction in: Psychol Health Med. 2020 Oct 23;:1. PMID: 32286091.

21. Jahrami H, BaHammam AS, AlGahtani H, Ebrahim A, Faris M, AlEid K, Saif Z, Haji E, Dhahi A, Marzooq H, Hubail S, Hasan Z. The examination of sleep quality for frontline healthcare workers during the outbreak of COVID-19. Sleep Breath. 2021 Mar;25(1):503-511. doi: 10.1007/s11325-020-02135-9. Epub 2020 Jun 26. PMID: 32592021; PMCID: PMC7319604.

Citation: Güler S, Şahan S, Demir G (2022) Sleep quality of inpatients with a positive diagnosis of COVID-19. Glob J Infect Dis Clin Res 8(1): 015-019.
DOI: https://doi.org/10.17352/2455-5363.000053