

The Impact of COVID-19 Infection on the Quality of Life of Health Care Workers

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Research

Keywords: COVID-19, quality of life, sleep quality, pandemic

Posted Date: November 16th, 2021

DOI: <https://doi.org/10.21203/rs.3.rs-1009194/v1>

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Version of Record: A version of this preprint was published at Journal of Pharmaceutical Health Services Research on May 9th, 2022. See the published version at <https://doi.org/10.1093/jphsr/rmac015>.

Abstract

Background: COVID-19 pandemic has negatively affected the entire world and one of its impacts was the increased level of stress and anxiety, especially among healthcare workers. Therefore, this study aims at evaluating the quality of life (QoL) and sleep quality of healthcare professionals in Iraq.

Methods: This study assessed the QoL and sleep quality by using World Health Organization Quality of Life Instruments (WHOQOL-BREF) and the Insomnia Severity Index (ISI) respectively. The questionnaires were administered through an online cross-sectional survey targeted at workers in medical fields in Iraq from 1st to 20th of August 2021.

Results: Three hundred medical health workers participated, and females constituted 75.3%. The two questionnaires had very good internal consistency. The highest scoring domain was the social relationships, followed by physical health. Significant difference was found in the mean scores of psychological health domain between males and females, with higher scores observed in males. The mean of the total ISI score was 11.58 ± 6.88 with a range between 0 and 27. Severe insomnia was observed in only 9.7% of the participants. A significant negative correlation ($r = -0.118$) was found between age and ISI scores of the participants. Significant differences were found between males and females with higher ISI mean score observed among males.

Conclusion: The quality of life and sleep pattern can be impacted by COVID-19 infection with the psychological aspect of QoL being the most affected and some degrees of insomnia being observed in many participants.

Introduction

Wuhan, a province of China, was the first place where Coronavirus Disease 2019 (COVID-19) was reported, then it spread rapidly worldwide [1]. COVID-19 is a newly discovered viral infection which was considered to be an international concern for public health in January, 2020 [2]. The World Health Organization (WHO) (<https://covid19.who.int>) reported 226,844,344 confirmed cases of COVID-19 all over the world, including 4,666,334 deaths till September 17, 2021. In Iraq, the number of confirmed cases has reached 1,967,187 according to the WHO.

Quality of life (QoL) is considered to be an important concept and the target for many researchers in health and medicine fields [3]. In the past decades, researchers have started to focus on the assessment of patients' QoL in addition to the usual monitoring of biomedical results [4]. QoL can be used to recognize different problems that may affect patients; these problems are self-reported by the patients themselves and may result in changes and modifications in the treatment and therapies [5]. Moreover, QoL can be considered as one of the most important objectives in the prevention and management of chronic diseases [6].

In most patients, COVID-19 infection would affect the respiratory system and may eventually cause serious complications [7]. Beside the lungs, COVID-19 virus has the ability to attack other organs in the body [8]. Moreover, the pandemic resulted in increased prevalence of depression, anxiety, stress and sleep disorders among populations compared to pre-COVID-19 data [9]. The outbreak of COVID-19 infection in Iraq and other countries around the world had led to the declaration of public health emergency state together with implementing preventive measures in an effort to prevent the spread of the disease. All these COVID-19 related factors have negative impact on the patients' quality of life. Health care professionals are more prone to this impact than others due to the increased stress they are facing when dealing with COVID-19 patients in hospitals [10]. In spite of the numerous studies about COVID-19 infection in Iraq, the effect of the virus on the quality of life did not receive much focus yet. Therefore, this research aims to study the impacts of COVID-19 infection on the quality of life and sleep quality of healthcare professionals in Iraq. In this study, the QoL was assessed by using World Health Organization Quality of Life Instruments (WHOQOL-BREF) after adaptation [11] while the Insomnia Severity Index (ISI) was used to assess the sleep quality [12]. Both scales -WHOQOL-BREF and ISI- were not originally designed for individuals with COVID-19 infection.

Materials And Methods

An online cross-sectional survey was conducted from 1st to 20th of August 2021. The target of this study was the workers in medical fields in Iraq. Being healthcare professional, and previously infected with COVID-19 virus were the inclusion criteria for this study.

The online survey was used because it was the safest and most appropriate way to reach the target sample without breaking the social distancing protocols imposed by the local government. The link of the survey was shared by the researchers through different social networking medical sites.

Questionnaire

The first part of the questionnaire was used for assessing the socio-demographic characteristics of the participants beside information about their COVID-19 infection. The second part consisted of questions which were adapted from the World Health Organization Quality of Life Instruments (WHOQOL-BREF) to assess the quality of life [11].

The first two questions in the WHOQOL-BREF questionnaire are used to measure overall QoL and general health of the individuals respectively. These are followed by questions assessing 4 domains: physical health, psychological health, social relationships and environment.

The items in WHOQOL-BREF questionnaire are rated depending on 5-point Likert scale. The raw score of each domain is then transformed to another score that ranges between 0 and 100 to be comparable with the scores resulting from WHOQOL-100 questionnaire. The higher scores are indicative of a higher or better quality of life [13].

The last part in the questionnaire was used to measure the sleep quality and insomnia problems in the participants by using Insomnia Severity Index (ISI) which consists of 7 items. ISI had an excellent internal consistency with a Cronbach alpha value of 0.90 and 0.91 [12]. Each item is rated also by using a 5-point Likert scale resulting in scores ranging between 0 and 28. Total scores between 0 and 7 are interpreted as no clinically significant insomnia, and the scores ranging from 8 to 14 are subthreshold insomnia. However, moderate and severe insomnia are considered when the total scores are 15-21 and 22-28 respectively.

Data analysis

The data were analyzed using SPSS (Statistical Package for Social Science) Statistics for Windows, version 26 (IBM Corp, Armonk, NY, USA). Descriptive statistics were used for describing the socio-demographic characteristics (like gender, educational level, and marital status). The continuous variables (like age) were described by using mean \pm SD. While inferential statistics were used to compare the differences in the scales scores among different variables and a *P*-value of less than 0.05 was considered statistically significant. Pearson correlation coefficient was used to identify the relationships between the scores.

Results

Socio-demographic characteristics

Three hundred medical health workers participated in the data analysis of this study. Twenty-five participants were excluded because their response to the questionnaire was incomplete; the response rate was 92.3%.

The participants' age ranged between 21 and 71 years (mean 37.30 \pm SD 10.07). Three-quarters of the participants (75.3%) were females, and most were married (63.3%).

Regarding the severity of COVID-19 infection, it was mild for the majority of the participants (84%), with more than two-thirds of the infections (70%) being confirmed by laboratory tests while the reminder depended only on clinical symptoms. Table 1 presents the statistical description of the socio-demographic characteristics of the participants.

Table 1
Socio-demographic characteristics of the participants

Variables (N=300)	N	%
Gender		
Male	74	24.7
Female	226	75.3
Educational Level		
Bachelor	143	47.7
Postgraduate	157	52.3
Marital Status		
Single	110	36.7
Married	190	63.3
Infection Severity		
Mild	252	84
Severe	48	16
Confirmed Infection		
Yes	210	70
No	90	30

Reliability

The Cronbach's alpha values for the two questionnaires were greater than 0.8 indicating very good internal consistency and thereby reliability. For WHOQOL-BREF instrument, Cronbach's alpha was 0.847 and for ISI instrument it was 0.875.

WHOQOL-BREF instrument

The overall QoL and general health perceptions were measured by the first two questions in WHOQOL-BREF instrument respectively. The overall perception of QoL mean was 3.6 ± 0.91 . Forty-one percent of the participants described their overall QoL as "neither poor nor good", and about one-third (34%) of them said that it was "good". Meanwhile, the mean of the overall perception of general health was 3.68 ± 0.97 . More than two-thirds of the participants were either "satisfied" or "neither satisfied nor dissatisfied" with their current health. Percentages of the other possible responses are presented in Figure 1.

With respect to the scores of the 4 domains, the highest mean score was found in the social relationships domain (63.81 ± 24.27), followed by physical health domain (61.21 ± 19.96). Psychological health and environmental domains showed approximately same mean scores (53.37 ± 22.27 and 53.41 ± 15.11) respectively.

The correlations between age and the domains' mean scores were calculated by Pearson's correlation coefficient (Table 2). A negative correlation was observed in physical health domain, as getting older was associated with lower scores, while the other domains correlated positively with age, with all correlations being non-significant.

Table 2
Correlations between QoL scores and age

Variables	Age	
	r*	P-value
Physical Health	-0.057	0.32
Psychological Health	0.113	0.05
Social Relationships	0.075	0.197
Environment	0.066	0.256
* Pearson's correlation		

Significant difference was found in the mean scores of psychological health domain between males and females, with higher scores observed in male. Better scores of physical health were seen in those participants whose infection was mild and those who did not resort to laboratory tests to confirm their infection. Regarding environmental domain, significant statistical difference was only found in terms of educational level with higher means observed in those with bachelor's degree. Table 3 presents these results.

Table 3
QoL scores and socio-demographic characteristics of the participants

Variables (N=300)	Physical Health		Psychological Health		Social Relationships		Environment	
	Mean ± SD	P-value	Mean ± SD	P-value	Mean ± SD	P-value	Mean ± SD	P-value
Gender	64.46 ± 19.6	0.107	59.35 ± 26.5	0.008§	64.22 ± 23.4	0.87	55.93 ± 11.7	0.098
Male								
Female	60.15 ± 19.9		51.42 ± 20.3		63.68 ± 24.5		52.58 ± 15.9	
Educational Level	60.69 ± 18.4	0.667	55.66 ± 21.4	0.09	65.88 ± 23.8	0.159	56.23 ± 13.2	0.002§
Bachelor	61.69 ± 21.3		51.29 ± 22.8		61.93 ± 24.5		50.83 ± 16.2	
Postgraduate								
Marital Status	60.51 ± 18.2	0.643	50.31 ± 23.5	0.07	62.72 ± 24.5	0.553	54.25 ± 15.1	0.461
Single								
Married	61.62 ± 20.9		55.15 ± 21.3		64.45 ± 24.1		52.92 ± 15.0	
Infection Severity	63.26 ± 19.2	0.00§	53.69 ± 21.7	0.578	64.17 ± 24.4	0.564	53.25 ± 15.2	0.689
Mild	50.46 ± 20.3		51.73 ± 24.9		61.96 ± 23.2		54.21 ± 14.6	
Severe								
Confirmed Infection	59.51 ± 20.2	0.024§	51.49 ± 23.1	0.025§	63.53 ± 22.9	0.761	53.17 ± 14.6	0.681
Yes	65.19 ± 18.7		57.78 ± 19.4		64.47 ± 27.1		53.96 ± 16.2	
No								

§P-value < 0.05 indicates significant result

ISI instrument

The mean of the total ISI score was 11.58 ± 6.88 with a range between 0 and 27. The highest frequency was found in score 15 which was achieved by 32 (10.7%) participants followed by scores 8 (26 participants) and score 0 (24 participants).

About one-third of the participants (28%) showed no clinically significant insomnia with total ISI scores ranging between 0 and 7. Subthreshold insomnia was the interpretation of 109 (36.3%) individuals who participated in this study. Seventy-eight (26%) participants were suffering from moderate insomnia which was considered with ISI scores from 15 to 21. Severe insomnia was observed in only 29 (9.7%) participants whose scores of total ISI were between 22 and 27.

A significant negative correlation ($r = -0.118$) was found between age and ISI scores of the participants. Independent samples t-test was used to determine the differences in ISI scores with socio-demographic characteristics; significant differences were found between males and females with higher ISI mean score observed among males. No significant variations were observed between individuals in terms of educational level, marital status or infection severity. Table 4 summarizes these results.

Table 4
Insomnia Severity Index (ISI) and socio-demographic characteristics of the participants

Variables (N=300)	ISI	
	Mean \pm SD	P-value
Gender	13.00 \pm 7.4	0.041[§]
Male	11.12 \pm 6.6	
Female		
Educational Level	12.08 \pm 6.1	0.233
Bachelor	11.13 \pm 7.4	
Postgraduate		
Marital Status	12.13 \pm 6.7	0.296
Single	11.26 \pm 6.9	
Married		
Infection Severity	11.37 \pm 6.7	0.233
Mild	12.67 \pm 7.4	
Severe		
Confirmed Infection	12.17 \pm 7.1	0.023[§]
Yes	10.20 \pm 5.9	
No		
[§] P-value < 0.05 indicates significant result		

Discussion

In this cross-sectional study, we investigated the impact of COVID-19 infection on the quality of life and the quality of sleep among the Iraqi medical staff by using WHOQOL-BREF and ISI instruments. The measurement of internal consistency indicated that the two instruments were reliable among the target population. To the best of our knowledge, there is no previous work in Iraq studying the impact of COVID-19 infection on the QoL and sleep quality.

Regarding the overall perception of QoL, in our study the mean was 3.6 ± 0.91 which was comparable to the mean (3.99 ± 0.95) of a study conducted in Saudi Arabia [14]. Eighteen percent of the participants in the current study felt that their overall QoL was “very good” which was about one-half that reported by the Saudi study [14]. This could be attributed to the differences in the age of the target population, in our study the target was medical staff with a mean age was 37.30 ± 10.07 , while in Saudi Arabia the participants were medical students with mean age 21.07 ± 1.70 years, and with increasing age there would be a substantial decrease in the QoL [15]. Additionally, being in the front line in fighting the pandemic may contribute to the lower perception of QoL [16].

The mean of overall perception of general health (3.68 ± 0.97) was also very close to that found in Saudi Arabia by Malibary *et al* [14]. In the current study, about 57% of the participants were either satisfied or very satisfied about their health which was in parallel to the finding (59.7 %) of the other study [14].

The mean scores of the 4 domains in this study showed the following descending order: social relationships, physical health, environmental and finally psychological domains. A study conducted in India by Chawla *et al* [17] found the highest mean score was in environmental (72.10 ± 13.0), then physical (67.23 ± 13.74), followed by social (57.13 ± 20.1), and the lowest was in the psychological domain (52.10 ± 17.45). Genta *et al* [18] also reported the highest scores in environmental domain (73.0 ± 11.6), followed by physical (68.9 ± 14.2), then social (67.8 ± 20.4) and finally psychological (64.0 ± 15.3). The results in these studies agreed with our results in that COVID-19 infection had the worst effect on the psychological status more than any other domain. In the latter 2 studies, the environmental domain was the highest scoring, disagreeing with our results in being the second lowest. However, a study assessing the QoL in Iraq found that the response was the poorest in the environmental domain [19].

The lack of significant correlations between the means scores of the four domains with age may give an indication that COVID-19 will affect the QoL of the healthcare staff regardless of their age demonstrating the huge impact of the pandemic.

In the current study, the mean score of the four domains was higher in males than females, Chawla *et al* [17] reported similar results regarding physical and psychological domains while in social and environmental domains females showed higher mean scores. This can be due to the differences in human nature as females have less physical power than males, also they are more passionate and sensitive to external pressure [20]. Moreover, Ali *et al* [21] attributed the differences in mean scores in terms of gender to the additional responsibilities female workers have in the domestic life. The most significant difference in Table 2 was recorded in the mean of the physical health domain in terms of severity of COVID-19 infection with higher scores in those participants with mild infection. It is known that COVID-19 infection may progress to severe disease with serious health complications affecting number of organs [7], [8] and therefore such a difference is not unexpected. The progression of the infection to severe may also increase the chance of testing for the patient to be eligible to receive hospital care and this may explain the significantly lower scores of physical health domain in those whose infection was confirmed by a laboratory test. With all the stress and anxiety that the pandemic is causing [9], a positive

test result should be expected to psychologically affect the patient in a negative way, and hence the lower scores in the psychological health domain in those whose infection was confirmed by a test.

About 70% of the participants in this study reported some degree of insomnia (ISI scores > 8). This was higher than the 58% reported by Wańkiewicz *et al* [22] in Poland. The difference may be explained on the basis of the inclusion criteria; in the Polish study, the healthcare professionals were those in contact with COVID-19 patients with no regard to their infection, while in our study, the participants were infected with the virus. This could mean that being infected with COVID-19 has more impact on sleep quality than the stress resulting from dealing with COVID-19 patients.

The negative correlation between ISI score and age was unusual, since it is expected for the sleep pattern to be disturbed with advancing age. One study which found such a positive correlation is that by Dragioti *et al* [23]. The relatively young age of our sample (37.30 years) compared to much older sample in Dragioti *et al* study (76.2 years) may be the reason for the negative correlation in the current study.

ISI score was significantly higher in males than females, which means men are suffering from insomnia more than women. This was surprising as it contradicted other studies [23]–[25] where females had higher ISI scores and were more prone to suffer from sleep problems. However, even with this significant difference, both genders reported ISI scores that lay within the same type of insomnia (subthreshold).

The ratio of females to males in this study may be considered as a limitation; females constituted 3 quarters of the sample size with males only accounting for about 25%. The design of the study itself (cross-section) may affect generalizability and causality.

Conclusion

Our study found that the quality of life and sleep pattern can be impacted by COVID-19 infection. The psychological aspect of QoL was found to be the most affected. Also, more than 2 thirds of the participants were found to have some degree of insomnia. These findings should be a warning to the healthcare system to intervene in an attempt to improve the quality of life and sleeping pattern in healthcare professionals to enable them to provide the much-needed service to the public during the pandemic.

Abbreviations

COVID-19

Coronavirus Disease 2019

WHO

World Health Organization

Quality of life

QoL

World Health Organization Quality of Life Instruments

WHOQOL-BREF

Insomnia Severity Index

ISI

SPSS

Statistical Package for Social Science

Declarations

Ethics approval

Before conducting this study an approval from the Scientific Committee of the Department of Clinical Pharmacy in the College of Pharmacy, University of Mosul was obtained. An approval from the Medical Research Ethics Committee at University of Mosul was also received. The aims of the study were explained to the participants, and the participation was completely voluntary.

Consent for publication

This version of the manuscript has been approved for publication by the authors.

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request.

Competing interests

The authors declare that they have no competing interests

Funding

This work was self-funded by the authors and did not receive any financial support from any organization or authority.

Authors' contributions

All the authors have contributed to the study conception and design. The questionnaire was prepared by Sadeel A. Shanshal and Harith Kh. Al-Qazaz. Data collection was performed by Ali Saleh Noori, Jaafar Atheer Ghazi, Abdullah Tahseen Dahham and Abdulrahman Samir Mohamed Saleh. Data analysis and statistical work was the responsibility of Sadeel A. Shanshal. Writing the manuscript was a combined effort of all the authors.

Acknowledgements

Authors acknowledge all the participants enrolled in this study, without their cooperation and help, the study could not have been completed. They also acknowledge the University of Mosul/ College of

Pharmacy for the moral support in conducting this study.

Conflict of interests: The authors declare that there is no conflict of interest involved in this work.

Code availability: Not applicable.

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Figures

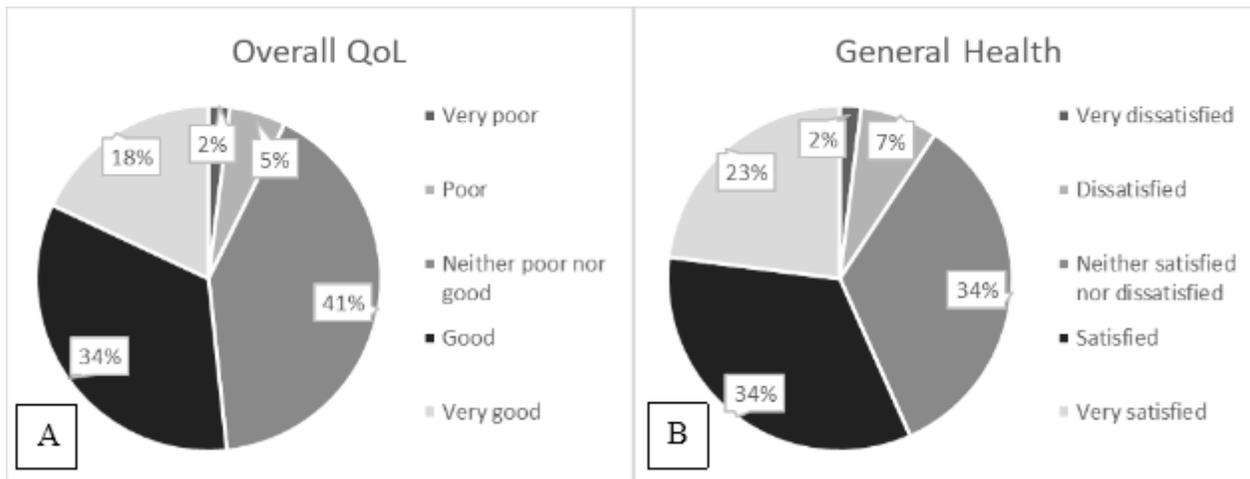


Figure 1

A: overall QoL B: general health