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Research Article

Quality of Life Comparison between Front-Line Residents and Medical Students during COVID-19 Pandemic

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ABSTRACT

Background: The Covid-19 disease was the most significant pandemic of the century. Health care providers showed great sacrifices in managing this disease and saving humanity, and they suffered many injuries. So, this study aimed to investigate the effect of Covid-19 on the resident's quality of life and comparison with medical students.

Methods: This cross-sectional study was performed on 223 Residents and 225 medical students. Using a random sampling method, WHOQOL-BREF 26 questionnaire was distributed among the participants. The collected data were analyzed with SPSS 21 software using T-test and ANCOVA.

Results: The results showed that covid-19 had caused a decrease in the quality of life of residents compared to medical students (P value<0.001). In addition, more advanced statistical analyzes showed that high work and study hours, irregular sleep, work history in COVID-19 wards, and the experience of CPR and intubation conditions of covid-19 patients have independent effects on the quality of life.

Conclusion: Covid-19 hurt all aspects of the quality of life of residents. Considering the essential role of residents in educational and treatment hospitals, it is necessary to make plans to improve the quality of life and psychological support of these people to prevent the decline in the quality of healthcare services.

Introduction

In December 2019, several cases of acute respiratory failure were reported in China. The cause of the disease was the coronavirus, and the name of the disease was given as acute respiratory failure syndrome [1] With the spread of the disease, the World Health Organization (WHO) declared a pandemic emergency for humanity [2]. Exposure to patients increased knowledge about symptoms and diagnosis but remained challenges for effective treatment [3-4].

So, the health authorities decided to use preventive methods to reduce the spread of the disease. Social distancing was the most essential method, which was implemented by restricting inter-city and intra-city traffic and recommending home quarantine. The instruction that was applied in almost all countries, as well as the effects can be seen in various aspects of education, economy, health, entertainment, and psychology [5]. The front-line of the fight against COVID-19 was healthcare providers

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[6]. They suffered from stress, anxiety, physical fatigue, problem-solving disorder, burnout & damage to quality of life due to the increased workload, sleep deprivation, social relation restrictions, and fear of getting infected and dying [7].

Quality of life (QOL) in health care providers is effective in better relationships with patients and quality of patient care [8-9]. In some cases, healthcare providers are suffering from poor health in COVID-19 patients [10]. Residents are at a higher risk of burnout and QOL damage because of higher levels of work, professional responsibility, need to study more and less social and economic support at the same time [11-12]. Statistics have shown that the level of suicidal thoughts in young physicians is higher than the average in society [13].

Today, the QOL has become an essential indicator in measuring health levels [14]. The QOL is a concept utterly dependent on the perceptions of each person, so the presentation of concepts will be different according to people's personality or social efficiency. These concepts were reviewed by the World Health Organization, and a definition was presented. In this definition, QOL is a broad concept of physical health, mental health, personality development, mental independence, and social relations, which also emphasizes the individual's perception [15].

There are several methods to measure QOL. Some of them are designed for specific diseases (for example, the QOL scale in asthma patients), and others (such as the EQ-5D and SF-6D scales and WHO QOL) have a comprehensive aspect [16-17].

During recent studies, the effect of exposure to COVID-19 patients on residents' QOL has not been investigated. We need a control group to compare with residents. Medical students were similar to the residents in many aspects of their lives, but they were exempted from presence in the hospital during the COVID-19 pandemic. They were training in the form of non-attendance courses and did not have any contact with COVID-19 patients. So, we investigate the difference in QOL between residents and medical students to understand the depth of the damage and probable effects of COVID-19, and find appropriate solutions and plans.

Methods

Ethical Consideration

This study was conducted after receiving the approval of the ethics committee of the Tehran University of Medical Sciences (ethics code: IR.TUMS.IKHC.REC.1400.492). The questionnaire was made available online (https://porsline.ir). On the first page was explained the purpose of the study and the complete protection of the participants' information, and the full authority not to complete the questionnaire.

Study Design and Population

This cross-sectional study was conducted on 223 residents and 225 medical students. The sample size was adequate to ensure that the investigation had enough power to focus on the impact of COVID-19 on the QOL of the residents and medical students.

This hospital is a referral educational center for patients from Tehran and neighboring provinces. This hospital has been serving all triage levels of COVID-19 patients throughout the pandemic. Also, all the health protocols provided by the Ministry of Health and Medical Education were implemented in this center.

Data Collection

Due to the social distancing protocols in the COVID-19 pandemic, an online survey was the most practical method to reach the study group and the control group. The questionnaire was designed online and sent to 280 residents and 280 medical students through a platform approved by the Tehran University of Medical Sciences. The responses received from residents were 235 (response rate 84%) and medical students 240 (response rate 86%). After reviewing the answer sheets and removing the incomplete and unacceptable answers, 223 cases from the resident group and 225 cases from the medical student group were entered into the final analysis.

Measurement of "Quality of Life"

The World Health Organization Quality of Life Brief Form (WHOQOL-BREF) includes 26 questions, and examines the QOL from the psychological, social, physical, environmental, and general health aspects. The validity and reliability of the Persian version of WHOQOL-BREF are approved by Nejat et al. in the Iranian population [17].

Also, basic factors were asked, including age, gender, marital status, sleep status, working and study hours in 24 hours, working months in the COVID-19 departments, experience of CPR & Intubation of COVID-19 patients, and COVID-19 Vaccination.

Statistical Analysis

Data analysis was done by IBM SPSS version 23 (Armonk, USA). T-test, univariate and multivariate ANCOVA was used. In the multivariate ANCOVA test, the QOL score of the resident and medical student was compared in the presence and controlling the effect of the basic factors. A P value less than 0.05 was interpreted as statistically significant.

Results

The basic information of the participants (223 residents and 225 medical students) can be seen in (Table 1). Generally, 30-35 years old residents and 20-25 years old medical students were the most frequent. Also, the number of female participants in the resident group was 128 and the medical student group was 115.

Then, the T-test showed that residents and medical students were statistically significantly different in every domain of QOL (including psychological, social, physical, environmental, and general health Perception domain). The mean scores of medical students were higher than residents (Table 2).

Also, ANCOVA examined the independent effect of basic factors in each domain of QOL (Table 3). In the psychological domain, statistically significant results were obtained from sleep status, working months in the COVID-19 wards and the experience of CPR & Intubation of COVID-19 patients (P value<0.05). In the social domain, sleep status, working months in the COVID-19 wards were statistically significant (P value<0.05). In the physical domain, sleep status was statistically significant (P value<0.05). In environmental domain, sleep status, working months in the COVID-19 wards and the experience of CPR & Intubation of COVID-19 patients (P value<0.05). In general health Perception domain, sleep status, working months in the COVID-19 wards, the experience of CPR & Intubation of COVID-19 patients (Table 4).

Table 1- Basic information of Participants by age, gender, marital status, sleep status, work and study hours in 24 hours, Working months in the COVID-19 wards, The experience of CPR & Intubation of COVID-19 patients, COVID-19 Vaccination

Variable	Factors	223 Resident Number(Percent)	225 Medical student Number(Percent)
Age (yr)	20-25	12 (5.4)	197 (87.6)
	25-30	82 (36.8)	24 (10.7)
	30-35	88 (39.5)	3 (1.3)
	35-45	34 (15.2)	1 (0.4)
	45<	7 (3.1)	0 (0)
Gender	Male	94 (42.15)	111 (49.33)
	Female	128 (57.39)	115 (50.66)
Marital status	Single	130 (58.3)	172 (76.4)
	Married	82 (36.8)	50 (22.2)
	Divorce	10 (4.5)	2 (0.9)
	Other	1 (0.4)	1 (0.4)
Sleep status	Regular	30 (13.5)	168 (74.7)
	Irregular	193 (86.5)	57 (25.3)
Work and study hours in 24 hours	0-6 hr	5 (2.2)	87 (38.7)
	6-12 hr	58 (26.0)	118 (52.4)
	12-18 hr	84 (37.7)	18 (8.0)
	18-24 hr	76 (34.1)	2 (0.9)
Working months in the COVID-19 wards	0-3	40 (17.9)	225 (100.0)
	3-6	20 (9.0)	0 (0)
	6-9	17 (7.6)	0 (0)
	9 months<	146 (65.5)	0 (0)
The experience of CPR & Intubation of COVID-19 patients	Yes	187 (83.9)	0 (0)
	No	36 (16.1)	225 (100.0)
COVID-19 Vaccination	Yes	218 (97.8)	215 (95.6)
	No	5 (2.2)	10 (4.4)

Table 2- Comparison of mean scores of QOL domains between residents and medical students during COVID-19

QOL Domain	Group(N)	Mean(SD)	t-Test(P value)
Psychological Domain Score	Resident(۲۲۳)	34.57(18.92)	-24.11(<0.001)
	Medical student (۲۲۵)	69.73(10.82)	
Social Domain Score	Resident(۲۲۳)	35.53(21.55)	-15.65(<0.001)
	Medical student (۲۲۵)	64.67(17.61)	
Physical Domain Score	Resident(۲۲۳)	38.03(15.73)	-23.30(<0.001)
	Medical student(۲۲۵)	68.84(11.98)	
Environmental Domain Score	Resident(۲۲۳)	34.59(17.64)	-21.66(<0.001)
	Medical student(۲۲۵)	66.76(13.47)	
General Health Perception Domain Score	Resident(۲۲۳)	37.72(21.81)	-21.37(<0.001)
	Medical student(۲۲۵)	74.00(12.95)	

Table 3- Univariate GLM test of QOL between residents and medical students during COVID-19 pandemic

QOL Domain / Variables	Psychological	Social	Physical	Environmental	General Health Perception
	F (P value)	F (P value)	F (P value)	F (P value)	F (P value)
Group	583.927 (<0.001)	245.652 (<0.001)	544.474 (<0.001)	470.590 (<0.001)	459.019 (<0.001)
AGE	155.705 (<0.001)	59.545 (<0.001)	149.839 (<0.001)	142.055 (<0.001)	157.359 (<0.001)
GENDER	588.042 (<0.001)	247.990 (<0.001)	537.244 (<0.001)	473.651 (<0.001)	461.296 (<0.001)
Marital status	587.881 (<0.001)	246.852 (<0.001)	528.550 (<0.001)	457.174 (<0.001)	454.901 (<0.001)
Sleep status	255.727 (<0.001)	89.789 (<0.001)	226.549 (<0.001)	197.975 (<0.001)	200.395 (<0.001)
Work and study hours in 24 hr	256.273 (<0.001)	111.489 (<0.001)	298.228 (<0.001)	205.650 (<0.001)	231.429 (<0.001)
Working months in the COVID-19 wards	113.878 (<0.001)	36.394 (<0.001)	142.260 (<0.001)	90.248 (<0.001)	99.309 (<0.001)
The experience of CPR & Intubation of COVID-19 patients	66.409 (<0.001)	37.151 (<0.001)	103.012 (<0.001)	59.702 (<0.001)	61.275 (<0.001)
COVID-19 Vaccination	579.532 (<0.001)	243.142 (<0.001)	543.111 (<0.001)	466.133 (<0.001)	456.416 (<0.001)

Table 4- Multivariate GLM test of the QOL between residents and medical students during COVID-19 pandemic

QOL Domain / Variables	Psychological	Social	Physical	Environmental	General Health Perception
	F (P value)	F (P value)	F (P value)	F (P value)	F (P value)
Group	19.029 (<0.001)	13.534 (<0.001)	63.471 (<0.001)	24.842 (<0.001)	31.423 (<0.001)
AGE	2.340 (0.054)	-	-		2.031 (0.089)
GENDER	3.603 (0.058)	2.594 (0.108)	-	3.639 (0.057)	2.445 (0.119)
Marital status	2.434 (0.064)	1.245 (0.293)	0.9780 (0.403)	-	-
Sleep status	29.715 (<0.001)	21.187 (<0.001)	39.770 (<0.001)	28.494 (<0.001)	21.095 (<0.001)
Work and study hours in 24 hr	1.557 (0.199)	2.483 (0.060)	2.368 (0.070)	2.023 (0.110)	4.899 (0.002)
Working months in the COVID-19 wards	9.290 (<0.001)	5.240 (0.001)	2.382 (0.124)	9.495 (<0.001)	12.320 (<0.001)
The experience of CPR & Intubation of COVID-19 patients	14.913 (<0.001)	0.365 (0.546)	2.244 (0.083)	5.611 (0.018)	7.192 (0.008)
COVID-19 Vaccination	-	-	-	2.325 (0.128)	-

Discussion

The outbreak of the COVID-19 pandemic has affected many aspects of life [18]. Based on the global guidelines of COVID-19 [19], the healthcare provider used the personal protective equipment at the patient's bedside. It helped to protect against the infection of covid-19, but the need to make decisions in dangerous situations put them at risk of psychological injuries and post-traumatic stress disorder [20].

Also, during COVID-19, the QOL of the healthcare providers has changed more than other people in society [21]. The quality of patient's services was affected due to the mental and psychological problems of healthcare providers [22-23]. So, it is necessary to pay attention to QOL of the healthcare providers. Usually, in educational hospitals, emergency physicians, residents, medical interns, and emergency nurses are the first line of contact with patients. Therefore, they are more likely to be psychologically harmed than other healthcare providers. During the COVID-19 research, for the first time, the QOL of residents compared to medical students.

Generally, the scores of all domains of QOL (psychological, social, physical, environmental, and general health) in residents were statistically significantly lower than medical students. Next, we examine the correlating basic factors (sex, age, working hours and study in 24 hours, marital status, sleep status, work experience in the inpatient department of patients with COVID-19, experience of CPR and intubation of patients with COVID-19 and vaccination against COVID-19) with the QOL.

1- Psychological Domain of QOL:

In the psychological domain, the mean score of residents participating in this study, was 34.57, which was lower than the results of Senol et al. (45.83) and Nurikhwan et al. (65.85) [24-25].

Low quality of sleep, work in the COVID-19 ward, and the experience of being in difficult situations such as CPR and intubation of COVID-19 patients are correlated with a lower QOL score. These results have also been obtained in other studies. Woon [26] and Asante [27] concluded that in the COVID-19 pandemic, working long hours without adequate rest is causing psychological damage in the healthcare providers. Also, Liu [28] and Vafaei [29] showed that healthcare providers in close contact with COVID-19, were exposed to more psychological damage. Also, during COVID-19, Korkmaz [30] and Samadi [31] observed specific effects on QOL due to sleep problems in healthcare providers.

Next, the comparison of psychological domain scores showed that residents QOL is lower than medical students (34.57 vs. 69.73). Residents had serious psychological damage due to increasing workload, the lack of human resources, long working hours, Lack of personal protective equipment such as masks, gloves, caring for critically ill patients, observing the illness of colleagues and the deterioration of their condition [32].

In this study, residents and medical students were in different age groups, and it was possible that the score of the participants QOL was affected by the confounding effect of age. The ANCOVA test showed that the quality of life of residents is lower than that of medical students regardless of age (P value=0.045). Also, the independent examination of the age showed that age was an influential factor in the psychological domain of QOL. The psychological domain score of QOL in older age group is lower than younger group.

2- Social domain of QOL:

In the social domain, the mean score of residents participating in this study was 35.53, which was lower than the result of Senol et al. (83.33) and Nurikhwan et al. (62.58) [24-25]. Examining the basic factors on the social domain showed low QOL score is correlated with low quality of sleep and work experience in the COVID-19 wards. This is similar to the observations of Woon et al [26]. Workload, followed by physical and mental fatigue, made the healthcare providers unable to spend time with the family and benefit from their emotional support, as before the COVID-19 pandemic. In contrast, time spent with friends and colleagues increased. In addition, having fun with colleagues is effective because they all understand each other [27].

Also, Lehman et al. found that healthcare providers may experience low quality of social life due to stigma and social isolation [33]. The health managers applied quarantines inside the city [34]. This decision made the healthcare providers more limited in social relations. Due to direct contact with patients, there is a possibility of virus transmission by healthcare providers, which makes them voluntarily limit their social relations [35]. If the social support of the healthcare providers is improved, their stress will be reduced, their performance at work will be enhanced, and self-confidence will be obtained. The final effect can be seen in their personal life [36]. In this situation, the healthcare providers can better control their emotions against the events at work and try to sleep regularly after work, which means improving the quality of sleep.

Next, the comparison of scores showed that the scores of residents are lower than medical students (35.53 vs. 64.67).

3- Physical domain of QOL:

In the physical domain of QOL, the mean score of residents participating in our study was 38.03. The result of this domain is reported 63.24 by Nurikhwan et al. and 19.28 by Senol et al. [24-25]. The effects of basic factors on the physical domain showed that poor quality of sleep and working months in the COVID-19 wards were correlated with a lower QOL score.

In the study of Mroczek et al. the physical conditions of healthcare providers were evaluated. There was an increased risk of physical health damage and musculoskeletal disorders due to long working hours without rest, medical activities in a standing position and a bent and twisted trunk, lifting heavy objects, lack of ergonomic equipment, a history of chronic disease, and high BMI [37]. Furthermore, Bread et al. found that healthcare providers are imposed a high level of stress and anxiety because of working with ill patients in the long term. So, Chronic physical anxiety symptoms will occur, such as heart palpitations, sleep disorders, headaches, and muscle and spine pains [38]. These physical pains prevent proper functioning at work and home, so the QOL is affected [39].

Next, comparing physical domain scores showed that residents' QOL is lower than medical students (38.03 vs. 68.84).

4- Environmental domain of QOL:

The mean score of residents' Environmental domain was 34.59, which was lower than the results reported in Nurikhwan et al.'s study (63.06) and higher than the results of Senol et al.'s study (12.18) [24-25]. The multivariate ANCOVA showed that low sleep quality,

work experience in COVID-19 wards, and placement in CPR or intubation conditions of COVID-19 patients correlated with a lower QOL score in the Environmental domain.

Furthermore, in the study of Maqsood and Woon, more factors are mentioned, such as the male sex, marriage, and age over 40 years old [26, 40]. But in our study, these factors were not statistically significant. In their study, the older healthcare providers had more experience, and more opportunities to learn. So, they have found enough skills to maintain proper performance when placed in stressful situations. Also, more work experience teaches a person how to achieve a work-life balance.

Next, in the environment domain of QOL, the score of residents was lower than medical students (34.59 versus 66.76).

5- General Health Perception domain of QOL:

The mean score of the general health Perception domain of residents was 37.72, which was lower than the results obtained in the study of Senol and Nurikhwan [24-25].

Examining the effect of basic factors on the QOL score in the General Health Perception domain showed that low quality of sleep, long hours of work and study in 24 hours, work experience in the COVID-19 wards, and exposure to CPR or intubation of COVID-19 patients is correlated with a lower QOL score.

The comparison of scores showed that the resident's score was lower than medical students in the General Health Perception domain of QOL (37.72 vs. 74.00).

In another part of the obtained information, it was found that the QOL of residents were lower than medical students in all domains (psychological, social, physical, environmental, and general health) regardless of the effect of basic factors (including gender, age, working hours and study in 24 hours, marital status, sleep status, work history in the inpatient ward of patients with COVID-19, the experience of CPR and intubation of patients with COVID-19 and vaccination against COVID-19). So it can be concluded that the residents are involved in more issues during their training years, and there is a need for more in-depth research on the problems of this group.

Conclusion

During COVID-19, all aspects of the residents' QOL were affected.

Due to the decisive role of residents, health and educational managers should make practical decisions such as increasing social support, providing personal protective equipment, creating psychological support teams, providing ergonomic equipment, and making decisions to prevent long and continuous working hours.

Also, mental health services should be made available adequately and effectively. These services can include access to an online psychotherapist, designing psychological self-help books, and creating psychological support teams. Increasing the QOL of residents makes a sense of job satisfaction for them and ultimately leads to improved job performance and increased work efficiency.

Limitation

There are several limitations in our study:

This study is a single-center study, but this hospital is most significant in the country and has the largest number of hospitalized COVID-19 patients.

Data collection was done in a single center. The COVID-19 pandemic affects the conditions of this hospital and how to answer the questionnaire. We suggest designing and conducting a multicenter study with a larger sample size so that the results can be generalized. We have no information about the QOL of this group of participants before the COVID-19 pandemic. As a result, a long-term study is needed to understand better the short-term and long-term outcomes of the COVID-19 pandemic.

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