

Quality of Life among Health Professionals during COVID-19: A Narrative Review Article

Amany IA Soliman^{1*}, Yaser MA Raya², Randa M Said¹, Hanaa S Said¹

¹Family Medicine Department, Faculty of Medicine –Zagazig University–Egypt

²Psychiatry Department, Faculty of Medicine - Zagazig University–Egypt

*Corresponding author:

Amany Ibrahim Abdelrhman Soliman

Email: Aias22110022@gmail.com

Address: Qurain, Sharqia, Egypt

Postal Address: 44519, Egypt

Tel: +201014561465

Conflict of interests: The authors have not declared any conflict of interests.

Fund: none

Abstract

In 2019, the coronavirus disease pandemic affected quality of life of health personnel who have been on front lines in coping with COVID-19 studied cases. And due to that, all health professionals (HPs) are under pandemic conditions like COVID-19. emergence of COVID-19 pandemic has produced several diversions in keeping of quality of life of doctors and nurses by deviations from normal physical, mental, & social well-being aspects, so in this article, we aimed to map the studies on quality of life of health professionals throughout COVID-19 pandemic. We made study of MEDLINE by PubMed & Web of Science [Science Citation Index Expanded], Social Sciences Citation Index, & Emerging Sources Citation Index] of all scientific literature published from May 2020 until April 2023. Summary: evidence to date indicates that female nurses with close contact with COVID-19 studied cases could have most to gain from efforts wanted to support psychological well-being. Nevertheless, inconsistencies in results & lack of data assembled outside of hospital settings recommend that we must not exclude any groups when addressing psychological well-being in health & social care workers. Although psychological interventions designed to improve resilience in individuals could be of value, it has been marked that to build resilient workforce, occupational & environmental factors ought to be addressed. An additional study containing social care workers & analysis of wider societal structural factors has been recommended.

Keywords: COVID-19, Health Professionals, SARS-CoV-2, Quality of Life

Tob Regul Sci. TM 2023;9(1): 2454-2466

DOI: doi.org/10.18001/TRS.9.1.168

Introduction

Since the COVID-19 pandemic has been going on for over 3 years, greater focus is being placed on long-term consequences of SARS-CoV-2 infection on physical, social, & emotional functioning, or the health-related quality of life. After the first stage of infection, numerous COVID-19 individuals resume their pre-COVID-19 level of health, despite a sizable percentage of people experiencing persistent post-infection sequelae (1).

Only a few studies have examined COVID-19 studied cases of long-term HRQL with follow-up times of twelve months or longer. These studies have produced conflicting findings, with some claiming that studied cases still have impaired HRQL after one year while others claim that most studied cases have made good physical & functional recoveries. Because most SARS-CoV-2 infections have been asymptomatic or mildly symptomatic & do not require hospitalization, & it has been well known that long-term post-infection sequelae are not limited to people who originally had severe or critical COVID-19 necessitating hospitalization, these studies had been almost exclusively conducted between previously hospitalized studied cases, leaving a significant knowledge gap (1, 2).

Healthcare workers have been regarded as risk group because of in-hospital exposure to transmission, SARS-CoV-2 virus contagion, & challenging working conditions they deal with on an everyday basis, including inadequate distribution of PPE, absence of medical equipment (mechanical ventilators), & unstable hospital infrastructure (2).

A person's perception of their place in life about their cultural upbringing & belief systems, that have been linked to their aspirations, expectations, standards, & considerations, is referred to as their quality of life (3).

Signs of work stress pose significant public health issues in the present healthcare context. The quality of life of HCWs can be impacted by specific components of their work & personal lives. Unprecedented levels of anxiety & terror could have severe negative effects on healthcare workers' quality of life (4).

While the pandemic's effects on health have been well documented, very little research has looked at how it has affected people's quality of life, particularly QoL of HCWs (4). Quality of life includes physical & mental health & individual convictions, interpersonal connections, & interactions with key elements of their surroundings. According to reports, the population's quality of life had been lower throughout the epidemic than it had been before (5).

Compared to the general population, healthcare workers have been more prone to experience psychological morbidities, & same has been probably true of QoL (6). Understanding how the pandemic affects healthcare workers' quality of life & risk factors has been essential since studied cases' safety & standard of care they receive have been directly & indirectly impacted by healthcare workers' quality of life (7,8).

In this research, we are required to demonstrate the influence of COVID-19 pandemic on the QOL of healthcare professionals & determine related factors to the QOL of healthcare professionals in this context. The health influence of COVID-19 may negatively affect quality-of-

life of HCWs & possible related reasons; thus, it has been principal to recognize sequelae & prioritize mental health interventions.

Quality of life between health professionals

absence of studies on the effects of COVID-19 pandemic on people's professional & personal lives, & quality of life of healthcare personnel, is highlighted by prior research (9).

In addition to lack of physical illness, perceived quality of life refers to a person's subjective assessment of their psychological, social, & environmental circumstances. While more research on quality of life of healthcare professionals had been published by **Melo-Oliveira et al.**, (10) even though this research has shown significant proportion of healthcare workers with low health-related QoL impacted by depression, anxiety, stress, poor self-perceived mental health status, insomnia, & working in COVID-19-designated hospitals throughout COVID-19 pandemic, little has been known about how COVID-19 pandemic affects various domains of QoL (11).

Even little has been known about linked factors that affect QoL negatively or favorably, particularly for those who are working in high-risk clinical settings throughout this epidemic. Additionally, information on how various social support systems & stresses connected to COVID-19 influence healthcare workers' quality of life has been sparse & has not been examined in prior studies (12).

Scholars from many nations produced numerous studies on QoL between HPs throughout COVID-19 epidemic. cross-sectional study from Indonesia had been obtained regarding quality of life of health care workers throughout COVID-19 outbreak. HWs' Quality of Life is evaluated using WHOQOL-BREF instrument. Physical health, psychological health, social interactions, & environment have been 4 domains of quality of life that makeup twenty-six questionnaire items used to measure QoL. research's conclusions had been as follows: between HCWs, average scores for Social Relation Health Domain (51.57 ± 17.61) & Environmental Health Domain (57.28 ± 12.48) had been interpreted as having Moderate QoL, while average scores for Physical Health Domain (63.18 ± 10.62) & Psychological Health Domain (60.33 ± 15.44) had been interpreted as having Good QoL. The survey's findings show that good mental and physical health, fair social relationship quality, and a healthy environment have been reported by all health professionals who took part in the research (13).

Only 9 research evaluated the total QoL of HCWs in recently published research on the QoL evaluation of healthcare professionals throughout COVID-19. the bulk of research evaluated psychological health or QoL linked to health. Just 3 of these 9 studies examined risk variables for QoL (14). Çelmeçe and Menekay conducted a cross-sectional study with 218 HCWs & discovered that all QoL variables were negatively connected with health anxiety to COVID-19 virus (15). Stress, trait anxiety, & burnout was strongly correlated with quality of life in research on 240 healthcare professionals in Turkey (16).

Investigations on health anxiety among medical professionals associated with COVID-19 viral infection & its quality relationship has been reported from Egypt. Short Health Anxiety Inventory, Symptom Check List-90-Revised & World Health Organization Quality of Life - BREF had been used to measure the quality of life of healthcare professionals. Research results showed that twenty-eight percent of HCWs had concerns about their health-related to COVID-19 virus. Healthcare workers' health anxiety in reaction to COVID-19 virus had been negatively correlated with all QoL domains. Physicians (n=seventy-four) had mean & standard deviations for the following QoL domains: Physical health (55.2 ± 14.5), Psychological (58.7 ± 17.3), Social relationship (60.8 ± 20.2), & Environmental (49.6 ± 16.8), while Other HCWs (n = 144) had mean & standard deviations for following QoL domains: Physical health (49.2 ± 15.7), Psychological (56.1 ± 14.3), Social relationship (64.0 ± 19.2), Environmental (49.2 ± 14.1) (17).

Using web-based, descriptive quantitative cross-sectional technique, novel research results on mental health results & professional quality of life have been released between 893 respondents throughout the COVID-19 pandemic. Effects of Event Scale-Revised, Connor-Davidson Resilience Scale, & Professional Quality of Life Scale had been used as study tools. In the emergency unit, female nurses & doctors reported a greater percentage of psychological discomfort, based on research results. Employees at COVID-19 special departments reported having high levels of satisfaction (40.12 ± 4.3), burnout (32.30 ± 7.7), & stress (28.49 ± 8.1) as symptoms of their professional quality of life (18).

New study results on the professional quality of life & mental health results had been documented between 893 respondents utilizing web-based, descriptive quantitative cross-sectional technique throughout COVID-19 pandemic. Effect of Event Scale-Revised, Connor-Davidson Resilience Scale, Professional Quality of Life Scale, & questionnaires focused on feelings had been instruments used in the study. The study's results indicated that psychological discomfort was more common among female nurses & doctors who worked in the emergency room. Worker satisfaction (40.12 ± 4.3), burnout (32.30 ± 7.7), & stress (28.49 ± 8.1) had been professional quality-of-life symptoms that had been detected between those in COVID-19 special departments (19).

a cross-sectional study from Italy that included 265 HCWs examined professional quality of life & mental health results between SARS-COV-2 (COVID-19)-affected healthcare workers. Compassion satisfaction, burnout, secondary traumatization, & depression, & worry symptoms in HCWs had been evaluated using Professional Quality of Life-five, nine-Item Patient Health Questionnaire, & 7-Item Generalized Anxiety Disorder scale. Working in the intensive care unit & being on the front lines were found to be potential risk factors for anxiety symptoms but not depressive symptoms, according to a study (20).

A study on mental health & quality of life had been conducted between medical staff in India throughout COVID-19 pandemic. generalized anxiety disorder (GAD-7) questionnaire, Quality of Life (QoL-1) visual analogue scale, & multiple-choice questions with twelve alternatives for

rating stressors are among research's instruments. The study's results showed that a sizable portion of the sample (ninety-two, forty-seven percent) displayed signs of depression, anxiety (ninety-eight, fifty percent), & poor quality of life (eighty-nine, forty-five percent). The study's conclusions indicate that Indian healthcare personnel experienced a considerable incidence of depression & anxiety symptoms, in addition to poor quality of life, throughout COVID-19 epidemic. Low quality of life had been found in this research to be forty-five percent, with severe to moderate depression identified as thirty-two (seventy-three percent), moderate-to-severe anxiety reported being thirty-nine (percent), & moderate-to-severe depression & anxiety reported to be twenty-four (seventy-three percent) (21).

Research with 1290 respondents had been undertaken on Quality of Life Previous & throughout COVID-19 Pandemic: national cross-sectional study including dietitians in Brazil. WHO-QOL-BREF had been a study tool that had been employed. Data on quality of life before SARS-COV-2 & throughout the outbreak had been considerably different, which highlights the study's conclusions. The study indicated that the SARS-COV-2 pandemic has negative effect on Brazilian dietitians' quality of life as pressure from their jobs causes modifications to their personal lives (22).

Factors Affecting Health-Related Quality of Life Between Healthcare Workers Throughout COVID-19

Early in COVID-19 pandemic, medical professionals had been already under stress from additional pandemic-related factors like great infection risk, unexpected increase in cases, lack of personal protection equipment, numerous fatalities, self-isolation, demanding & long work hours, uncertainty about vaccine level of protection, & stigmatization (23).

the mortality rate from non-disease causes has been significant, healthcare personnel have different health issues than the public (24). Additionally, as COVID-19 develops, treatment procedures are devised, & efforts have been made to address the poor psychological well-being of healthcare workers who had been exposed to infectious diseases, including work-related stress & worry. The mental health of healthcare professionals is further threatened by new infectious diseases like COVID-19, which could cause illnesses including depression & post-traumatic stress disorder (25).

Additionally, the effects of the current epidemic have an impact on mental & emotional health of healthcare personnel & their physical health (26). Work-related stress & mental health concerns can have a negative impact on well-being & productivity, which may lead to decreased patient safety, lower-than-expected treatment, & early retirement (27). In addition, these issues, such as broken relationships, problematic alcohol & drug use, & suicidal thoughts, may have negative influence on health-related quality of life of health workers. Workers' impression of how coworkers would react to behaviors suggested by interpersonal situations is represented by psychological safety (28).

By fostering a climate of trust & risk-free communication, psychological safety may be a key strategy to decrease stress (29). Healthcare workers can have had lower health-related quality of life throughout COVID-19 pandemic as result of emotional stress, but psychological safety may help with emotional weariness (30). It was important to verify that emotional safety may enhance health-related quality of life for healthcare professionals. When faced with numerous risks of developing infectious diseases, numerous healthcare workers exhibit signs of sleep issues, like poor sleep quality & brief sleep duration. (31). Sleep issues, including stress & despair, may harm one's mental health & productivity at work (32). For healthcare professionals, inadequate & poor-quality sleep may be significant early indicators of underlying physical or mental health issues & may also influence their quality of life in terms of their health (33).

Many variations in the contributing elements have been noted. Positive aspects of QoL of healthcare professionals could be categorized into the following factors: Sleep hygiene, resiliency, active coping style, dietary preferences, & physical activity, years of experience, & psychosocial & economic factors such as income, access to healthcare, & financial security (34).

On the contrary, most studies revealed negative aspects that reduced QOL. These consisted of (a) factors relating to mental health, such as the severity of worry, worse self-perception of mental health, depression, burnout syndrome, higher severity of stress, insomnia, & pre-existing mental illness; (b) psychosocial factors, such as stigmatization & stress due to annual leave being frozen; (c) factors relating to physical health, such as comorbidities & existence of COVID-19-related symptoms; & (d) COVID-19-related factors, such worry, fear & stress due to COVID-19, being worried about quarantine, loss of daily routine, & (e) individual reason: smoking habits (35).

Additionally, several working COVID-19 criteria included being on the front lines or lacking training in managing COVID-19 patients, working in COVID-19 departments, dealing with COVID-19 confirmed patients, designated hospitals, and more (36). Lastly, a less positive impression of one's financial situation had been an economic component. the frontline situation had significantly poorer QOL in comparison to other work modalities, according to research that assessed frontline HCWs' quality of life by workplace, treating COVID-19 studied cases, or else participating in COVID-19 answers (37).

Additionally, some aspects had been linked to QOL while others had not been. For instance, having children or just being married had been linked to higher QOL scores in employees who had frequent interactions with COVID-19 studied cases. Yet, different investigations revealed that marital status had not been (38).

In addition, nurses & women often reported higher QOL. However, other research indicates that women's QOL had been lower or that gender had neither a positive nor negative impact on QOL. Professional variations in scores did not significantly affect QOL either. Lastly, participants over forty-five or sixty years old performed better, but other studies have suggested that being older than thirty or between forty-one & sixty years old may be associated with lower

QOL. On the other hand, 2 studies found that younger HCWs (those under thirty years old) had lower mean QOL than the elderly (39).

Yet, our analysis discovered that HCWs have been also exposed to other factors that have a detrimental impact on QOL. Increased QOL is supported by factors like resiliency, active coping style, & perceptions of social & familial support. This emphasizes the importance of resilience as a coping mechanism that improves QOL by causing less distress (40).

Studies in this area acknowledge significance of resilience as deciding element in HCWs' mental health. As a result, they promote its reinforcement together with active coping techniques, appropriate sleep habits, a happy outlook on life, & life satisfaction as cornerstones for developing resiliency & primary means of addressing mental health concerns while also having a favorable effect on overall health (41). Therefore, those with stronger coping mechanisms, high levels of pleasure in their lives, & resilience to adversity will also have a better quality of life (42).

In addition, several factors might lessen the possibility that HCWs could suffer a negative change in QOL. Firstly, by improving organizational prevention measures like hand hygiene, wearing PPE, reducing workplace gatherings, & caring about the health of healthcare professionals. Secondly, by ensuring timely access to immunizations & booster shots. These steps could lessen unfavorable psychological conditions including stress & anxiety & increase confidence in medical professionals (45).

Implications for future research

These discoveries have potentially significant practical ramifications. Firstly, therapies intended to reduce anxiety & fear about COVID-19 life changes brought on by COVID-19 that aim to enhance people's quality of life could not be as useful as formerly believed for persons who have not had COVID-19 (46). Secondly, the measurement model's finding of large covariance among 1) perceived COVID-19 risk & quality of life & 2) COVID-19 life change could be deceptive since, once each link is considered, others vanish. Therefore, if these interactions have been studied apart from one another in other research with individuals who have not received COVID-19, their significance could be overestimated. the final question is: if people without COVID-19 report comparable levels of perceived danger, life changes, & quality of life to people with COVID-19, but did not perceive danger & life changes have been connected to their quality of life, what accounts for variation in the quality of life in people without COVID-19? Future studies on this issue are still needed.

To get a clearer picture of how COVID-19 affects the quality of life, more investigation has been required. The study of empirical data has been continuing. Many paths still need to be empirically investigated. Evidence of study on alternative paths has been still developing. When empirical evidence has been more comprehensive & mature, systematic reviews of relevant literature have been required. A more detailed grasp of regional circumstances will be provided by upcoming evaluations that are specifically focused on that region.

Furthermore, our review demonstrated that the working features of HCWs and mental health issues were the two main causes of the decline in QOL. Implementing mental health & psychological support interventions, decreasing work schedules, & preserving security & protection standards at the workplace would help decrease working risk factors, allowing the protection of health of employees & improving their QOL.

Additionally, it is advised that various work sectors, particularly health sector by Occupational Medicine, implement surveillance & prevention programs for workers' physical & mental health to increase awareness, provide for, & intervene in development of mental disorders which could impact staff's QOL.

Additionally, this research gave healthcare organizations some information about the effects of workplace support elements on psychological results between nurses throughout the pandemic. Future departmental & organizational initiatives have been required to enhance workplace assistance given to nurses, particularly in recognition of their sentiments of contribution. Additionally, encouraging collaboration in the workplace may improve how well healthcare employees perform. To improve the psychological health of HCWs throughout the pandemic & lessen the impact of stressful work environments, certain tailored treatments have been advised. Additionally, COVID-19 recovery strategies for nurses have been essential for preventing burnout, increasing job commitment, & raising self-rated health.

Conclusion

This review outlined influences of COVID-19 epidemic on healthcare professionals' quality of life & determined contributing causes. We discovered that HCWs' QOL was lower than that of their counterparts, according to evidence, & that this was due to psychosocial factors, work-related COVID-19 factors, physical & mental health conditions like depression, anxiety, occupational stress, & individual & prior mental illnesses. There was no variation in QOL by profession, but social support, resilience, & active coping increased QOL. This literature may help health organization stakeholders in promoting QOL between health professionals by providing required provisions, measures, or initiatives for welfare of health professionals, notably in resolving epidemic demands in all health organizations.

References

- [1] **Verveen, A., Wynberg, E., van Willigen, H.D.G. et al.** Health-related quality of life among persons with initial mild, moderate, and severe or critical COVID-19 at 1 and 12 months after infection: a prospective cohort study. *BMC Med* 20, 422 (2022). <https://doi.org/10.1186/s12916-022-02615-7>
- [2] **Razvi S, Oliver R, Moore J, Beeby A.** Exposure of hospital healthcare workers to the novel coronavirus (SARS-CoV-2). *Clin Med (Lond)*. 2020 Nov; 20(6):e238-e240. doi: 10.7861/clinmed.2020-0566. Epub 2020 Sep 22. PMID: 32962975; PMCID: PMC7687340.

- [3] **Skevington SM; WHOQOL SRPB Group.** Is Culture Important to the Relationship Between Quality of Life and Resilience? Global Implications for Preparing Communities for Environmental and Health Disasters. *Front Psychol.* 2020 Jul 30; 11: 1492. doi: 10.3389/fpsyg.2020.01492. PMID: 32852482; PMCID: PMC7406707.
- [4] **Kandula UR, Wake AD.** Assessment of Quality of Life among Health Professionals during COVID-19: Review. *J Multidiscip Healthc.* 2021 Dec 30; 14: 3571-3585. doi: 10.2147/JMDH.S344055. PMID: 35002247; PMCID: PMC8722681.
- [5] **Eicher S, Pryss R, Baumeister H, Hövener C, Knoll N, Cohrdes C.** Quality of life during the COVID-19 pandemic - Results of the CORONA HEALTH App study. *J Health Monit.* 2021 Oct 13; 6(Suppl 6):2-21. doi: 10.25646/8867. PMID: 35585992; PMCID: PMC8832366.
- [6] **Khaing NEE, Quah C, Png GK, Wong J, Tee A, Oh HC.** Association between proximity to COVID-19 and the quality of life of healthcare workers. *PLoS One.* 2023 Mar 23; 18(3): e0283424. doi: 10.1371/journal.pone.0283424. PMID: 36952485; PMCID: PMC10035903.
- [7] **Estoque RC, Togawa T, Ooba M, Gomi K, Nakamura S, Hijioka Y, et al.** A review of quality of life (QOL) assessments and indicators: Towards a "QOL-Climate" assessment framework. *Ambio.* 2019 Jun; 48(6): 619-638. doi: 10.1007/s13280-018-1090-3. Epub 2018 Sep 11. PMID: 30206898; PMCID: PMC6486941.
- [8] **Bryson WJ.** Long-term health-related quality of life concerns related to the COVID-19 pandemic: a call to action. *Qual Life Res.* 2021 Mar; 30(3): 643-645. doi: 10.1007/s11136-020-02677-1. Epub 2020 Oct 18. PMID: 33073307; PMCID: PMC7568937.
- [9] **Testoni I, Francioli G, Biancalani G, Libianchi S, Orkibi H.** Hardships in Italian Prisons during the COVID-19 Emergency: The Experience of Healthcare Personnel. *Front Psychol.* 2021 Feb 4; 12: 619687. doi: 10.3389/fpsyg.2021.619687. PMID: 33613396; PMCID: PMC7890194. **Amanullah S, Shankar R. R.** The impact of COVID-19 on physician burnout globally: a review. *Healthcare*, 2020; 8:421. 10.3390/healthcare8040421
- [10] **Pappa S, Ntella V, Giannakas T, Giannakoulis VG, Papoutsis E, Katsaounou P.** Prevalence of depression, anxiety, and insomnia among healthcare workers during the COVID-19 pandemic: A systematic review and meta-analysis. *Brain Behav Immun.* 2020 Aug; 88: 901-907. doi: 10.1016/j.bbi.2020.05.026. Epub 2020 May 8. Erratum in: *Brain Behav Immun.* 2021 Feb; 92: 247. PMID: 32437915; PMCID: PMC7206431.
- [11] **An Y, Yang Y, Wang A, Li Y, Zhang Q, Cheung T, et al.** Prevalence of depression and its impact on quality of life among frontline nurses in emergency departments during the COVID-19 outbreak. *J Affect Disord.* 2020; 276, 312–315. 10.1016/j.jad.2020.06.047
- [12] **Abdelghani M, Mahdy R, El-Gohari H.** Health anxiety to COVID-19 virus infection and its relationship to quality of life in a sample of health care workers in Egypt: a cross-sectional study. *Arch Psychiatry Psychother.* 2021; 23(1): 19–28. doi: 10.12740/APP/130304

- [13] Cruz-Ausejo L, Villarreal-Zegarra D, Reátegui-Rivera CM, Burgos M, Vilela-Estrada AL, Castro G, et al. The impact of COVID-19 pandemic on the quality of life of healthcare workers and the associated factors: A systematic review. *Rev Psiquiatr Salud Ment.* 2023 Jan-Mar; 16: 11-24. doi: 10.1016/j.rpsm.2022.11.003. Epub 2022 Nov 21. PMID: 36438714; PMCID: PMC9678228.
- [14] Buselli R, Corsi M, Baldanzi S. Professional quality of life and mental health outcomes among health care workers exposed to Sars-Cov-2 (Covid-19). *Int J Environ Res Public Health.* 2020; 17(17):6180. doi: 10.3390/ijerph17176180
- [15] Çelmeçe N, Menekay M. The Effect of Stress, Anxiety and Burnout Levels of Healthcare Professionals Caring for COVID-19 Patients on Their Quality of Life. *Front Psychol.* 2020 Nov 23; 11: 597624. doi: 10.3389/fpsyg.2020.597624. PMID: 33329264; PMCID: PMC7719786.
- [16] Khan AG, Kamruzzaman M, Rahman MN, Mahmood M, Uddin MA. Quality of life in the COVID-19 outbreak: influence of psychological distress, government strategies, social distancing, and emotional recovery. *Heliyon.* 2021; 7(3): e06407. doi: 10.1016/j.heliyon.2021.e06407
- [17] Deng D, Naslund JA. Psychological impact of COVID-19 pandemic on frontline health workers in low- and middle-income countries. *Harv Public Health Rev Camb Mass.* 2020; 28.
- [18] Trumello C, Bramanti SM, Ballarotto G. Psychological adjustment of healthcare workers in Italy during the COVID-19 pandemic: differences in stress, anxiety, depression, burnout, secondary trauma, and compassion satisfaction between frontline and non-frontline professionals. *Int J Environ Res Public Health.* 2020; 17(22): 8358. doi: 10.3390/ijerph17228358
- [19] Buselli R, Corsi M, Baldanzi S, Chiumiento M, Del Lupo E, Dell'Oste V, et al. Professional Quality of Life and Mental Health Outcomes among Health Care Workers Exposed to Sars-Cov-2 (Covid-19). *Int J Environ Res Public Health.* 2020 Aug 26; 17(17): 6180. doi: 10.3390/ijerph17176180. PMID: 32858810; PMCID: PMC7504107.
- [20] Zhao YJ, Xing X, Tian T, Wang Q, Liang S, Wang Z, et al. Post COVID-19 mental health symptoms and quality of life among COVID-19 frontline clinicians: a comparative study using propensity score matching approach. *Transl Psychiatry.* 2022 Sep 9; 12(1): 376. doi: 10.1038/s41398-022-02089-4. PMID: 36085292; PMCID: PMC9461449.
- [21] Da Costa Matos RA, Akutsu RCCA, Zandonadi RP, Botelho RBA. Quality of Life Prior and in the Course of the COVID-19 Pandemic: A Nationwide Cross-Sectional Study with Brazilian Dietitians. *Int J Environ Res Public Health.* 2021 Mar 8; 18(5): 2712. doi: 10.3390/ijerph18052712. PMID: 33800225; PMCID: PMC7967437.
- [22] Gupta N, Dhamija S, Patil J, Chaudhari B. Impact of COVID-19 pandemic on healthcare workers. *Ind Psychiatry J.* 2021 Oct; 30(Suppl 1):S282-S284. doi: 10.4103/0972-6748.328830. Epub 2021 Oct 22. PMID: 34908710; PMCID: PMC8611576.

- [23] **Mohanty A, Kabi A, Mohanty AP.** Health problems in healthcare workers: A review. *J Family Med Prim Care.* 2019 Aug 28; 8(8): 2568-2572. doi: 10.4103/jfmmpc.jfmmpc_431_19. PMID: 31548933; PMCID: PMC6753812.
- [24] **Jung G, Oh J.** Factors Affecting Health-Related Quality of Life among Healthcare Workers during COVID-19: A Cross-Sectional Study. *Medicina (Kaunas).* 2022 Dec 24; 59(1): 38. doi: 10.3390/medicina59010038. PMID: 36676662; PMCID: PMC9866756.
- [25] **Kamble S, Joshi A, Kamble R, Kumari S.** Influence of COVID-19 Pandemic on Psychological Status: An Elaborate Review. *Cureus.* 2022 Oct 1; 14(10): e29820. doi: 10.7759/cureus.29820. PMID: 36337829; PMCID: PMC9622468.
- [26] **Nagel C, Nilsson K.** Nurses' Work-Related Mental Health in 2017 and 2020-A Comparative Follow-Up Study before and during the COVID-19 Pandemic. *Int J Environ Res Public Health.* 2022 Nov 23; 19(23): 15569. doi: 10.3390/ijerph192315569. PMID: 36497643; PMCID: PMC9738150.
- [27] **Sarfraz M.H.H, Abdullah M.I, Ivascu L, Ozturk I.** The effects of the COVID-19 pandemic on healthcare workers' psycho-logical and mental health: The moderating role of felt obligation. *Work.* 2022; 71: 539–550. doi: 10.3233/WOR-211073.
- [28] **Wouters-Soomers L, Van Ruysseveldt J, Bos AER, Jacobs N.** An individual perspective on psychological safety: The role of basic need satisfaction and self-compassion. *Front Psychol.* 2022 Aug 18; 13: 920908. doi: 10.3389/fpsyg.2022.920908. PMID: 36059778; PMCID: PMC9434267.
- [29] **Sexton JB, Adair KC, Proulx J, Profit J, Cui X, Bae J, et al.** Emotional Exhaustion Among US Health Care Workers Before and During the COVID-19 Pandemic, 2019-2021. *JAMA Netw Open.* 2022 Sep 1; 5(9): e2232748. doi: 10.1001/jamanetworkopen.2022.32748. PMID: 36129705; PMCID: PMC9494188.
- [30] **Jahrami H, Haji EA, Saif ZQ, Aljeeran NO, Aljawder AI, Shehabdin FN, et al.** Sleep Quality Worsens While Perceived Stress Improves in Healthcare Workers over Two Years during the COVID-19 Pandemic: Results of a Longitudinal Study. *Healthcare (Basel).* 2022 Aug 22; 10(8): 1588. doi: 10.3390/healthcare10081588. PMID: 36011245; PMCID: PMC9408655.
- [31] **Medic G, Wille M, Hemels ME.** Short- and long-term health consequences of sleep disruption. *Nat Sci Sleep.* 2017 May 19; 9: 151-161. doi: 10.2147/NSS.S134864. PMID: 28579842; PMCID: PMC5449130.
- [32] **Chattu VK, Manzar MD, Kumary S, Burman D, Spence DW, Pandi-Perumal SR.** The Global Problem of Insufficient Sleep and Its Serious Public Health Implications. *Healthcare (Basel).* 2018 Dec 20; 7(1):1. doi: 10.3390/healthcare7010001. PMID: 30577441; PMCID: PMC6473877.
- [33] **Park SK, Lee KS.** Factors Associated with Quality of Life of Clinical Nurses: A Cross-Sectional Survey. *Int J Environ Res Public Health.* 2023 Jan 18; 20(3): 1752. doi: 10.3390/ijerph20031752. PMID: 36767119; PMCID: PMC9914889.

- [34] **Arenliu Qosaj F, Weine SM, Sejdiu P, Hasani F, Statovci S, Behluli V, et al.** Prevalence of Perceived Stress, Anxiety, and Depression in HCW in Kosovo during the COVID-19 Pandemic: A Cross-Sectional Survey. *Int J Environ Res Public Health*. 2022 Dec 12; 19(24): 16667. doi: 10.3390/ijerph192416667. PMID: 36554548; PMCID: PMC9779736.
- [35] **Ravaghi H, Naidoo V, Mataria A, Khalil M.** Hospitals early challenges and interventions combatting COVID-19 in the Eastern Mediterranean Region. *PLoS One*. 2022 Jun 3; 17(6): e0268386. doi: 10.1371/journal.pone.0268386. PMID: 35657795; PMCID: PMC9165776.
- [36] **Wu Z, McGoogan J.M.** Characteristics of and important lessons from the coronavirus disease 2019 (COVID-19) outbreak in China: summary of a report of 72314 cases from the Chinese Center for Disease Control and Prevention. *JAMA - J Am Med Assoc*. 2020; 323: 1239–1242.
- [37] **Stojanov A, Stojanov J, Milosevic V, Malobabic M, Stanojevic G, Stevic M, et al.** The Impact of the Coronavirus Disease-2019 Pandemic on the Psychological Status and Quality of Life of Myasthenia Gravis Patients. *Ann Indian Acad Neurol*. 2020 Jul-Aug;23(4):510-514. doi: 10.4103/aian.AIAN_551_20. Epub 2020 May 8. PMID: 33223669; PMCID: PMC7657293.
- [38] **Orszulak N, Kubiak K, Kowal A, Czapla M, Uchmanowicz I.** Nurses' Quality of Life and Healthy Behaviors. *Int J Environ Res Public Health*. 2022 Oct 9; 19(19): 12927. doi: 10.3390/ijerph191912927. PMID: 36232229; PMCID: PMC9564667.
- [39] **Jubin J, Delmas P, Gilles I, Oulevey Bachmann A, Ortoleva Bucher C.** Protective Factors and Coping Styles Associated with Quality of Life during the COVID-19 Pandemic: A Comparison of Hospital or Care Institution and Private Practice Nurses. *Int J Environ Res Public Health*. 2022 Jun 10; 19(12): 7112. doi: 10.3390/ijerph19127112. PMID: 35742361; PMCID: PMC9222516.
- [40] **Labrague LJ.** Psychological resilience, coping behaviours and social support among health care workers during the COVID-19 pandemic: A systematic review of quantitative studies. *J Nurs Manag*. 2021 Oct; 29(7): 1893-1905. doi: 10.1111/jonm.13336. Epub 2021 Apr 28. PMID: 33843087; PMCID: PMC8250179.
- [41] **Al-Shannaq Y, Mohammad AA, Aldalaykeh M.** Depression, coping skills, and quality of life among Jordanian adults during the initial outbreak of COVID-19 pandemic: cross sectional study. *Heliyon*. 2021 Apr 20; 7(4): e06873. doi: 10.1016/j.heliyon.2021.e06873. PMID: 33997404; PMCID: PMC8095109.
- [42] **Zheng Y, Li T, Zhang Y, Luo H, Bai M, Liu Z, et al.** COVID-19 Knowledge/Practices, Mental Status, and Return-To-Work Concerns Among Healthcare Workers in Huangzhou District, Huanggang City, China. *Front Public Health*. 2022 Jan 14; 9: 723118. doi: 10.3389/fpubh.2021.723118. PMID: 35096724; PMCID: PMC8795632.
- [43] **Li M, Jameel A, Ma Z, Sun H, Hussain A, Mubeen S.** Prism of Employee Performance Through the Means of Internal Support: A Study of Perceived Organizational Support.

Psychol Res Behav Manag. 2022 Apr 20; 15: 965-976. doi: 10.2147/PRBM.S346697. PMID: 35480712; PMCID: PMC9035458.

- [44] **Tan HMJ, Tan MS, Chang ZY, Tan KT, Ee GLA, Ng CCD, et al.** The impact of COVID-19 pandemic on the health-seeking behaviour of an Asian population with acute respiratory infections in a densely populated community. *BMC Public Health*. 2021; 21(1): 1196. doi: 10.1186/s12889-021-11200-1
- [45] **Qasem Surrati AM, Asad Mansuri FM, Ayadh Alihabbi AA.** Psychological impact of the COVID-19 pandemic on health care workers. *J Taibah Univ Med Sci*. 2020 Dec; 15(6):536-543. doi: 10.1016/j.jtumed.2020.10.005. Epub 2020 Nov 5. PMID: 33173451; PMCID: PMC7643620.
- [46] **Stone, B.M.** The explanatory ability of COVID-19 life changes on quality of life: A comparison of those who have had and not had COVID-19. *Curr Psychol* (2022). <https://doi.org/10.1007/s12144-022-03504-1>