Comparison of Lifestyle of Nurses with and Without COVID-19 Working in Hospitals Affiliated with Tehran University of Medical Sciences

Afzal Shamsi [1, 2], Musab Ghaderi [1] and Mansureh Jaladati [3, *]

[1]Anesthetics Group, School of Allied Medicine, Tehran University of Medical Sciences, Tehran, Iran
[2]Nursing and Midwifery Care Research Center, Tehran University of Medical Sciences, Tehran, Iran
[3]Baharllo Hospital, Tehran University of Medical Sciences, Tehran, Iran

Corresponding author: Baharllo Hospital, Tehran University of Medical Sciences, Tehran, Iran. Email: mansureh.jaladati@gmail.com

Abstract

Background: Health and lifestyle are very important considering the current coronavirus disease 2019 (COVID-19) pandemic. In the meantime, the lifestyle of nurses is of two-fold importance regarding their role in providing a wide range of services.

Objectives: The present study aimed to determine and compare the lifestyle of nurses with and without COVID-19 working in hospitals affiliated with Tehran University of Medical Sciences, Tehran, Iran.

Methods: This comparative study was performed on 500 nurses working in hospitals affiliated with Tehran University of Medical Sciences in 2021. The study population included 500 nurses with (n = 250) and without (n = 250) COVID-19 nurses. The used research methods complied with the STROBE checklist. The data were collected using a demographic information questionnaire and a cross-culturally adapted nurses' lifestyle questionnaire. Data analysis was performed using SPSS software (version 25) and descriptive and inferential statistical tests. A P-value less than 0.05 was considered the significance level.

Results: The mean age values of participants with and without COVID-19 were 33.9 ± 8.35 and 35.7 ± 7.02 years, respectively. The statistical *t*-test showed that the overall lifestyle score was significantly higher in nurses with COVID-19 (4.06 ± 0.39) than in nurses without COVID-19 (3.90 ± 0.43) (P = 0.010). The overall score of lifestyle subscales in the COVID-19 group was higher than the nonCOVID-19 group. In this regard, the highest subscale score was related to the competence dimension in both COVID-19 (4.69 ± 0.300) and nonCOVID-19 (4.57 ± 0.418) groups (P = 0.001).

Conclusions: The lifestyle of COVID-19 nurses is better than nonCOVID-19 nurses. Accordingly, planning is necessary to improve the lifestyle of nurses during the COVID-19 pandemic, especially nurses without COVID-19.

Keywords: Lifestyle, Nurse, COVID-19, Pandemic, Coronavirus

1. Background

In recent decades, health has been recognized as a human right and a social goal. Lifestyle assessment is one of the main aspects of health assessment in different societies (1). A healthy lifestyle reduces the incidence and severity of diseases and complications and is considered an effective strategy to control the cost of healthcare (2). In a survey on health and quality of life, the World Health Organization stated that 60% of the quality of life depends on lifestyle (3). In Iran, lifestyle-related diseases are among the most important causes of mortality and disability (1). Accordingly, the Iranian Ministry of Health and Medical Education has regulated health and treatment programs based on self-care and the improvement of individuals' lifestyles in recent years (4). Lifestyle is defined as the way in which

individuals live. It is often reflected in their activities, beliefs, interests, opinions, and values and influenced by certain factors, such as family, culture, and social status (5).

Nurses are the largest group of service providers in the healthcare system who play an important role in the quality of healthcare; therefore, their health is very important. Nursing is one of the professions, the working conditions of which affect lifestyle (6, 7). The results of studies have shown that long working hours, work-related stress, and physical and mental fatigue of nurses reduce lifestyle-promoting behaviors and expose them to infections (6, 8). In a systematic review study, Nabizadeh Gharghozar and Sharifi reported that, despite having knowledge of different diseases and their important role in training proper behaviors to patients, nurses do not enjoy a desirable

lifestyle. On the other hand, nurses' health not only affects different aspects of their lives but also plays an important role in promoting patients' health; therefore, it is necessary to design programs to increase the frequency of health-promoting behaviors to improve the lifestyle by Iranian nurses (8).

The Coronavirus disease 2019 (COVID-19) pandemic and its social health-related consequences are among the most important human social events of the 21st century (9). Hospital staff are always at the forefront of the fight against specific pandemics and risk their lives to perform their duties (10). Meanwhile, nurses are also at the forefront of the fight against infectious diseases in close contact with COVID-19. They are vulnerable to infection, and their health is affected by the disease and its subsequent problems (11). In this regard, Chopra et al. reported that COVID-19 has a direct and significant effect on the health and lifestyle of healthy individuals and COVID-19 patients (12). Additionally, the relationship between COVID-19 and the lifestyle of healthy individuals and COVID-19 patients has been confirmed in different countries. The aforementioned studies have reported different results. Some of these studies indicated a decline in healthy lifestyles, such as studies by Lopez-Moreno et al. (13) and Leon-Zarceno et al. in Spain (14), Reyes-Olavarria et al. in Chile (15), Marchant et al. in France (16), and Di Renzo et al. in Italy (17). However, some other studies showed an improvement in healthy lifestyles, such as studies by Yang et al. (18) and Sidor and Rzymski (19) in China, Martinez-de-Quel et al. in Spain (20), and Robinson et al. in the United Kingdom (21). Therefore, there is a need to perform further studies in this area.

2. Objectives

Considering the different mutations of the COVID-19 virus and the fact that a large number of nurses have been infected with the disease, an advanced search in the available literature suggests that no study has investigated the lifestyle of COVID-19 nurses and compared it to the lifestyle of healthy nurses; therefore, considering the importance of nurses' health, the present study aimed to determine and compare the lifestyle of nurses with and without COVID-19 working in hospitals affiliated with Tehran University of Medical Sciences, Tehran, Iran.

3. Methods

This comparative study was performed on 500 nurses working in hospitals affiliated with Tehran University of Medical Sciences in 2021. The used research methods complied with the STROBE checklist. The sample size was estimated at 240 for each of the COVID-19 and nonCOVID-19 groups using the sample size formula and previous studies (22) considering a 95% confidence interval, S = 0.30, and D = 0.04. Finally, 250 nurses were considered for each group, taking into account the possible drop-out. In both groups, the samples did not drop out.

$$n = \frac{p\,(1-p)\left(Z_1 + \frac{\alpha}{2} + Z_1 - B\right)^2}{(P_1 - P_0)^2}$$
$$= 240$$

a/2 = 1.96; Z_1 – B = 0.8

The subjects were selected using a multistage random sampling method and then availability sampling within the clusters based on inclusion criteria. Each of the hospitals of Tehran University of Medical Sciences was considered a cluster. Then, several hospitals (including Baharloo, Imam Khomeini, Yas, and Ziaeian) were randomly selected. Within each of the hospitals, all nurses working in the COVID-19 unit were considered a sample. The nurses were divided into two groups with and without COVID-19 based on the inclusion criteria. Questionnaires were given to the nurses at the beginning of each shift (e.g., morning, evening, and night) and were collected after completion.

The inclusion criteria were an associate degree in nursing and higher, a minimum of one year of work experience in nursing, a minimum of one month of work experience in the COVID-19 ward, the possibility and informed consent to participate, COVID-19 diagnosis [a positive polymerase chain reaction (PCR) test and confirmed COVID-19 infection by an infectious disease specialist] or a history of infection in the last 6 months in the COVID-19 group, and no symptoms of COVID-19 or a history of infection in the healthy group (a negative PCR test and confirmation of the absence of COVID-19 by an infectious disease specialist).

The data were gathered using a demographic information questionnaire (including age, gender, marital status, work experience, type of employment, and educational level) and a cross-culturally adapted nurses' lifestyle questionnaire. This instrument was designed by Mahmoodi Shan (23) with 44 items answered based on a 5-point Likert scale (always, often, sometimes, rarely, and never). The questionnaire comprised six subscales, namely competence (8 items), personal life management (11 items), role management and work system (7 items), responsibility (8 items), interactions (5 items), and systematic interactions (5 items). The subjects' scores altogether in each subscale show the extent to which the mentioned behaviors have been displayed, which collectively represent the lifestyle score. There is no cut-off point for this instrument. As the total score increases, the lifestyle will be more desirable.

The validity of the questionnaire was evaluated as acceptable by the instrument designers. Furthermore, the reliability was confirmed using the correlation coefficients of the whole test (0.897) and subscales (0.79) (24). The instrument's content validity and reliability were determined and confirmed in other domestic studies, such as studies by Mahmoodi Shan et al. ($\alpha = 0.87$) (23) and Hasanpour et al. ($\alpha = 0.75$) (25).

The study design has been reviewed by the Ethics Committee of Tehran University of Medical Sciences and has been registered with an ethics code (IR.TUMS.MEDICINE.REC.1399.1070). The authors adhered to research ethics at all stages of the research, including nurses' human values, informed consent, and confidentiality. The data were analyzed using descriptive and inferential statistical tests (i.e., the *t*-test and chi-square test) in SPSS software (version 25). A P-value less than 0.05 was considered the significance level.

4. Results

A total of 500 nurses with (n = 250) and without (n = 250) COVID-19 participated in the present study. The mean age of total participants in the study was 34.8 ± 7.67 years, with 33.9 ± 8.35 and 35.7 ± 7.02 years in the COVID-19 and nonCOVID-19 groups, respectively. Over half of the participants in both study groups were female. Table 1 shows some demographic characteristics of nurses. The two groups were homogeneous in terms of demographic characteristics.

The *t*-test showed a significant relationship between the lifestyle scores of COVID-19 and nonCOVID-19 nurses; accordingly, the lifestyle score in the COVID-19 group (4.06 $\pm$ 0.39) was higher than in the nonCOVID-19 group (3.90 $\pm$ 0.43) (P = 0.010). The total scores of lifestyle subscales (including competence, work system, responsibility, interactions, and systematic interactions) were higher in the COVID-19 group than in the nonCOVID-19 group. In this regard, the highest subscale score in both infected (4.69 $\pm$ 0.300) and noninfected (4.57 $\pm$ 0.418) groups was related to the competence dimension (P = 0.001). Table 2 shows the results of comparing lifestyle scores and all its subscales of the COVID-19 and nonCOVID-19 nurses.

5. Discussion

In the present study, the average overall lifestyle score in both groups of COVID-19 and nonCOVID-19 nurses was higher than the expected average; therefore, it can be stated that the nurses in both groups have acceptable lifestyles. The COVID-19 pandemic has caused numerous changes in the lifestyles of individuals worldwide (26). Numerous studies have reported different effects on the lifestyle of individuals during the COVID-19 pandemic. Some studies have reported an increase in healthy lifestyles; however, others reported a decrease in this regard. For example, Jalal et al. showed that most medical students maintained a lifestyle-related body mass index during the COVID-19 quarantine period and had a better lifestyle than during the prepandemic period (27). In this regard, Mohammed et al. stated that nurses are heroes who take care of their patients during the COVID-19 pandemic with their courage and self-devotion. The nurses were able to provide high-quality care in addition to maintaining their health by increasing their knowledge and applying it during the COVID-19 pandemic, which is a symbol of a true hero (28).

The results of various studies have shown that nurses have relatively high knowledge of healthy lifestyles leading to higher lifestyle scores (28-31). Accordingly, one of the reasons for the appropriate lifestyle of nurses in the present study is their high knowledge of health behaviors, especially during the COVID-19 pandemic. This group of treatment team has been at risk of developing COVID-19 since its onset; therefore, they attempted to prevent getting the COVID-19 by strengthening their immune system and following a healthy lifestyle. Fortunately, Iranian health officials have played an effective role in this regard since the onset of the COVID-19 outbreak by formulating and communicating standard healthy lifestyle protocols, modifying the daily diet of the treatment team, and so forth.

There has been no study on the lifestyle of Iranian nurses during the COVID-19 period; nevertheless, consistent with the results of the present study, the results of similar nonIranian studies on nurses, such as studies by Sampson et al. (32), Moberg et al. (33), and Perkins (34), showed that nurses had an acceptable lifestyle during the COVID-19 pandemic and tried to maintain a healthy lifestyle.

On the other hand, the results of several studies are in contrast with the results of the present study. For example, the results of several studies in different countries also showed that following a healthy lifestyle in nonmedical students and even other study populations, such as those of studies by Lopez-Moreno et al. (13) and Leon-Zarceno et al. in Spain (14), Reyes-Olavarria et al. in Chile (15), Marchant et al. in France (16), and Di Renzo et al. in Italy (17), decreased during the COVID-19 quarantine. This discrepancy might be due to the difference in the study population. The present study was conducted on Iranian nurses who have a higher level of healthy lifestyle knowledge than other groups of society. Nurses were also among the occupational groups that experienced a higher workload and activity rate during the COVID-19 pandemic than

Table 1. Demographic Characteristics of Nurses with and Without Coronavirus Disease 2019

Groups	With COVID-19	Without COVID-19	Statistical Test; P-Value
Age (y)			$\chi^2 = 3.145$; df = 2; P = 0.052
Under 30	51 (20.4)	80 (30)	
40 - 30	109 (43.6)	83 (33.2)	
Over 40	90 (36)	87 (34.8)	
Gender			$\chi^2 = 3.083$; df = 1; P = 0.079
Female	196 (78.4)	179 (71.6)	
Male	54 (21.6)	71 (28.4)	
Marital status			$\chi^2 = 3.187$; df = 1; P = 0.055
Single	79 (35.1)	102 (40.8)	
Married	171 (68.4)	148 (59.2)	
Educational level			$\chi^2 = 2.611$; df = 1; P = 0.106
Bachelor's degree	39 (15.6)	53 (21.2)	
Master's degree	211 (48.4)	197 (78.8)	
Work experience (y)			$\chi^2 = 3.182$; df = 2; P = 0.052
Under 10	76 (30.4)	114 (45.6)	
20 - 10	141 (56.4)	114 (45.6)	
Over 20	33 (13.2)	22 (8.8)	

Abbreviation: COVID-19, Coronavirus disease 2019.

Table 2. Total Score of Lifestyle and Its Subscales in Nurses with and Without Coronavirus Disease 2019

Groups	With COVID-19	Without COVID-19	Independent Samples Test		
			t	df	P-Value
Competence	4.69 ± 0.300	4.57 ± 0.418	3.626	451.806	0.001
Personal life management	3.49 ± 0.68	3.48 ± 0.71	-0.674	498	0.501
Role management and work system	3.68 ± 0.52	3.64 ± 0.79	0.727	498	0.468
Responsibility	4.08 ± 0.55	3.89 ± 0.78	3.284	498	0.001
Interactions	3.34 ± 0.44	4.13 ± 0.78	3.780	394.482	0.001
Regulated interactions	4.66 ± 0.35	4.44 ± 0.75	4.215	353.662	0.001
Total score	4.06 ± 0.39	3.90 ± 0.43	2.605	498	0.010

Abbreviation: COVID-19, Coronavirus disease 2019.
[a] Values are expressed as mean ± SD.

other study populations (i.e., the research populations of the above-mentioned studies); nevertheless, most members of the society experienced a sedentary lifestyle due to quarantine conditions, which can also justify this discrepancy.

The results of the present study showed that the mean score of lifestyle and its subscales (including competence, work system, responsibility, interactions, and systematic interactions) in COVID-19 nurses were significantly higher than in nonCOVID-19 nurses. In other words, the lifestyle of COVID-19 nurses was better than nonCOVID-19 nurses.

Since there has been no study comparing the lifestyles of COVID-19 and nonCOVID-19 nurses, the present study was compared to relevant studies. Previous studies have shown that the fear of being infected with the coronavirus and transmitting it to their families and children and its complications was one of the factors that negatively affect the lives of nurses that force nurses to adhere to health protocols and healthy lifestyles (11). The results of a study in France showed that a physician committed suicide after being diagnosed with COVID-19, and this can apply to all healthcare workers, including nurses (35).

Updating the current information about COVID-19 and ensuring the availability of protective equipment might help reduce fears and anxiety among nurses (11, 36). Therefore, a better lifestyle in nurses with a history of COVID-19 disease might be greater confidence in the safety of this lifestyle and lower fear of reinfection of this group of nurses in the workplace because some aspects of the lifestyle questionnaire used in the present study are related to higher interactions and exposure of nurses with other individuals and patients in the workplace. However, nonCOVID-19 nurses were less frequently in contact with patients and other members of the health team due to fear of being infected with the virus. This finding also showed that COVID-19 nurses try to strengthen their immune system to prevent complications of the disease by following a proper lifestyle, such as proper diet, physical activity, and so forth.

The results of the present study showed that the highest scores of lifestyle subscales in both groups of COVID-19 and nonCOVID-19 nurses were related to competence, systematic interactions, interactions, responsibility, and role management, respectively. In this regard, Mahmoodi Shan et al.'s study showed that the highest score of lifestyle subscales was related to competence, interactions, systematic interactions, and responsibility (23), which is consistent with the results of the present study. This consistency might be due to the use of a common cross-culturally adapted questionnaire (nurses' lifestyle). In another study, Ozveren et al. reported that the highest nurses' lifestyle score was related to responsibility and perfectionism (37). In addition, in McElligott et al.'s study, the highest scores of nurses' lifestyle subscales included interpersonal relationships, spirituality, nutrition, health responsibility, physical activity, and stress management, respectively (31), which is not consistent with the results of the present study. This discrepancy could be attributed to the use of general lifestyle instruments in these studies; however, a cross-culturally adapted nurses' lifestyle instrument was used in the present study.

The results of previous studies on other study populations (13-17) are also inconsistent with the results of the present study. In this regard, it can be stated that nurses' lifestyle is a combination of general and professional lifestyles. Nurses work in three shifts in hospitals; therefore, nurses' lifestyles (e.g., sleep or nutritional patterns) will be different from the general public; therefore, specific lifestyle instruments should be used. The highest lifestyle score in the present study belonged to competence, which is of high value due to the nature of the nursing profession and the conditions of the COVID-19 pandemic, which should be promoted. The evidence has shown that delegating responsibilities to competent nurses undoubtedly reduces injuries and increases the quality of care (23, 37, 38).

5.1. Strengths and Limitations

The use of a cross-culturally adapted nurses' lifestyle instrument is one of the strengths of the present study. One of the limitations of the present study was the noncooperative COVID-19 nurses in the acute phase. For the purpose of overcoming this limitation, the nurses entered the study when their symptoms were reduced, and they were able to participate in the study. It is suggested to perform further studies on nurses in other parts of Iran and other countries.

5.2. Conclusions

The results of the present study showed that the lifestyle of COVID-19 nurses is better than nonCOVID-19 nurses. The increase in the level of nurses' healthy lifestyles can enhance the quality of nursing care, which is of particular importance considering the current COVID-19 pandemic and the need for high-quality care for these patients. Accordingly, it is necessary to improve the lifestyle of nurses, especially those without COVID-19.

References

1. Estebsari F, Bakhshi F, Nemati S, Kazemnejad Leili E, Ramezani H, Sadeghi R. Determinants of Health Promoting Lifestyle Behaviors in Hospital Staff of Guilan University of Medical Sciences. *Health Education and Health Promotion*. 2019;7(2):71–6. doi: 10.29252/hehp.7.2.71.

2. Wills J, Kelly M. What works to encourage student nurses to adopt healthier lifestyles? Findings from an intervention study. *Nurse Educ Today*. 2017;48:180–4. doi: 10.1016/j.nedt.2016.10.011. [PubMed: 27837707].

3. Arani MD, Taghadosi M, Gilasi HR. The Effect of Education Based on BASNEF Model on Lifestyle in Patients with Hypertension. *Iran Red Crescent Med J*. 2016;19(11). doi: 10.5812/ircmj.40731.

4. Rastegar M, Zendehtalab H, Yavari M, Mazlom S. [Health-promoting lifestyle and its related factors among health volunteers Mashhad in 2015]. *Journal of Torbat Heydariyeh University of Medical Sciences*. 2015;3(3):55–48. Persian.

5. Kaakinen J. Distinguished contribution to Family Nursing Award: Dr. Shirley May Harmon Hanson for: Family health care nursing: theory, practice, and research (1996, 2001, 2005). *J Fam Nurs*. 2007;13(2):152–6. doi: 10.1177/1074840707070130020102. [PubMed: 17452600].

6. Blake H, Malik S, Mo PK, Pisano C. 'Do as say, but not as I do': are next generation nurses role models for health? *Perspect Public Health*. 2011;131(5):231–9. doi: 10.1177/1757913911402547. [PubMed: 21999028].

7. Oelke ND, Besner J, Carter R. The evolving role of nurses in primary care medical settings. *Int J Nurs Pract*. 2014;20(6):629–35. doi: 10.1111/ijn.12219. [PubMed: 24237938].

8. Nabizadeh Gharghozar Z, Sharifi K. [Lifestyles of Iranian Nurses, Challenges and Solutions: A Systematic Review]. *Quarterly Journal of Nursing Management*. 2020;9(1):36–45. Persian.

9. Wilder-Smith A, Freedman DO. Isolation, quarantine, social distancing and community containment: pivotal role for old-style public health measures in the novel coronavirus (2019-nCoV) outbreak. *J Travel Med*. 2020;27(2). doi: 10.1093/jtm/taaa020. [PubMed: 32052841]. [PubMed Central: PMC7107565].

10. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet*. 2020;395(10223):497–506. doi: 10.1016/S0140-6736(20)30183-5. [PubMed: 31986264]. [PubMed Central: PMC7159299].

11. Al Thobaity A, Alshammari F. Nurses on the frontline against the COVID-19 pandemic: an integrative review. *Dubai Med J*. 2020;3(3):87–92.

12. Chopra S, Ranjan P, Singh V, Kumar S, Arora M, Hasan MS, et al. Impact of COVID-19 on lifestyle-related behaviours- a cross-sectional audit of responses from nine hundred and ninety-five participants from India. *Diabetes Metab Syndr*. 2020;14(6):2021–30. doi: 10.1016/j.dsx.2020.09.034. [PubMed: 33099144]. [PubMed Central: PMC7537601].

13. Lopez-Moreno M, Lopez MTI, Miguel M, Garces-Rimon M. Physical and Psychological Effects Related to Food Habits and Lifestyle Changes Derived from Covid-19 Home Confinement in the Spanish Population. *Nutrients*. 2020;12(11). doi: 10.3390/nu12113445. [PubMed: 33182816]. [PubMed Central: PMC7696994].

14. Leon-Zarceno E, Moreno-Tenas A, Boix Vilella S, Garcia-Naveira A, Serrano-Rosa MA. Habits and Psychological Factors Associated With Changes in Physical Activity Due to COVID-19 Confinement. *Front Psychol*. 2021;12:620745. doi: 10.3389/fpsyg.2021.620745. [PubMed: 33679535]. [PubMed Central: PMC7927665].

15. Reyes-Olavarria D, Latorre-Roman PA, Guzman-Guzman IP, Jerez-Mayorga D, Caamano-Navarrete F, Delgado-Floody P. Positive and Negative Changes in Food Habits, Physical Activity Patterns, and Weight Status during COVID-19 Confinement: Associated Factors in the Chilean Population. *Int J Environ Res Public Health*. 2020;17(15). doi: 10.3390/ijerph17155431. [PubMed: 32731509]. [PubMed Central: PMC7432624].

16. Marchant G, Bonaiuto F, Bonaiuto M, Guillet Descas E. Exercise and Physical Activity eHealth in COVID-19 Pandemic: A Cross-Sectional Study of Effects on Motivations, Behavior Change Mechanisms, and Behavior. *Front Psychol*. 2021;12:618362. doi: 10.3389/fpsyg.2021.618362. [PubMed: 33692722]. [PubMed Central: PMC7937732].

17. Di Renzo L, Gualtieri P, Pivari F, Soldati L, Attina A, Cinelli G, et al. Eating habits and lifestyle changes during COVID-19 lockdown: an Italian survey. *J Transl Med*. 2020;18(1):229. doi: 10.1186/s12967-020-02399-5. [PubMed: 32513197]. [PubMed Central: PMC7278251].

18. Yang S, Guo B, Ao L, Yang C, Zhang L, Zhou J, et al. Obesity and activity patterns before and during COVID-19 lockdown among youths in China. *Clin Obes*. 2020;10(6). e12416. doi: 10.1111/cob.12416. [PubMed: 33009706]. [PubMed Central: PMC7646045].

19. Sidor A, Rzymski P. Dietary Choices and Habits during COVID-19 Lockdown: Experience from Poland. *Nutrients*. 2020;12(6). doi: 10.3390/nu12061657. [PubMed: 32503173]. [PubMed Central: PMC7352682].

20. Martinez-de-Quel O, Suarez-Iglesias D, Lopez-Flores M, Perez CA. Physical activity, dietary habits and sleep quality before and during COVID-19 lockdown: A longitudinal study. *Appetite*. 2021;158:105019. doi: 10.1016/j.appet.2020.105019. [PubMed: 33161046]. [PubMed Central: PMC8580211].

21. Robinson E, Boyland E, Chisholm A, Harrold J, Maloney NG, Marty L, et al. Obesity, eating behavior and physical activity during COVID-19 lockdown: A study of UK adults. *Appetite*. 2021;156:104853. doi: 10.1016/j.appet.2020.104853. [PubMed: 33038479]. [PubMed Central: PMC7540284].

22. RezakhaniMoghaddam H, Mozaffari N, Mohammadi MA, Habibi A, Dadkhah B. [Compare the quality of life of nurses and administrative staff in Ardabil University of Medical Sciences]. *Journal of Health and Care*. 2013;15(3):26–18. Persian.

23. Mahmoodi Shan GR, Rahmani H, Abdollahi AA, Vakili MA, Sheikh H, Nasiri H. [Correlation between nurses' life style and some personal-professional characteristics in Golestan University of Medical Sciences' Hospitals]. *J Res Dev Nurs Midw Country*. 2014;11(1):118–26. Persian.

24. Maben J, Bridges J. Covid-19: Supporting nurses' psychological and mental health. *J Clin Nurs*. 2020;29(15-16):2742–50. doi: 10.1111/jocn.15307. [PubMed: 32320509]. [PubMed Central: PMC7264545].

25. Hasanpour L, Zohari Anboohi S, Safari M, Naderiravesh N, Khodakarim S. [Factors associated with nurses' lifestyles in nurses of Tehran hospitals in 2012]. *Adv Nurs Midwifery*. 2016;25(91):65–73. Persian.

26. van der Werf ET, Busch M, Jong MC, Hoenders HJR. Lifestyle changes during the first wave of the COVID-19 pandemic: a cross-sectional survey in the Netherlands. *BMC Public Health*. 2021;21(1):1226. doi: 10.1186/s12889-021-11264-z. [PubMed: 34172042]. [PubMed Central: PMC8231077].

27. Jalal SM, Beth MRM, Al-Hassan HJM, Alshealah NMJ. Body Mass Index, Practice of Physical Activity and Lifestyle of Students During COVID-19 Lockdown. *J Multidiscip Healthc*. 2021;14:1901–10. doi: 10.2147/JMDH.S325269. [PubMed: 34321887]. [PubMed Central: PMC8311005].

28. Mohammed S, Peter E, Killackey T, Maciver J. The "nurse as hero" discourse in the COVID-19 pandemic: A poststructural discourse analysis. *Int J Nurs Stud*. 2021;117:103887. doi: 10.1016/j.ijnurstu.2021.103887. [PubMed: 33556905].

29. Alpar SE, Senturan L, Karabacak U, Sabuncu N. Change in the health promoting lifestyle behaviour of Turkish University nursing students from beginning to end of nurse training. *Nurse Educ Pract*. 2008;8(6):382–8. doi: 10.1016/j.nepr.2008.03.010. [PubMed: 18495538].

30. Phiri LP, Draper CE, Lambert EV, Kolbe-Alexander TL. Nurses' lifestyle behaviours, health priorities and barriers to living a healthy lifestyle: a qualitative descriptive study. *BMC Nurs*. 2014;13(1):38. doi:

10.1186/s12912-014-0038-6. [PubMed: 25506262]. [PubMed Central: PMC4264254].

31. McElligott D, Siemers S, Thomas L, Kohn N. Health promotion in nurses: is there a healthy nurse in the house? *Appl Nurs Res*. 2009;**22**(3):211–5. doi: 10.1016/j.apnr.2007.07.005. [PubMed: 19616170].

32. Sampson M, Melnyk BM, Hoying J. The MINDBODYSTRONG Intervention for New Nurse Residents: 6-Month Effects on Mental Health Outcomes, Healthy Lifestyle Behaviors, and Job Satisfaction. *Worldviews Evid Based Nurs*. 2020;**17**(1):16–23. doi: 10.1111/wvn.12411. [PubMed: 31721425].

33. Moberg M, Golsater M, Norman A. Parents' Thoughts Regarding Their Normal-Weight Children's Food and Physical Activity as Expressed During Health Conversations With the School Nurse: A Qualitative Analysis Informing Health-Promoting Practices. *J Sch Nurs*. 2021:10598405211025400. doi: 10.1177/10598405211025440. [PubMed: 34184918].

34. Perkins A. Nurse health. *Nurs Made Incred Easy*. 2021;**19**(3):18–21. doi:

10.1097/01.NME.0000741828.14543.be.

35. Times NS. *French doctor commits suicide after Covid-19 diagnosis*. Africa: MultiChoice (Pty) Ltd; 2020. Available from: https://supersport.com/football/france/news/200405_French_club_doctor_commits_suicide_after_Covid19_diagnosis.

36. Shanafelt T, Ripp J, Trockel M. Understanding and Addressing Sources of Anxiety Among Health Care Professionals During the COVID-19 Pandemic. *JAMA*. 2020;**323**(21):2133–4. doi: 10.1001/jama.2020.5893. [PubMed: 32259193].

37. Ozveren H, Cerit B, Ertop NG. Differences in health promoting lifestyle behavior of health management students based upon early diagnosis coverage in a cancer course. *Asian Pac J Cancer Prev*. 2013;**14**(10):5769–73. doi: 10.7314/apjcp.2013.14.10.5769. [PubMed: 24289576].

38. Mahmoodi Shan G, Alhani F, Kazemnejad A. Ethics in nurses' lifestyle: a qualitative study. *Iranian Journal of Medical Ethics and History of Medicine*. 2009;**2**(4):63–78.