코로나19 팬데믹 동안 간호사의 건강행동과 관련 요인

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Nurses' healthy behaviors during the COVID-19 pandemic and related factors

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Purpose: This study aimed to examine nurses' healthy behaviors during the coronavirus disease 2019 (COVID-19) pandemic and related factors. **Methods:** A cross-sectional study was adapted, and data were collected from 300 hospital nurses between August and November 2021. The nurses' characteristics, healthy behaviors, COVID-19 stress levels, health self-efficacy, and nursing professional pride were self-reported using structured questionnaires. Multivariable linear regressions were conducted to identify factors related to nurses' healthy behaviors. **Results:** Healthy lifestyle was the lowest among the subscales of healthy behaviors. Nurses' healthy behaviors were related to age (B=0.15, *p*=.021), COVID-19 stress level (B=-0.08, *p*=.007), nursing professional pride (B=0.19, *p*<.001), and health self-efficacy (B=0.38, *p*<.001). **Conclusion:** To enhance nurses' healthy lifestyles during the pandemic, organizational support is needed, such as ensuring facilities for rest or physical activities accessible from the hospital and supplying healthy food in hospitals. Younger nurses, nurses with high levels of COVID-19 stress, and nurses with lower health self-efficacy may benefit from hospital organizations that provide more support and guidance in promoting health behaviors. Furthermore, hospital organizations should promote professional pride by empowering nurses' efforts and reinforcing their values.

Keywords: Nurses, Health behavior, Professionalism, Self efficacy, COVID-19

Introduction

As nurses comprise a large human resource of hospital organizations, the maintenance of nurses' health is essential for sustaining a healthcare workforce capable of meeting the increased demand for healthcare during the coronavirus disease 2019 (COVID-19) pandemic. Nurses' health can also affect the quality of care and patient safety [1]. However, the health of nurses is threatened by overload, occupational stress, and exposure to infectious diseases [2,3]. Research also indicates that

recent emerging infectious diseases such as the severe acute respiratory syndrome coronavirus, Middle East respiratory syndrome coronavirus and COVID-19 have affected nurses' health [4].

Healthy behaviors are attitudes and actions that serve as core determinants of health. Nurses' healthy behaviors are important not only because of their impact on nurses' own health [5,6] but also because they can influence nursing performance [6,7] and health promotion practices with patients [8]. Previous studies [5-7] have indicated that nurses' healthy behaviors include good eating habits, physical activity, stress management, job-related safety, and interpersonal relationships. Among the many studies that have highlighted the personal and professional impact of nurses' health, some have noted that many nurses engage in negative health behaviors. In one study, more than 60% of American nurses did not engage in the recommended amount of physical activity and more than half consumed a poor-quality diet [9]. In another study, Australian nurses had a lower vegetable and fruit intake than a sample from the general population [10]. Nurses may be well aware of the importance of healthy behaviors, but they engaged in less than the recommended amount of physical activity and lacked proper nutrition, stress management, and interpersonal relations due to shift work, lack of free time, and fatigue from work overload [7,11].

Recently, the COVID-19 pandemic has exacerbated nurses' workload globally and challenged nurses' health through stress, burnout, depression, and infection risk [12-14]. Although the literature has reported on the negative impact of COVID-19 on nurses' health, little is known about the healthy behaviors that nurses engage in as they attempt to manage the health challenges of the pandemic. It is vital to understand how nurses maintain healthy behaviors during this time [4], as such an understanding can suggest novel strategies for improving nurses' health.

Some studies have shown that stress and self-efficacy are factors related to nurses' healthy behaviors [5,15]. A systematic review found that nurses with higher stress levels were more likely to engage in poor dietary behaviors [15]. Another study reported that nurses with low self-efficacy engaged in fewer healthy behaviors during the COVID-19 pandemic [5]. Accordingly, it is believed that the nurses' stress and self-efficacy can contribute to their healthy behaviors during the pandemic [5,15]. However, there are few studies on the relationship between COVID-19-related stress, health self-efficacy, and nurses' healthy behaviors during the pandemic.

Moreover, previous studies have linked demographic factors such as age, marital status, and education level with nurses' healthy behaviors [5,16,17]. Job characteristics such as hospital level, shift work, and working years have also influenced nurses' healthy behaviors in previous studies [6,15].

There are reports that the COVID-19 pandemic has affected nurses' professionalism [4,18,19]. Although nurses experienced the negative impacts of the pandemic such as fear and anxiety over working in unprecedented situations, they have also expressed their professional pride in engaging in authentic relationships with patients and emphasized the importance that their professional role brings to care [18]. Indeed, many nurses mobilised their nursing professionalism with a vocation and responsibility to care for patients; they made every effort to draw upon their resources to cope with the challenges imposed by the pandemic [19]. Through their responses, nurses were trying to reduce the stress of the situation and engage in healthy behaviors for coping with the pandemic [4,18]. However, little is known about the relationship between professional pride in nursing and healthy behaviors during the pandemic.

Based on the Pender's health promotion model [20], this study presumed that COVID-19-related stress serves as a variable within the personal factors category. Additionally, health self-efficacy was considered a variable for perceived self-efficacy category, while nursing professional pride was regarded as a variable for activity-related affect category within the domain of behavior-specific cognitions and affect in the health promotion model. Therefore, this study aimed to identify factors related to nurses' healthy behaviors that can be used to develop strategies to promote the health of nurses.

Materials and Methods

Study design

This is a cross-sectional descriptive study.

Participants

Participants were recruited using convenience sampling from five hospitals located in the Incheon, Gyeonggi-do, and Gyeongnam areas of Republic of Korea. In a previous study, nurses with less than one year of experience had the fewest healthy behaviors, due to their adaptation to the long hours and

heavy workload of the clinical setting [21]. Moreover, during a pandemic, new nurses may have insufficient time to engage in healthy behaviors. Therefore, the inclusion criterion was registered nurses working more than 12 months. The sample size was calculated using the G*Power 3.1.9.7 program [22]. Assuming a effect size $f^2=.07$ [16], a statistical power of .80, 15 predictors, and a significance level of .05 for the multiple regression analysis, the minimum required sample size was 282.

Measurements

The questionnaire consisted of questions spanning five sections: participants' characteristics, COVID-19 stress, health self-efficacy, nursing professional pride, and health behaviors. Participants' characteristics included age, sex, marital status, education level, clinical experience, job position, type of work, workplace, type of hospital, self-quarantine related to COVID-19, experience working with COVID-19 patients, and COVID-19 vaccination.

● Healthy behaviors

Healthy behaviors were measured using the nurses' health promoting behavior scale developed by Kim et al. [23]. The scale consists of 16 items with 5 subscales: self-concept as a nurse (2 items), management of work life (4 items), healthy lifestyle (5 items), stress management (3 items), and interpersonal relationships in the workplace (2 items). An example item is, 'I am trying to lead a healthy lifestyle.' Each item was rated on a 5-point Likert scale (1='strongly disagree' to 5='strongly agree'). The total score for each subscale ranged from 16 to 80, with higher scores indicating a higher level of healthy behaviors. Cronbach's α was .85 in the original study [23] and .88 in this study.

● COVID-19 stress

COVID-19 stress was measured using the Korean COVID-19 stress scale developed by Kim et al. [24]. This scale consists of 21 items with three subscales: fear of infection (9 items), difficulties with social distancing (6 items), and anger toward others (6 items). An example item is, 'It is stressful for me because I cannot meet my family or friends often due to COVID-19.' Each item was rated on a 5-point Likert scale (1='strongly agree' to 5='strongly disagree'). The scores for all items were summed, with the total score ranging from 21 to 105. Higher scores indicated less stress related to COVID-19.

Cronbach's α was .91 in both Kim et al. [24] study and the current study.

● Nursing professional pride

Nursing professional pride was measured using a scale developed by Jeon et al. [27] consisting of 27 items across five subscales: feeling of vocation (6 items), role satisfaction (6 items), role of problem solver (6 items), self-achievement (4 items), and willingness to stay (5 items). An example item is, 'Nursing is a profession, and nurses take pride in their jobs.' Each item was rated on a 5-point Likert scale (1='strongly disagree' to 5='strongly agree'). The total score ranged from 27 to 135, with a higher score indicating higher professional nursing pride. Cronbach's α was .92 in Jeon et al. [27] study was .95 in this study.

● Health self-efficacy

Health self-efficacy was measured using the Korean version of the health self-efficacy scale translated and validated by Lee et al. [25]. The original scale was developed by Becker et al. [26] and consists of 24 items across six subscales: exercise (8 items), illness (4 items), emotion (3 items), nutrition (3 items), stress (3 items), and health practice (3 items). An example item is, 'I am able to fit exercise into my regular routine.' Each item was rated on a 5-point Likert scale (1='strongly disagree' to 5='strongly agree'). The total score ranged from 24 to 120, with higher scores indicating higher healthcare self-efficacy. Cronbach's α was .91 in Lee et al. [25] and .91 in this study.

Data collection procedure

The data were collected between August and November 2021. First, we called the nursing department of each hospital to explain the purpose of the study and obtained permission to administer the survey to nurses. We then delivered an envelope with the questionnaire and a small gift for the participants to the nursing departments by post. A total of 10 to 100 questionnaires were distributed to each nursing department. The number of questionnaires completed by each hospital varied. All 330 questionnaires were returned (100% response rate). Thirty questionnaires were excluded due to incomplete responses and 300 questionnaires were analyzed.

Data analysis

Data were analyzed using IBM SPSS Statistics 28.0 (IBM Corp.). The normal distribution of the main variables was confirmed using the skewness, which ranged from -.44 to .22. Descriptive analyses, including means, standard deviations (SDs), frequencies with percentages, and ranges, were conducted to describe the participants' characteristics and study variables. Pearson's correlation coefficients were used to examine the relationships among COVID-19 stress, health self-efficacy, nursing professional pride, and healthy behaviors. Multiple linear regression analysis was performed to identify factors related to healthy behaviors. If the p-value was below the established significance level of .05, it was considered to have statistical significance. It was confirmed that there was no multicollinearity and autocorrelation in the statistical assumptions for multiple regression. Moreover, homoscedasticity was assessed through a residual plot, while normality of the residuals was verified using a normal probability plot.

Ethical considerations

This study was approved by the Institutional Review Board of Gachon University (IRB No. 1044396-202106-HR-135-01, IRB No. 1044396-202106-HR-135-02). Participants were informed that participation was voluntary, anonymity was guaranteed, the collected data would only be used for the study, and no personal information would be disclosed to external parties. Participants were also informed of their right to withdraw from the study without any negative consequences. The returned questionnaires contained written consent from the participants.

Table 1. Participants' Characteristics (N=300)

Characteristics	Categories	n (%)	Mean±SD
Age (years)	≤24		32.27±7.18
	≥52		
Sex	Female	289 (96.3)	
	Male	11 (3.7)	
Marital status	Not married	198 (66.0)	
	Married	102 (34.0)	
Education level	Associate degree	59 (19.7)	
	Bachelor's degree	205 (68.3)	
	Graduate degree	36 (12.0)	
Clinical experience (years)	≤1.5		9.36±7.05
	≥30		
Job position	Staff nurse	225 (75.0)	
	Charge or head nurse	75 (25.0)	
Type of work	Regular	70 (23.3)	
	Shift	230 (76.7)	
Workplace	Floor unit	160 (53.3)	
	Special unit	140 (46.7)	
Type of hospital	Teaching hospital	159 (53.0)	
	General hospital	141 (47.0)	
Experience of self-quarantine due to COVID-19	Yes	28 (9.3)	
	No	272 (90.7)	
Work experience for patients with COVID-19	Yes	127 (42.3)	
	No	173 (57.7)	
COVID-19 vaccination	Vaccinated	287 (95.7)	
	Not	13 (4.3)	

COVID-19=coronavirus disease 2019; SD=standard deviation

Results

Participant characteristics

The mean±SD age of the participants was 32.27±7.18 years. Of the 300 participants, 289 participants (96.3%) were female and 205 participants (68.3%) had a bachelor's degree. The mean±SD length of clinical experiences was 9.36±7.05 years. Two hundreds twenty-five participants (75.0%) were staff nurses and 230 participants (76.7%) were doing shift work. In addition, 28 participants (9.3%) had experienced self-quarantine due to COVID-19 and 127 participants (42.3%) had worked with patients who had COVID-19 (Table 1).

Nurses' healthy behaviors and mean scores of the study variables

The mean±SD score of participants' healthy behaviors was 57.77±8.67 out of 80. Among the subscales, interpersonal relationships in the workplace had the highest mean±SD score of 3.96±0.69, while healthy lifestyle had the lowest mean score of 3.21±0.81. The mean±SD score of COVID-19 stress was

Table 2. Participants' Main Characteristics (N=300)

Variables	Mean±SD
Healthy behaviors	57.77±8.67
Self-concept as a nurse	3.89±0.68
Management of work life	3.77±0.56
Healthy lifestyle	3.21±0.81
Stress management	3.64±0.76
Interpersonal relationships in workplace	3.96±0.69
COVID-19 stress	47.52±12.41
Nursing professional pride	95.36±16.05
Health self-efficacy	90.65±11.30

COVID-19=coronavirus disease 2019; SD=standard deviation

47.52±12.41, nursing professional pride was 95.36±16.05 out of 135 and health self-efficacy was 90.65±11.30 out of 120 (Table 2).

Individual differences in healthy behaviors

Table 3 shows that the participants' healthy behaviors differed significantly according to marital status, educational level, and type of work. Healthy behaviors were higher among married than unmarried nurses (t=-2.17, p=.031) and nurses with a graduate degree than those with an associate degree (F=4.86, p=.008).

Table 3. Differences in Healthy Behaviors according to Participant Characteristics (N=300)

Variables	Categories	Mean±SD	t or F (p)	Scheffé
Sex	Female	57.73±8.69	0.37 (.710)	
	Male	58.73±8.47		
Marital status	Not married	56.99±8.64	-2.17 (.031)	
	Married	59.27±8.59		
Education level	Associate degree[a]	55.15±8.70	4.86 (.008)	a<c
	Bachelor's degree[b]	58.02±8.70		(p<.05)
	Graduate degree[c]	60.64±7.45		
Job position	Staff nurse	57.23±8.79	-1.87 (.415)	
	Charge or head nurse	59.39±8.15		
Type of work	Regular	59.90±8.05	2.37 (.019)	
	Shift	57.12±8.77		
Workplace	Floor unit	57.39±9.21	-0.82 (.062)	
	Special unit	58.21±8.02		
Type of hospital	Teaching hospital	57.71±8.75	-0.13 (.900)	
	General hospital	57.84±8.62		
Experience of self-quarantine due to COVID-19	Yes	59.54±8.14	1.13 (.259)	
	No	57.59±8.72		
Work experience for patients with COVID-19	Yes	57.86±8.49	0.15 (.880)	
	No	57.71±8.83		
COVID-19 vaccination	Vaccinated	57.70±8.68	0.65 (.514)	
	Not	59.31±8.68		

COVID-19=coronavirus disease 2019; SD=standard deviation

Nurses who engaged in regular work reported higher levels of healthy behaviors than those who engaged in shift work (t=2.37, p=.019).

Correlations between healthy behaviors and study variables

Table 4 shows that healthy behaviors had a significant positive correlation with nursing professional pride (r=.60, p<.001), health self-efficacy (r=.65, p<.001), and age, clinical experiences (r=.19, p=.001). Conversely, COVID-19 stress was negatively correlated with healthy behaviors (r=-.18, p=.002).

Factors related to nurses' healthy behaviors

Table 5 presents the results of multiple linear regressions examining the factors related to nurses' healthy behaviors after adjusting for the participants' significant demographic characteristics. Age and clinical experience were highly correlated, indicating a

risk of multicollinearity; therefore, age, except for clinical experience, was included in the regression analysis. Age was positively related to healthy behaviors (B=0.15, p=.021), COVID-19 stress was negatively related to healthy behaviors (B=-0.08, p=.007), nursing professional pride (B=0.19, p<.001), and health self-efficacy (B=0.38, p<.001) were positively related to nurses' healthy behaviors during the pandemic. Together, these variables explained 57.0% of the variance in nurses' healthy behaviors. The variance inflation factor values were between 1.07 and 2.04, indicating the absence of multicollinearity. The Durbin-Watson statistic was 1.91, indicating the absence of autocorrelation.The variance inflation factor values were between 1.07 and 2.04, indicating the absence of multicollinearity. The Durbin-Watson statistic was 1.91, indicating the absence of autocorrelation.

Discussion

In this study, nurses' healthy behavior scores during the

Table 4. Correlation Coefficients between the Study Variables   (N=300)

Variables	1	2	3	4	5	6
	r (p)					
Healthy behaviors	1					
COVID-19 stress	-.18 (.002)	1				
Nursing professional pride	.60 (<.001)	-.19 (.001)	1			
Health self-efficacy	.65 (<.001)	-.03 (.666)	.41 (<.001)	1		
Age	.19 (.001)	.06 (.329)	.23 (<.001)	.06 (.320)	1	
Clinical experiences	.19 (.001)	.05 (.367)	.22 (<.001)	.05 (.407)	.95 (<.001)	1

COVID-19=coronavirus disease 2019

Table 5. Multiple Linear Regression Analysis Predicting Nurses' Healthy Behaviors   (N=300)

Variables (Reference)	B	SE	β	t	p-value
(Constant)	3.60	4.04		0.89	.374
Age	0.15	0.07	.13	2.32	.021
Type of work (Regular)[*]	-0.56	0.96	-.03	-0.58	.563
Marital status (Not married)[*]	0.63	0.92	.04	0.69	.491
Education level (Graduate degree)[*]	-0.49	0.87	-.02	-0.56	.577
Education level (Associate degree)[*]	-0.57	1.20	-.02	-0.48	.635
COVID-19 stress	-0.08	0.03	-.11	-2.71	.007
Nursing professional pride	0.19	0.02	.36	7.94	<.001
Health self-efficacy	0.38	0.03	.49	11.53	<.001
F=47.69, p<.001, Adjusted R^2=.57, Durbin-Watson=1.91					

COVID-19=coronavirus disease 2019; SE=standard error
[*] Dummy coded

pandemic were found to be higher than those in Kim's [28] study conducted before the pandemic (57.77 vs. 53.42 points, respectively). Among the subscales of healthy behaviors, interpersonal relationships in the workplace had the highest score, while healthy lifestyle had the lowest. Although nurses on the frontline were exposed to the risk of infection and pressured psychologically and physiologically through their direct care for COVID-19 patients, they tried to accept the situation and struggled to adapt professionally [18]. Nurses' professional motivation to provide care for COVID-19 patients and to protect themselves from infection may have promoted their healthy behaviors. During the pandemic, nurses also experienced deeper and closer relationships with patients as well as healthcare teamwork by supporting one other and other healthcare professionals [18,19], which may have led to a positive perception of interpersonal relationships in the workplace.

Even though the scores for total healthy behaviors in this current study were higher than those observed in a prior study conducted before the COVID-19 pandemic [28], the score for healthy lifestyle within the subscales was relatively low. Repeated long-term COVID-19 crises have disrupted the lives of nurses. Nurse workload and overtime have increased, whereas breaks and off-duty time have decreased. In addition, owing to the risk of spreading the infection, nurses often travel back and forth between hospitals and homes [19]. Consequently, nurses might not engage in physical activity, eat healthy foods and supplements, or have a daily routine during the pandemic. Because they are on the frontline where they are responsible for rapid responses to crises, the protection and promotion of nurses' health are crucial in critical situations such as emerging pandemics [5]. However, the prioritization of public health during the COVID-19 pandemic has overshadowed the health maintenance needs of nurses [29]. To maintain nurses' health during the pandemic, hospital organizations need to secure facilities for rest, programs for physical activities, and healthy food and supplements. Nurse managers also need to understand nurses' healthy behaviors during the pandemic and encourage them to maintain a healthy lifestyle as much as possible.

In the univariate analysis, age, marital status, education level, and type of work were related to nurses' healthy behaviors, which is a finding like that in previous studies [5,16,17]. However, in the multivariate regression analysis, only age was related to nurses' healthy behaviors. Similarly, older nurses were reported to adhere more closely than younger nurses to healthy food recommendations in a previous study [17]. Younger nurses may benefit from hospital organizations or nurse managers with more support and guidance in promoting healthy behaviors.

In the multiple regression analysis, all main variables were also related to nurses' healthy behaviors during the pandemic. In a previous study, stress was a key barrier to nurses' healthy behaviors [15]. This study included COVID-19-related stress as a variable, in line with the pandemic situation. With long-lasting pandemics, nurses experience fear, fatigue, and anxiety related to infecting their family members as well as their own potential infection risk, which leads to their willingness to leave the nursing profession [18,19,30]. Additionally, the results of this study suggest that the psychological burden and physical fatigue of COVID-19-related stress impede nurses' healthy behaviors.

In a previous study [5], self-efficacy was also found to be related to nurses' healthy behaviors. However, the previous study [5] measured self-efficacy using the general self-efficacy scale; the current study measured self-efficacy using the health self-efficacy scale. Nurses with higher health self-efficacy exhibited higher levels of healthy behaviors, even during the pandemic. Although the COVID-19 pandemic has threatened nurses' health and well-being [1,13], nurses who believe they can successfully maintain their healthy behaviors even with their healthcare responsibilities are more likely to sustain healthy behaviors during the pandemic. Future studies should examine the relationships among health self-efficacy, healthy behaviors, and nurses' health status.

The current results demonstrated that nurses with higher professional pride engaged in more healthy behaviors during the pandemic. During the pandemic, nurses fighting COVID-19 on the frontline experienced feelings of pride as nurses and authentic collaboration with healthcare workers. Nurses' opinions were respected, and the healthcare teams supported each other, unlike in the previous hierarchical system. Given the tremendous responsibility of nurses in the COVID-19 crisis, nurses have taken pride in nursing professionalism [18,19]. By working with professional pride, nurses would have been more healthy behaviors for both personal and professional reasons. While there were no prior studies similar to this study, the findings from this study imply an association between nursing professionalism pride and their ability to maintain healthy behaviors in high-risk situations like a pandemic. Furthermore, this study incorporated nursing professionalism as a variable within the activity-related affect category of the HPM. Consequently, it can be seen as a

valuable variable for explaining nurses' health promotion behaviors in future studies.

Meanwhile, hospital organizations must acknowledge nurses' professionalism in caring for COVID-19 patients and should provide appropriate compensation that fits nurses' professionalism, which could lead to improvements in nursing professional pride. Nurse managers should also encourage nurses to have professional pride and engage in healthy behaviors to maintain their health during the pandemic.

Although this study highlighted nurses' healthy behaviors and related factors during the pandemic, it had several limitations. First, there may be variables not measured in this study that are related to nurses' healthy behaviors. Specifically, aspects of the work environment were not considered. Second, the data were collected at the beginning of the 4th epidemic wave of COVID-19. Accordingly, the results may differ from other studies depending on the length of time the epidemic has been ongoing. Third, the study participants worked in general hospitals, and nurses working in hospitals dedicated to infectious diseases or public health centers were not included.

Conclusion

Understanding nurses' healthy behaviors during the pandemic through current study would provide essential information to strategies about nurses' health during future emerging infectious diseases. This study suggests that nurses engaged in more healthy behaviors during the pandemic than before it. Meanwhile, among the various subscales of healthy behaviors during the pandemic, the healthy lifestyle subscale exhibited a comparatively lower score. The COVID-19 crisis brought professional responsibility to nurses, who would otherwise have been more concerned about maintaining their own healthy behaviors to fight infection with COVID-19. However, fatigue, overwork, and precautions during the pandemic might be barriers to retain a typically healthy lifestyle. To retain nurses' healthy lifestyles during the pandemic, organizational support is needed, such as ensuring facilities for rest or physical activities accessible from the hospital and supplying healthy food in hospitals.

The findings from this study highlighted that nurses with high professional pride were more likely to maintain healthy behaviors. To retain nurses' healthy behaviors during the pandemic like COVID-19, the hospital organizations should establish effective strategies to enhance nursing professional pride. During the health crisis, nurses' sacrifices and vocations have been reported and nurses have been praised by the public. It is needed to emphasise nursing professionalism to the public during the pandemic and enhance professional pride by empowering nurses' efforts and promoting nursing values. Nurses also need to communicate the pride in their nursing professionalism to colleagues and encourage each other to maintain healthy behaviors for both their own and patients' health.

Author contributions

EK Lee: Conceptualization, Formal analysis, Methodology, Resources, Investigation, Writing - original draft. **JS Kim:** Methodology, Data curation, Formal analysis, Visualization, Supervision, Validation, Writing - review & editing.

Conflict of interest

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Supplementary materials

None

References

1. Jarden RJ, Jarden AJ, Weiland TJ, Taylor G, Brockenshire N, Rutherford M, et al. Nurse wellbeing during the coronavirus (2019) pandemic: A qualitative descriptive study. Collegian. 2021;28(6):709-719. https://doi.org/10.1016/j.colegn.2021.06.002

2. Hessels AJ, Kelly AM, Chen L, Cohen B, Zachariah P, Larson EL. Impact of infectious exposures and outbreaks on nurse and infection preventionist workload. American Journal of Infection Control. 2019;47(6):623-627. https://doi.org/10.1016/j.ajic.2019.02.007

3. Oyama Y, Fukahori H. A literature review of factors related to hospital nurses' health-related quality of life. Journal of Nursing Management. 2015;23(5):661-673. https://doi.org/10.1111/jonm.12194

4. Ortoleva Bucher C, Delmas P, Oulevey Bachmann A, Gilles I. Stressors, self-reported overall health, potential protective factors and the workplace well-being of nurses during the COVID-19 pandemic in Switzerland: A longitudinal mixed-methods study protocol. BMJ Open. 2021;11(12): e057021. https://doi.org/10.1136/bmjopen-2021-057021

5. Lee SG, Kim B. Factors affecting nurses' health promotion behavior during the COVID-19 pandemic based on the information-motivation-behavioral skills model. Medicina. 2022;58(6):720. https://doi.org/10.3390/medicina58060720

6. Zeng W, Shang S, Fang Q, He S, Li J, Yao Y. Health promoting lifestyle behaviors and associated predictors among clinical nurses in China: A cross-sectional study. BMC Nursing. 2021;20(1):230. https://doi.org/10.1186/s12912-021-00752-7

7. Orszulak N, Kubiak K, Kowal A, Czapla M, Uchmanowicz I. Nurses' quality of life and healthy behaviors. International Journal of Environmental Research and Public Health. 2022;19(19):12927. https://doi.org/10.3390/ijerph191912927

8. Kelly M, Wills J, Sykes S. Do nurses' personal health behaviours impact on their health promotion practice? A systematic review. International Journal of Nursing Studies. 2017;76:62-77. https://doi.org/10.1016/j.ijnurstu.2017.08.008

9. Priano SM, Hong OS, Chen JL. Lifestyles and health-related outcomes of U.S. hospital nurses: A systematic review. Nursing Outlook. 2018;66(1):66-76. https://doi.org/10.1016/j.outlook.2017.08.013

10. Perry L, Gallagher R, Duffield C. The health and health behaviours of Australian metropolitan nurses: An exploratory study. BMC Nursing. 2015;14:45. https://doi.org/10.1186/s12912-015-0091-9

11. Ross A, Yang L, Wehrlen L, Perez A, Farmer N, Bevans M. Nurses and health-promoting self-care: Do we practice what we preach? Journal of Nursing Management. 2019;27(3): 599-608. https://doi.org/10.1111/jonm.12718

12. Chen R, Sun C, Chen JJ, Jen HJ, Kang XL, Kao CC, et al. A large-scale survey on trauma, burnout, and posttraumatic growth among nurses during the COVID-19 pandemic. International Journal of Mental Health Nursing. 2021;30(1): 102-116. https://doi.org/10.1111/inm.12796

13. Couper K, Murrells T, Sanders J, Anderson JE, Blake H, Kelly D, et al. The impact of COVID-19 on the wellbeing of the UK nursing and midwifery workforce during the first pandemic wave: A longitudinal survey study. International Journal of Nursing Studies. 2022;127:104155. https://doi.org/10.1016/j.ijnurstu.2021.104155

14. Sampaio F, Sequeira C, Teixeira L. Impact of COVID-19 outbreak on nurses' mental health: A prospective cohort study. Environmental Research. 2021;194:110620. https://doi.org/10.1016/j.envres.2020.110620

15. Marko S, Wylie S, Utter J. Enablers and barriers to healthy eating among hospital nurses: A systematic review. International Journal of Nursing Studies. 2023;138:104412. https://doi.org/10.1016/j.ijnurstu.2022.104412

16. Hong E. Factors affecting nurse's health promoting behavior: Focusing on self-efficacy and emotional labor. Korean Journal of Occupational Health Nursing. 2014;23(3):154-162. https://doi.org/10.5807/kjohn.2014.23.3.154

17. Perry L, Xu X, Gallagher R, Nicholls R, Sibbritt D, Duffield C. Lifestyle health behaviors of nurses and midwives: The 'fit for the future' study. International Journal of Environmental Research and Public Health. 2018;15(5):945. https://doi.org/10.3390/ijerph15050945

18. Akkuş Y, Karacan Y, Güney R, Kurt B. Experiences of nurses working with COVID-19 patients: A qualitative study. Journal of Clinical Nursing. 2022;31(9-10):1243-1257. https://doi.org/10.1111/jocn.15979

19. Oh H, Lee NK. A phenomenological study of the lived experience of nurses caring for patients with COVID-19 in Korea. Journal of Korean Academy of Nursing. 2021;51(5): 561-572. https://doi.org/10.4040/jkan.21112

20. Pender N. Health promotion in nursing practice. 3rd ed. Appleton & Lange; 1996. p. 51-76.

21. Song SH, Suh SR, Park JM. The effects of self-efficacy and health promoting behaviors on professional quality of life in university hospital nurses. Journal of Health Informatics and Statistics. 2021;46(2):147-153. https://doi.org/10.21032/jhis.2021.46.2.147

22. Faul F, Erdfelder E, Buchner A, Lang AG. Statistical power analyses using G*Power 3.1: Tests for correlation and regression analyses. Behavior Research Methods. 2009;41(4): 1149-1160. https://doi.org/10.3758/BRM.41.4.1149

23. Kim MY, Choi SO, Kim EH. Development of measuring tool for health promotion behavior of nurses. Journal of the Korea

Academia-Industrial cooperation Society. 2021;22(3):138-147.
https://doi.org/10.5762/KAIS.2021.22.3.138

24. Kim E, Park S, Lee Y, Park H. Development and initial validation of the COVID stress scale for Korean people. Korean Journal of Counseling. 2021;22(1):141-163.
https://doi.org/10.15703/kjc.22.1.202102.141

25. Lee J, Hong HG, Park J. Validation study of the Korean Self Rated Abilities for Health Practices: Health Self-Efficacy Measure (K-SRAHP). Stress. 2018;26(3):140-148.
https://doi.org/10.17547/kjsr.2018.26.3.140

26. Becker H, Stuifbergen A, Oh HS, Hall S. Self-rated abilities for health practices: A health self-efficacy measure. Health Values: The Journal of Health Behavior, Education & Promotion. 1993;17(5):42-50.

27. Jeon JH, Lee EH, Kim EJ. Development of an instrument to assess the nursing professional pride. Journal of Korean Academy of Nursing. 2020;50(2):228-241.
https://doi.org/10.4040/jkan.2020.50.2.228

28. Kim MY. Development measure tool for health promotion behavior of nurses [dissertation]. Busan: Catholic University of Pusan; 2020. p. 1-147.

29. Sun N, Wei L, Shi S, Jiao D, Song R, Ma L, et al. A qualitative study on the psychological experience of caregivers of COVID-19 patients. American Journal of Infection Control. 2020;48(6):592-598.
https://doi.org/10.1016/j.ajic.2020.03.018

30. Moore KS, Hemmer CR, Taylor JM, Malcom AR. Nursing professionals' stress level during coronavirus disease 2019: A looming workforce issue. The Journal for Nurse Practitioners. 2021;17(6):702-706.
https://doi.org/10.1016/j.nurpra.2021.02.024