JoP Journal of Pharmacopuncture

Journal of Pharmacopuncture 2024;27(3):253-263
pISSN: 2093-6966 • eISSN: 2234-6856
https://doi.org/10.3831/KPI.2024.27.3.253

Original Article

Mental Health and Medical Error among Nursing Staffs at Korean Medicine Clinics: a first survey in South Korea

Soo-Hyun Nam[1†]*, Chan-Young Kwon[2†]*

[1]Department of Nursing, Andong National University, Andong, Republic of Korea
[2]Department of Oriental Neuropsychiatry, College of Korean Medicine, Dong-Eui University, Busan, Republic of Korea

Received May 24, 2024
Reviewed June 20, 2024
Accepted June 25, 2024

***Corresponding Author**
Chan-Young Kwon
Department of Oriental Neuropsychiatry, College of Korean Medicine, Dong-Eui University, 52-57 Yangjeong-ro, Busanjin-gu, Busan 47227, Republic of Korea
Tel: +82-51-850-8808
E-mail: beanalogue@deu.ac.kr

Soo-Hyun Nam
Department of Nursing, Andong National University, 1375 Gyeongdong-ro, Andong 36729, Republic of Korea
Tel: +82-54-820-6772
E-mail: snam@anu.ac.kr

[†]The authors contributed equally to this work as co-first authors.

Objectives: Nurses face mental health issues like emotional labor, stress, and depression, increasing the risk of medical errors. This study assesses the mental health and medical errors among nurses in Korean medicine clinics in South Korea.
Methods: The cross-sectional analysis involved 83 nurses, examining relationships between emotional labor, stress, depression, cognitive failure, Hwa-byung (HB) (a syndrome of suppressed anger in Korean culture), and medical errors. It identified factors associated with HB and medical errors using multiple regression analysis, presenting their odds ratios (ORs) with 95% confidence intervals (CIs).
Results: The findings revealed a current HB prevalence of 19.28% and a 6-month medical error prevalence of 16.87% among participants. The regression analysis showed that higher levels of depression (OR = 1.368, 95% CI = 1.098 to 1.703, p = 0.005), cognitive failure (OR = 1.072, 95% CI = 1.011 to 1.136, p = 0.020), and HB trait (OR = 1.136, 95% CI = 1.005 to 1.284, p = 0.041) significantly correlated with HB presence.
Conclusion: This groundbreaking study on this previously under-researched nurse workforce highlights the critical need for comprehensive mental health care, with the objective of significantly enhancing their mental well-being and improving their overall work environment.

Keywords: nurses, emotions, occupational stress, medical errors, patient safety

INTRODUCTION

Nurses are a critical element of the healthcare workforce, essential for maintaining service quality and patient safety [1]. Despite their importance, nurses face numerous challenges in their work environments, leading to significant job-related stress [2, 3]. The complexity of caregiving, exposure to violence or aggression, understaffing, rotating shifts, and heavy workloads due to staff shortages all contribute to nurses' increased vulnerability to excessive job-related stress [2, 3].

Research has highlighted a rising incidence of depression among nurses, with reported rates varying from 18% to 61.7% [4, 5]. Moreover, across various international studies, excessive stress, emotional labor, burnout, and impaired cognitive functioning have been consistently identified as mental health concerns in this group [6, 7]. Hwa-byung (HB), recognized as suppressed anger syndrome within the Korean sociocultural context, emerges from the accumulation of unexpressed anger in response to external stressors [8]. Nurses, who frequently manage significant job-related stress and emotional labor by regulating and suppressing their emotions [9], may exhibit an increased prevalence of HB. Additionally, it has also been reported that anger suppression mediates the effects of emotional labor in Korean nurses [10].

Adverse mental health conditions among nurses are closely associated with both their personal well-being and healthcare performance outcomes, including patient safety and health outcomes [11]. A systematic review found a significant positive

correlation between poor mental health in healthcare professionals (e.g., depression, anxiety, job-related stress, and distress) and diminished patient safety (i.e., medical errors) [11]. Poor mental health can impair attention, resulting in decreased individual work performance and quality of care, thus increasing the risk of errors [12]. Consequently, mental health issues within this group extend beyond the individual, having broad implications for the healthcare system [11].

Korean medicine (KM), a branch of traditional East Asian medicines (TEAMs), occupies a significant role in South Korea's national healthcare system [13]. In South Korea, conventional medicine (CM) and KM operate under distinct licensing systems, allowing individuals to choose either modality for disease treatment and health enhancement [13]. TEAMs emphasize holistic care based on their unique theories, primarily employing treatment modalities such as acupuncture, moxibustion, cupping, herbal medicine, and mind-body medicine [13]. Therefore, nurses in CM and KM settings may experience varied work environments due to the differences in work content and scope [14]. Reflecting this, our prior research has identified significant differences in job-related stress, job satisfaction, and role conflict between nurses in these two healthcare settings [14].

In KM medical institutions, medical errors such as needling accidents—errors occurring during the removal of acupuncture needles—or incidents related to needle punctures, are significant clinical concerns [15]. These needle-related medical errors are clinically important because they can lead to adverse events (AEs) ranging from mild to severe symptoms, and, in some cases, systemic complications, although such occurrences are infrequent [16]. Despite growing evidence linking deteriorating mental health among nurses to medical errors [11], research on the connection between medical errors, including those related to acupuncture, and the mental health of nurses in KM medical institutions remains notably lacking. For example, our systematic review on factors associated with emotional labor in Korean nurses, despite including 131 studies, found no studies focused on KM medical institutions or KM department nurses [17]. Similarly, a systematic review examining nurses' burnout and quality of life which included 21 studies, did not include any research on nurses working in KM medical institutions [18]. Therefore, to address this gap, our prior research at a university-affiliated hospital indicated that acupuncture-related errors accounted for 11.1% of medical errors, although this was limited to a single institution [15]. The distinct work environment and potential for medical errors in KM medical institutions warrant further investigation.

This study examines the mental health status (i.e., emotional labor, perceived stress, depression, cognitive failure, and HB) and medical errors among nurses in KM medical institutions in South Korea. Additionally, it investigates factors associated with HB and medical errors. Given the distinct work environments in KM and conventional medicine settings, this research provides valuable insights into KM nurses' specific challenges, informing future strategies to support this essential workforce.

MATERIALS AND METHODS

1. Study design

This study complied with the Strengthening the Reporting of Observational Studies in Epidemiology Statement (Supplement 1) [19].

2. Sample size calculation

The sample size was calculated whilst considering the absence of a centralized organization overseeing nursing staff at KM clinics in South Korea, and the lack of prior survey data targeting this group in the country. As a result, reference data for population size estimation was unavailable. To address this, we utilized data from the Health Insurance Review & Assessment Service, which reported 14,874 KM institutions in South Korea as of 2020, comprising clinics and hospitals. Assuming a target population of 14,874 nurses in KM medical institutions and considering a 90% confidence level and a 5% margin of error, the required sample size was determined to be 268. To account for potential insincere responses, we aimed for 300 participants.

3. Participants

An online cross-sectional anonymous survey was conducted among nurses employed at KM medical institutions in South Korea. Due to the absence of a representative body for these nurses, collaboration with the Society of Korean Medicine (SKOM) was essential for survey dissemination. The authors approached SKOM to distribute the survey through emails to its KM doctor members (n = 19,605), who then forwarded the survey to nurses at their respective KM medical institutions. To

 https://doi.org/10.3831/KPI.2024.27.3.253

minimize potential selection bias, this email was sent nationwide. The inclusion criteria for this survey were: (1) being a nurse, either a registered nurse (RN) or an assistant nurse (AN), currently employed at a KM medical institution (clinic or hospital); (2) possessing at least one month of work experience; and (3) having thoroughly reviewed the consent form and agreed to participate in the survey.

4. Measures

The questionnaire was developed by a licensed KM doctor specializing in neuropsychiatry (SHN) and a psychiatric advanced practice nurse (CYK). It aimed to measure demographic characteristics, mental health outcomes, and medical errors in participants as detailed below.

1) Demographic characteristics

This survey collected various demographic details, including sex, age, clinical experience, education level, marital status, religion, monthly income, job position, work type, employment setting (KM clinic or hospital), and self-rated health status using a 5-point Likert scale (ranging from 1, indicating "very bad," to 5, indicating "very good").

2) Mental health outcomes

To assess emotional labor, we employed Lee's 14-item emotional labor assessment tool [20], divided into two sections: employee-focused emotional labor (6 items) and job-focused emotional labor (8 items). Participants responded on a 5-point Likert scale, from 1 ("not at all") to 5 ("very much"). This yielded score ranges of 6-30 for employee-focused emotional labor and 8-40 for job-focused emotional labor, with higher scores indicating a greater degree of emotional labor.

The Perceived Stress Scale (PSS), conceived by Cohen et al. [21], was employed to evaluate participants' perceived stress. This 10-item tool assesses how individuals appraise the stressfulness of situations in their daily lives, focusing on unpredictability, uncontrollability, and overload. Responses are given on a 5-point Likert scale, from 0 ("not at all") to 4 ("very often"), with total scores ranging from 0 to 40. Higher scores indicate greater perceived stress.

The Patient Health Questionnaire-9 (PHQ-9), developed by Kroenke and Spitzer [22], is globally recognized for screening clinical depression and is extensively used in clinical settings without charge. It comprises nine items evaluating the severity of depressive symptoms over the previous two weeks. Participants rate each item on a 4-point Likert scale, from 0 ('not at all') to 3 ('nearly every day'), resulting in a total score ranging from 0 to 27. Higher scores denote a greater severity of depressive symptoms. Due to its effectiveness and cost-efficiency, the PHQ-9 is a widely adopted tool for depression evaluation in clinical and research settings globally.

The Cognitive Failure Questionnaire (CFQ) [23] assesses the frequency of cognitive failures in daily activities over the last 6 months. It comprises 25 items evaluating perception, memory, and motor function, with responses rated on a five-point Likert scale from 0 ("never") to 4 ("very often"), and a maximum score of 100. Elevated scores reflect a higher occurrence of cognitive failures.

Similarly, the Hwa-byung Scale (HB-S), developed by Kwon et al. [24], measures the traits and symptoms of HB. This 31-item scale is divided into two sections: HB trait (16 items) and HB symptoms (15 items), with each item scored on a five-point Likert scale from 0 ("not at all") to 4 ("very much"). Scores for HB traits and symptoms are 0-64 and 0-60, respectively, with higher scores indicating more pronounced traits and symptoms. Additionally, a cut-off score of 30 points for HB symptoms has been established, with scores at or above this threshold indicating the presence of HB.

3) Medical error

To assess medical error, participants were inquired whether they had encountered any medical errors in the past six months, with a simple "yes" or "no" question. Those who answered "yes" were then prompted to specify the type of error, including procedural and treatment errors, medication errors, patient falls, acupuncture-related errors, and others.

5. Data collection

This online survey was initially scheduled to run for one month, from August 17, 2023 to September 17, 2023, using the free online survey platform Moaform (Moaform, Qoom Networks, Inc., Seoul, South Korea). However, due to insufficient participant responses, the survey period was extended by an additional 10 days, concluding on September 27, 2023. Participants were informed that the survey would take approximately 10 minutes and that they would be rewarded with a coffee e-gift valued at around KRW 4,000 (approximately USD 3.01) upon completion.

6. Data analysis

Only subjects who completed the survey were included in the analysis. The study examined differences in emotional labor, perceived stress, depression, cognitive failure, HB, and medical errors based on demographic characteristics, employing t-tests and ANOVA. Pearson's correlation coefficient was also used to explore variable relationships. Moreover, multiple regression analysis was conducted to identify factors associated with HB and medical errors by incorporating statistically significant variables from univariate analyses. Binomial logistic regression was utilized to determine factors linked to HB and medical errors, presenting values as odds ratios (ORs) with 95% confidence intervals (CIs). SPSS Version 18.0 (SPSS Inc., Chicago, IL, USA) was employed for data analysis, with a p-value of less than 0.05 indicating statistical significance.

7. Ethical considerations

The study was carried out following the Declaration of Helsinki guidelines, and the study protocols received approval from the Institutional Review Board of Dong-Eui University Korean Medicine Hospital (No. DH-2023-04).

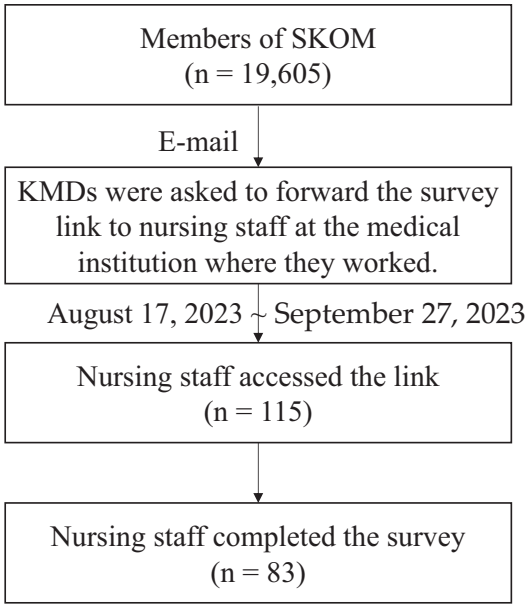

Figure 1. Flow diagram of this study. KMD, Korean medicine doctors; SKOM, the Society of Korean Medicine.

RESULTS

1. Demographic characteristics of the participants

During the survey, 115 individuals accessed the link, with 83 completing the survey, resulting in a completion rate of 72.2% (Fig. 1). Therefore, a total of 80 (96.4%) females and 3 (3.6%) males were included. The age distribution showed that participants aged 40-49 years (n = 35; 42.2%) were the most represented, followed by individuals over 50 years of age (n = 18; 21.7%) and then those aged 30-39 years (n = 18; 21.7%). Participants had an average clinical experience of 10.18 ± 8 years. Approximately half held a bachelor's degree or higher (n = 43; 51.8%), and a majority were married (n = 55; 66.3%). Over half identified as religious (n = 45; 54.2%), and around half reported a monthly income exceeding KRW 2.5 million. Furthermore, fewer than half occupied a staff nurse position or higher (n = 30; 36.1%). Regarding work patterns, a smaller proportion of nurses worked in shifts (n = 20; 24.1%) compared to those who did not (n = 63; 75.9%). The majority were employed in outpatient departments (n = 58; 69.9%) and over half reported their clinical setting as a clinic (n = 44; 53.0%). Concerning subjective health status, no participants rated their health as "very bad"; 9 rated their health as "bad" (10.8%), 41 as "normal" (49.4%), 29 as "good" (34.9%), and 4 as "very good" (4.8%) (Table 1).

2. Correlations among the outcomes

Significant positive correlations were observed between perceived stress and employee-focused emotional labor (r = 0.28; p = 0.011), depression and perceived stress (r = 0.41; p < 0.001), and cognitive failure and depression (r = 0.40; p < 0.001). Furthermore, significant positive correlations were identified between HB traits and employee-focused emotional labor (r = 0.28; p < 0.05), depression (r = 0.24; p < 0.05), and cognitive failure (r = 0.36; p < 0.001). Significant positive correlations were also noted between HB symptoms and perceived stress (r = 0.44; p < 0.001), depression (r = 0.63; p < 0.001), and cognitive failure (r = 0.45; p < 0.001). Additionally, HB symptoms exhibited significant positive correlations with perceived stress (r = 0.37; p = 0.001), depression (r = 0.55; p < 0.001), cognitive failure (r = 0.46; p < 0.001), and HB symptoms themselves (r = 0.76; p < 0.001). Apart from a significant positive correlation between the occurrence of medical error and perceived stress (r = 0.23; p < 0.05), no other outcome demonstrated a significant association with medical errors (all p > 0.05) (Table 2).

 https://doi.org/10.3831/KPI.2024.27.3.253

Table 1. Basic characteristics of the participants (N = 83)

Features	Category	N	%
Sex	Male	3	3.6
	Female	80	96.4
Age (yr)	< 30	12	14.5
	30-39	18	21.7
	40-49	35	42.2
	< 50	18	21.7
Clinical experience (yr)	< 5	30	36.1
	≤ 5, < 10	21	25.3
	≤ 10	32	38.6
	Raw data	10.18 ± 8.38	
Education level	Associate degree or below	40	48.2
	Bachelor degree or above	43	51.8
Marriage	Married	55	66.3
	Unmarried, etc.	28	33.7
Religion	Have	45	54.2
	Not have	37	44.6
Monthly income (KRW)	< 2.5 million	41	49.4
	≥ 2.5 million	42	50.6
Job position	Staff nurse or above	30	36.1
	Assistant nurse, etc.	53	63.9
Department	Outpatient	58	69.9
	Inpatient	25	30.1
Shift work	No shift	63	75.9
	Shift	20	24.1
Clinical setting	Clinic	44	53.0
	Hospital	39	47.0
Subjective health status	Very bad	0	0
	Bad	9	10.8
	Normal	41	49.4
	Good	29	34.9
	Very good	4	4.8

KRW, South Korean won.

3. Variables related to the presence of Hwa-byung

The prevalence of HB among participants was 19.28% (16/83). Significant differences in mental health outcomes were observed between those with and without HB. Specifically, the HB-present group exhibited significantly higher levels of perceived stress ($p = 0.001$), depressive symptoms ($p < 0.001$), cognitive failure ($p < 0.001$), and HB traits ($p < 0.001$) compared to the HB-absent group. Moreover, all sub-scales of the CFQ were significantly higher in the HB-present group ($p = 0.005$ or $p < 0.001$) (Supplement 2).

Multivariable logistic regression analysis indicated that higher levels of depression ($\beta = 0.313$; $p = 0.005$; OR = 1.368; 95% CI = 1.098 to 1.703), cognitive failure ($\beta = 0.069$; $p = 0.020$; OR = 1.072; 95% CI = 1.011 to 1.136), and HB trait ($\beta = 0.128$; $p = 0.041$; OR = 1.136; 95% CI = 1.005 to 1.284) were significantly associated with the presence of HB (Table 3).

Table 2. Correlations between emotional labor, perceived stress, depression, cognitive failure, Hwa-byung symptoms, and medical error (N = 83)

Variable	Pearson correlation coefficient (p-value)								
	1	2	3	4	5	6	7	8	9
1. EF-EL	1	0.440*** (< 0.001)	0.277* (0.011)	0.182 (0.100)	0.169 (0.126)	0.284** (0.009)	0.135 (0.224)	−0.048 (0.665)	0.092 (0.408)
2. JF-EL		1	−0.076 (0.497)	0.067 (0.546)	0.009 (0.936)	−0.016 (0.883)	−0.056 (0.614)	−0.032 (0.775)	0.123 (0.266)
3. PSS			1	0.406*** (< 0.001)	0.193 (0.080)	0.178 (0.108)	0.440*** (< 0.001)	0.368** (0.001)	0.234* (0.033)
4. PHQ-9				1	0.396*** (< 0.001)	0.244* (0.026)	0.630*** (< 0.001)	0.554*** (< 0.001)	−0.026 (0.814)
5. CFQ					1	0.359** (0.001)	0.446*** (< 0.001)	0.457*** (< 0.001)	0.136 (0.219)
6. HB-T						1	0.533*** (< 0.001)	0.381*** (< 0.001)	0.097 (0.385)
7. HB-S							1	0.760*** (< 0.001)	−0.014 (0.903)
8. HB								1	0.025 (0.826)
9. ME									1

CFQ, the Cognitive Failure Questionnaire; EF-EL, employee-focused emotional labor; HB, Hwa-byung; HB-S, Hwa-byung symptom; HB-T, Hwa-byung trait; JF-EL, job-focused emotional labor; ME, medical error; PHQ-9, the Patient Health Questionnaire-9; PSS, the Perceived Stress Scale.
*p < 0.05; **p < 0.01; ***p < 0.001.

Table 3. Multivariable analysis of presence of Hwa-byung (N = 83)

Variables	Category	Presence of HB				
		β	OR	95% LLCI	95% ULCI	p-value
PSS	Perceived stress	0.142	1.152	0.938	1.416	0.178
PHQ-9	Depression	0.313	1.368	1.098	1.703	0.005**
CFQ	Cognitive failure	0.069	1.072	1.011	1.136	0.020*
HB	HB-T	0.128	1.136	1.005	1.284	0.041*

CFQ, the Cognitive Failure Questionnaire; HB, Hwa-byung; HB-T, Hwa-byung trait; LLCI, lower limit of the confidence interval; OR, odd ratio; PHQ-9, the Patient Health Questionnaire-9; PSS, the Perceived Stress Scale; ULCI, upper limit of the confidence interval.
*p < 0.05; **p < 0.01.

4. Variables related to the occurrence of medical error

The 6-month prevalence of medical errors among participants was 16.87% (14/83). Statistically significant differences were notable in medical errors, particularly in terms of age group and perceived stress among nurses. Specifically, those who made medical errors were significantly more likely to be individuals under 30 (p = 0.026) and experience higher levels of perceived stress (p = 0.033) compared to those who did not make medical errors (Supplement 3). Multivariable logistic regression analysis revealed that being in one's 40s, rather than under 30 years of age, was significantly associated with a lower occurrence of medical errors (p = 0.034; OR = 0.152; 95% CI = 0.027 to 0.867) (Table 4).

DISCUSSION

This study is the first to investigate the relationship between mental health status and the occurrence of medical errors among nurses in KM medical institutions in South Korea. It

 https://doi.org/10.3831/KPI.2024.27.3.253

Table 4. Multivariable analysis of occurrence of medical error (N = 83)

Variables	Category	Occurrence of medical error				
		β	OR	95% LLCI	95% ULCI	p-value
Age (yr)	< 30 (ref)	-	1	1	1	1
	30-39	−0.401	0.670	0.127	3.542	0.637
	40-49	−1.881	0.152	0.027	0.867	0.034*
	< 50	−2.384	0.092	0.008	1.008	0.051
PSS	Perceived stress	0.133	1.142	0.987	1.322	0.075

LLCI, lower limit of the confidence interval; OR, odd ratio; PSS, the Perceived Stress Scale; ULCI, upper limit of the confidence interval.
*p < 0.05.

also defines key outcomes at both the individual and group levels—namely, the incidence of HB and medical errors, respectively— and analyzes factors associated with these outcomes using multiple regression analysis.

1. Summary of the findings

The current findings reveal a significant positive relationship between the incidence of HB and all other mental health-related outcomes, except for emotional labor. Specifically, HB incidence was significantly positively associated with levels of perceived stress, depressive symptoms, cognitive failure, and HB traits. However, no significant association was determined between HB incidence or symptoms and suppressed emotions [8] or emotional labor, whether employee-focused or job-focused. The absence of prior research on the connection between HB and emotional labor complicates the interpretation of these results. One potential explanation is that the onset of HB, being specifically associated with the suppression of anger [8], may not be adequately captured by the emotional labor assessment tool [20] utilized in this study, reducing the sensitivity of this measurement. Nevertheless, determining causality from this observation remains challenging.

2. Implications

This study expands the understanding of mental health within the target population by integrating the cultural component of HB in the context of medical institutions in South Korea. Specifically, a previous study [10] investigated the effects of anger suppression among Korean nurses, while the current study examines HB, a Korean cultural syndrome related to anger suppression. This survey found that HB prevalence was 19.28%, surpassing the known prevalence rates in the general population, ranging from 4.2% to 13.3% [8]. This discrepancy suggests a potential susceptibility to HB within this group [2, 3]. Furthermore, multiple regression analysis reveals depression, cognitive failure, and HB traits as significant predictors of HB occurrence. The link between depression and HB is consistent with previous studies [25, 26]. Conceptually, the HB trait denotes a predisposition toward experiencing HB [24], making its association with HB occurrence plausible. Research involving industrial workers highlighted a significant correlation between cognitive failure and factors such as emotional exhaustion and diminished physical health [27]. Furthermore, cognitive failure, as measured by the CFQ, is associated with negative emotional states, including anger-related emotions such as hostility [28], suggesting its potential contribution to HB onset. Nonetheless, further studies are required to clarify the precise nature of the relationship between cognitive failure and HB development.

The findings from this study suggest that depression, cognitive failure, and HB traits are significant predictive factors and management targets for nurses at KM medical institutions. Addressing these factors is crucial for preventing the occurrence of HB, which represents a critical outcome at the individual level in this research. Unlike depression, HB manifests through distinct psycho-somatic symptoms, including stomach or chest congestion, chest pain, and sensations of heat [8]. HB is more prevalent in Asian cultures, where the suppression of emotions is common [29]. The inability to express emotions, followed by their suppression, often results in psychological symptoms manifested through HB or other somatic complaints [30]. Individuals experiencing these symptoms frequently seek medical care for significant physical issues, such as cardiovascular or gastrointestinal problems, attributing these to physiological rather than psychological causes [31]. Therefore, healthcare authorities should consider both physiological and psychological factors when addressing symptoms of HB among nurses.

One important implication of the current findings is the association between mental health and medical errors, which strengthens theories linking mental well-being and job performance in nurses [32]. The Pearson correlation analysis exhibited a significant positive correlation between medical errors and the level of perceived stress. However, the multiple regression analysis revealed that this correlation was not significant, and identified a particular age group with a significant negative correlation with the incidence of medical errors. Specifically, participants in their 40s demonstrated a lower frequency of medical errors compared to those under 30. This observation that other mental health-related outcomes do not significantly correlate with medical errors diverges from prior studies that identified a strong link between high-stress levels among nurses and compromised patient safety [11]. This discrepancy may stem from variations in demographic characteristics and the sample size in the current study.

A noteworthy portion of the study's participants consisted of outpatient nurses and non-shift workers, the majority of whom were married and held religious affiliations. The prevalence of rotating shift work, known to negatively impact mental health [33], could have affected the results based on participant characteristics. Moreover, marital status and religious beliefs may serve as a social and emotional support system [34], possibly attenuating the effects of perceived stress on nurses. Also, the small sample size of this study may have limited its statistical power [35], highlighting the necessity for further research with a larger cohort of nurses to validate the link between perceived stress and medical errors.

The association between age group and medical error is consistent with prior research, which indicates a higher incidence of medical errors among younger nurses [36, 37]. These individuals often face challenges with clinical inexperience, skill deficits, and increased levels of job-related stress [36, 37]. Similar to the participants in this study, nurses employed at KM medical institutions have limited opportunities for learning KM nursing within the standard nursing curriculum, attributed to constraints within specialized nursing education programs [38]. Therefore, tailored clinical training addressing the unique needs of nurses in KM medical institutions is essential to mitigate the risk of medical errors.

The current findings also suggest that, alongside clinical training, mental health improvement strategies should be considered. Our team implemented an online mindfulness program for nurses currently working at KM medical institutions and observed improvements in emotional labor and burnout [39]. Additionally, we reported the results of improving HB symptoms using the online mindfulness program and a smart-

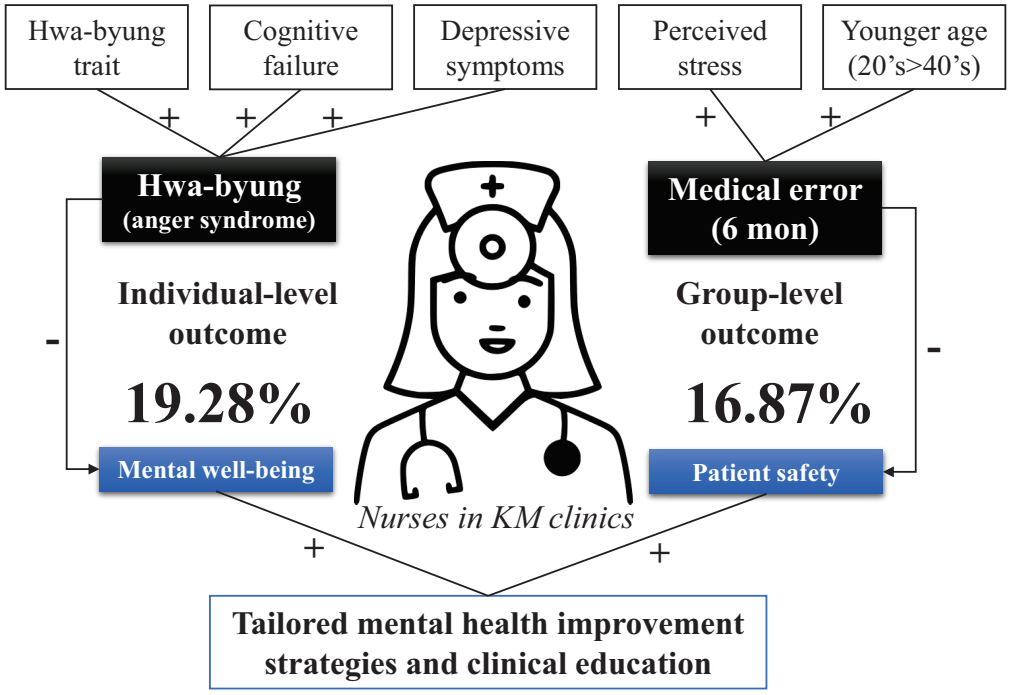

Figure 2. Implications of this study. KM, Korean medicine.

 https://doi.org/10.3831/KPI.2024.27.3.253

phone application for mind-body intervention in this population [40]. Future studies with larger samples are anticipated to elucidate the effectiveness of these interventions, which will be used to develop tailored mental health improvement strategies for nurses working at KM medical institutions (Fig. 2).

3. Limitations

The current study presents several limitations. First, the cross-sectional design prevents establishing causality between the observed correlations associated with nurses' mental health, cognitive failure, HB, and medical errors. It remains unclear whether diminished mental health among nurses leads to an increase in HB and medical errors, or if nurses who experience more HB symptoms or frequent medical errors are more prone to stress or depression. Therefore, a longitudinal study is necessary to determine whether nurses' mental health is a precursor to HB and medical errors.

Second, the sample size may have been insufficient to definitively ascertain the link between mental health and HB/medical errors, reducing the generalizability of current findings. Although the goal was to recruit 300 subjects, this target was not met. Despite extending the survey period, only one additional participant was recruited during the extension, leading to the decision to conclude the survey. This limitation significantly hinders the generalizability of the results and arises because there is no centralized organization in South Korea that oversees nursing staff in KM clinics, making it challenging to accurately estimate the total population. This lack of oversight could contribute to the vulnerable professional environment experienced by nursing staff in these clinics. Therefore, the results of this study should be interpreted cautiously.

Nevertheless, this research is notable as the first online anonymous survey focusing on nurses in KM medical institutions. Further research with a larger nurse cohort is essential to corroborate the association between mental health and HB/medical errors. Third, the applicability of our findings may be limited to countries with varying nurse staffing and hospital systems due to the distinctive characteristics of the KM setting [16]. Lastly, this study's reliance on self-reported data for evaluating nurses' overall mental health and negative work experiences, including medical errors, introduces the risk of recall bias. This bias, attributed to the unreliability of the memory, may lead to ambiguous interpretations of the results.

CONCLUSION

This study investigates the mental health status and incidence of medical errors among nurses in KM clinics. The findings reveal that mental health issues, particularly depression and cognitive failures, are closely associated with HB among these nurses, with those under 30 years old experiencing higher rates of medical errors. Additionally, HB stems from high stress and repressed emotions, impacting both the nurses' personal health and patient safety, as well as the performance of the medical institutions. Therefore, tailored mental health improvement strategies and specialized clinical education are necessary for nurses in KM clinics. Despite limitations in sample size and study design, this novel research is significant for its pioneering, systematic examination of the unique working environment and mental health issues faced by this specific population.

CONFLICTS OF INTEREST

Chan-Young Kwon has been an editorial board member of Journal of Pharmacopuncture since 2022 but has no role in the decision to publish this article. No other potential conflicts of interest relevant to this aricle were reported.

FUNDING

This work was supported by Innovative Human Resource Development for Local Intellectualization program through the Institute of Information & Communications Technology Planning & Evaluation (IITP) grant funded by the Korea government (MSIT) (IITP-2024-2020-0-01791).

SUPPLEMENTARY MATERIALS

Supplementary data is available at https://doi.org/10.3831/KPI.2024.27.3.253.

ORCID

Soo-Hyun Nam, https://orcid.org/0000-0002-1342-2769
Chan-Young Kwon, https://orcid.org/0000-0003-0068-9904

REFERENCES

1. Hassmiller SB, Cozine M. Addressing the nurse shortage to im-

prove the quality of patient care. Health Aff (Millwood). 2006; 25(1):268-74.
2. Jung HS, Baek E. A structural equation model analysis of the effects of emotional labor and job stress on depression among nurses with long working hours: focusing on the mediating effects of resilience and social support. Work. 2020;66(3):561-8.
3. Nam SH, Lee DW, Seo HY, Hong YC, Yun JY, Cho SJ, et al. Empathy with patients and post-traumatic stress response in verbally abused healthcare workers. Psychiatry Investig. 2021;18(8): 770-8.
4. Hui C, Li H. Anxiety, depression status and correlation analysis of the quality of life among community hospital nurses. Ind health Occup Dis. 2015;41(6):434-7.
5. Xie N, Qin Y, Wang T, Zeng Y, Deng X, Guan L. Prevalence of depressive symptoms among nurses in China: a systematic review and meta-analysis. PLoS One. 2020;15(7):e0235448.
6. Deng X, Liu X, Fang R. Evaluation of the correlation between job stress and sleep quality in community nurses. Medicine (Baltimore). 2020;99(4):e18822.
7. Kim JS. Emotional labor strategies, stress, and burnout among hospital nurses: a path analysis. J Nurs Scholarsh. 2020;52(1): 105-12.
8. The Society of Korean Medicine Neuropsychiatry. Korean medicine clinical practice guideline for Hwabyung. National Institute for Korean Medicine Development; 2021.
9. Badolamenti S, Sili A, Caruso R, FidaFida R. What do we know about emotional labour in nursing? A narrative review. Br J Nurs. 2017;26(1):48-55.
10. Kim JE, Park JH, Park SH. Anger suppression and rumination sequentially mediates the effect of emotional labor in Korean nurses. Int J Environ Res Public Health. 2019;16(5):799.
11. Hall LH, Johnson J, Watt I, Tsipa A, O'Connor DB. Healthcare staff wellbeing, burnout, and patient safety: a systematic review. PLoS One. 2016;11(7):e0159015.
12. Welp A, Meier LL, Manser T. Emotional exhaustion and workload predict clinician-rated and objective patient safety. Front Psychol. 2015;5:1573.
13. Kim D, Shih CC, Cheng HC, Kwon SH, Kim H, Lim B. A comparative study of the traditional medicine systems of South Korea and Taiwan: focus on administration, education and license. Integr Med Res. 2021;10(3):100685.
14. Kwon CY, Park JH, Ha DJ. Scoping review of research on mental health of nurses working in Korean medicine hospitals. J of Oriental Neuropsychiatry. 2021;32(1):55-66.
15. Kwon CY, Lee B, Kwon OJ, Kim MS, Sim KL, Choi YH. Emotional labor, burnout, medical error, and turnover intention among South Korean nursing staff in a university hospital setting. Int J Environ Res Public Health. 2021;18(19):10111.
16. Lee ES, Jeong JY, Seo DG, Shin SY, Seo JC, Seo YJ, et al. Clinical research of cervical acupotomy effects with acupuncture on facial & trigemial nerve branch on peripheral facial paralysis and postauricular pain. J Acupunct Res. 2014;31(4):143-54.
17. Ha DJ, Park JH, Jung SE, Lee B, Kim MS, Sim KL, et al. The experience of emotional labor and its related factors among nurses in general hospital settings in Republic of Korea: a systematic review and meta-analysis. Sustainability. 2021;13(21):11634.
18. Khatatbeh H, Pakai A, Al-Dwaikat T, Onchonga D, Amer F, Prémusz V, et al. Nurses' burnout and quality of life: a systematic review and critical analysis of measures used. Nurs Open. 2022;9(3):1564-74.
19. Vandenbroucke JP, von Elm E, Altman DG, Gøtzsche PC, Mulrow CD, Pocock SJ, et al.; STROBE Initiative. Strengthening the Reporting of Observational Studies in Epidemiology (STROBE): explanation and elaboration. PLoS Med. 2007;4(10):e297.
20. Lee B. Development of a model for emotional labor worker's health. Korean J Occup Health Nurs. 2007;16(1):78-88.
21. Cohen S, Kamarck T, Mermelstein R. A global measure of perceived stress. J Health Soc Behav. 1983;24(4):385-96.
22. Kroenke K, Spitzer RL. The PHQ-9: a new depression diagnostic and severity measure. Psychiatric Annals. 2002;32(9):509-15.
23. Broadbent DE, Cooper PF, FitzGerald P, Parkes KR. The Cognitive Failures Questionnaire (CFQ) and its correlates. Br J Clin Psychol. 1982;21(1):1-16.
24. Kwon JH, Kim JW, Park DG, Lee MS, Min SG, Kwon H. Development and validation of the Hwa-Byung Scale. Korean J Clin Psychol. 2008:27(1):237-52.
25. Park SJ, Choi EY. Relationships among Hwabyung, depression and quality of life in middle-aged women. J Asian Women. 2014;53(2):167-87.
26. Min SK, Suh SY, Cho YK, Huh JE, Song KJ. Development of Hwa-Byung scale and research criteria of Hwa-Byung. J Korean Neuropsychiatr Assoc. 2009:48:77-85.
27. Chalak MH, Jafari H, Yadollahifar S, Rajabi F, Zamandi M, Masruri B, et al. The effect of occupational burnout on cognitive failure and general health in industrial workers (case study: Iran Tire Factory). Health Psychol Rep. 2023;11(2):166-75.
28. Payne TW, Schnapp MA. The relationship between negative affect and reported cognitive failures. Depress Res Treat. 2014; 2014:396195.
29. Kwon CY, Chung SY, Kim JW. Hwabyung: a mental disorder related to suppressed emotions and somatic symptoms reminiscent of being on fire. Psychosom Med. 2020;82(5):529-31.
30. Pang KY. Hwabyung: the construction of a Korean popular illness among Korean elderly immigrant women in the United States. Cult Med Psychiatry. 1990;14(4):495-512.
31. Barsky AJ. Stop being your symptoms and start being yourself:

the 6-week mind-body program to ease your chronic symptoms. Harper Collins; 2006.
32. Pappa D, Koutelekos I, Evangelou E, Dousis E, Mangoulia P, Gerogianni G, et al. Investigation of nurses' wellbeing towards errors in clinical practice-the role of resilience. Medicina (Kaunas). 2023;59(10):1850.
33. Brown JP, Martin D, Nagaria Z, Verceles AC, Jobe SL, Wickwire EM. Mental health consequences of shift work: an updated review. Curr Psychiatry Rep. 2020;22(2):7.
34. Ofei AMA, Paarima Y, Barnes T, Kwashie AA. Stress and coping strategies among nurse managers. J Nurs Educ Pract. 2020;10(2):39-48.
35. Faber J, Fonseca LM. How sample size influences research outcomes. Dental Press J Orthod. 2014;19(4):27-9.
36. Chang YK, Mark BA. Antecedents of severe and nonsevere medication errors. J Nurs Scholarsh. 2009;41(1):70-8.
37. Ali L, Saifan A, Alrimawi I, Atout M. Nurses' perceptions toward factors that cause medication errors in Jordan: a qualitative study. Perspect Psychiatr Care. 2021;57(3):1417-24.
38. Oh NK, Sim J. Educational needs and knowledge level of traditional Korean nursing among nurses in Korean medicine hospitals. J East-West Nurs Res. 2022;28(2):83-90.
39. Kwon CY, Park DH. The first attempt to apply an online mindfulness program to nursing staff in a traditional Korean medicine clinic in COVID-19 era: a case series. Healthcare (Basel). 2023;11(1):145.
40. Kwon CY. Mindfulness meditation combined with digital health for medical personnel at a Korean medicine hospital in South Korea: a case series. J Orient Neuropsychiatry. 2023;34(4):463-71.