



Research Article

THE HIDDEN IMPACTS OF OCCUPATIONAL STRESS ON PATIENT SAFETY CULTURE

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Abstract: Previous studies have shown that over 45% of healthcare workers exhibit symptoms of stress, but the impacts of occupational stress on PSC are not well understood. This study was to determine the relationship between occupational stress and PSC at Pham Ngoc Thach Hospital in 2022. A cross-sectional study was conducted on 390 hospital employees at Pham Ngoc Thach Hospital in November 2022. Data was collected using the Vietnamese version of the HSOPSC 2.0 tool (Cronbach's alpha 0.68-0.93) and the DASS-21-S. The results showed that 15% of hospital employees had mild to severe stress. The average PSC score was 3.13 with a standard deviation of 0.36 (5-point Likert scale). Higher occupational stress was associated with lower overall PSC. Specifically, occupational stress negatively impacted three domains of patient safety: teamwork, error communication, and hospital management support for patient safety. This study demonstrates that reducing healthcare worker stress could be an intervention to improve PSC. Hospitals should consider implementing workplace stress relief initiatives as an important factor in promoting PSC in healthcare, which can directly impact patient health and satisfaction.

Keywords: Occupational stress; Patient safety culture; Healthcare workers.

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1. Introduction

According to the World Health Organization (WHO), the detrimental effects of unsafe patient care present a major global public health challenge, one that is escalating. It is recognized as one of the leading causes of death and disability worldwide [1]. In recent years, the concept of "patient safety" and related solutions have garnered increasing attention within healthcare facilities, particularly in Vietnam. Patient safety refers to the prevention of errors and adverse events during the provision of health care services. This includes measures to prevent medication errors (including overuse or insufficient use as per physician's prescription), infection control in hospitals, prevention of other errors in diagnosis or treatment, and improving communication between healthcare staff and between patients and staff [2].

Although there are various definitions of "patient safety culture" (PSC), broadly, PSC relates to attitudes, beliefs, perceptions, and values about the importance of patient safety and the commitment of healthcare organizations to improve it [1], [3]. PSC encompasses safe practices, processes, policies, and

behaviors of healthcare staff, as well as management's commitment to patient safety. PSC helps reduce medical errors, lower the rate of adverse events, and improve patient outcomes (reduce disease rates, medical incidents, healthcare costs, and improve patient satisfaction), enhancing the satisfaction of healthcare staff [3]–[5].

Some recent studies indicate that over 45% of healthcare staff experience stress, 25.8% exhibit symptoms of anxiety disorder, and 24.3% show symptoms of depression [6]–[8]. Some studies suggest that occupational stress among healthcare staff reduces PSC in healthcare facilities [6], [9]. Despite this, to the best of our understanding, there are limited studies in Vietnam exploring the relationship between occupational stress and PSC in hospitals. Pham Ngoc Thach Hospital is the largest respiratory hospital in Southern Vietnam. The hospital has over 900 healthcare staff serving more than 900 inpatient beds (with bed occupancy rate consistently over 90%) and nearly 1800 outpatient visits per day. Pham Ngoc Thach Hospital has conducted research related to PSC, but the relationship between stress and PSC has not been investigated. Investigating the relationship between occupational stress and PSC could assist managers in developing interventions aimed at reducing stress and improving PSC simultaneously, thereby delivering positive results for both healthcare staff and patients.

The objectives of this study are to determine the rate of occupational stress among healthcare staff at Pham Ngoc Thach Hospital in 2022; Determine the average score of patient safety culture at Pham Ngoc Thach Hospital in 2022; Identify the relationship between occupational stress and patient safety culture at Pham Ngoc Thach Hospital in 2022.

2. Materials and Methods

2.1. Setting

The study was conducted at Pham Ngoc Thach Hospital - the largest respiratory hospital in Southern Vietnam from September 2022 to March 2023

2.2. Study design

Cross-sectional study.

2.3. Participants, inclusion and exclusion criteria

The participants are hospital employees at Pham Ngoc Thach Hospital in Ho Chi Minh City in November 2022. The inclusion criteria for the study subjects were hospital employees who were working in the clinical departments, paraclinical departments, and outpatient departments of Pham Ngoc Thach Hospital at the time of the survey; The participant's seniority working at the hospital is 6 months or more. The exclusion criteria included those who were currently on maternity leave, long-term sick leave, long-term study or work trip, and those who did not agree to participate in the study.

2.4. Sampling size and sampling method:

The sample size was calculated using a formula to estimate a proportion, referenced from the study of Asefzadeh et al., which was 51.52% [6]. With a type I error probability (alpha) of 0.05 and an estimation error (d) of 0.05, the minimum required sample size was calculated to be 384 subjects. In reality, the study surveyed 390 subjects, selected randomly and systematically, who met all sampling criteria.

$$n \geq \frac{Z_{1-\alpha/2}^2(1-p)p}{d^2} \quad (1)$$

Data source and data tools: Data collection was conducted using an online questionnaire, self-filled with three parts: demographic characteristics of the study subjects involving 7 questions; a stress survey (DASS21-S) with 7 questions; and a survey on patient safety culture (Hospital survey on patient safety culture - HSOPSC) version 2.0 with 32 questions. The questionnaire consisted of 46 questions in total. The DASS-21 scale consists of 21 questions, including three component scales: Depression (DASS21-D), Anxiety (DASS21-A), and Stress (DASS21-S). It is a popular scale in stress, anxiety, and depression research with high reliability, Cronbach Alpha ranging from 0.761 to 0.906 [10], [11]. This study employed the Vietnamese version of the DASS21-S scale, with 7 questions to measure the stress level of healthcare workers. Each question included four short answer options, intended to reflect the severity level, and was scored from 0 (does not apply to me at all) to 3 (very much applies to me or most of the time). The Hospital Survey on PSC version 2.0 (HSOPSC 2.0) was published by the Agency for Healthcare Research and Quality (AHRQ) in the United States in 2019 [12]. The HSOPSC 2.0 toolkit consists of 10 safety areas, with 32 questions measured on a 5-point Likert scale: 1 is Strongly Disagree, 2 is Disagree, 3 is Neutral, 4 is Agree, and 5 is Strongly Agree. The Cronbach's Alpha value of the HSOPSC 2.0 scale was reported to range from 0.68 to 0.93 [13]. The ten patient safety areas in HSOPSC 2.0 include: 1. Teamwork (3 questions); 2. Staffing and workplace (4 questions); 3. Learning organization and continuous improvement (3 questions); 4. Response to errors (4 questions); 5. Supervision, management, or clinical leadership supports patient safety (3 questions); 6. Communication about errors (3 questions); 7. Open communication (4 questions); 8. Reporting patient safety events (2 questions); 9. Hospital management supports patient safety (3 questions); 10. Handoffs and information transitions (3 questions). The HSOPSC 2.0 toolkit was translated from the original English version to Vietnamese and then back-translated into English for comparison. Subsequently, a team of three medical experts reviewed it for linguistic and cultural appropriateness for Vietnam. The toolkit was revised until all three experts agreed before the survey was conducted. The Cronbach's Alpha value in this study is 0.78.

Data Collection

The study employed an online, structured questionnaire in Vietnamese. The research team compiled a list of all employees in the clinical, paraclinical, and outpatient departments who met the study criteria, obtained from the hospital's human resources department. The initial list consisted of 810 healthcare workers, arranged in order according to their departments and names. This list was then randomly and systematically selected by the research team to obtain a sample list of 390 study subjects. The sample size for each department was proportional to the number of personnel in the department, meaning departments with more staff had more representatives in the study than those with fewer staff. Afterward, the research team sent the participation instructions, online survey link, and a list of study subjects divided by department to each department's email inbox. Department representatives forwarded the survey link to the selected healthcare workers' phone numbers.

Data analyses and interpretations

Google Forms was used to create the online survey tool, and data were analyzed using R software, version 4.3. The characteristics of the healthcare workers were reported with frequency and ratio for variables such as gender, job title, position, regular patient contact, and stress level. Quantitative variables (age, working hours, hospital working hours) were reported with mean, median, and interquartile range. The results of the survey were multiplied by two and added together. The DASS21-S scale scores ranged from 0 points to 42 points. The severity of the stress condition was analyzed according to the recommendations of Lovibond and colleagues: normal (0-14 points); mild (15-18 points); moderate (19-25 points); high (26-33 points) and severe (34 points or more).¹⁴ Using a 5-point Likert scale for each question, the overall PSC score represents the average score of the ten PSC areas.

The score for each PSC area is calculated by averaging the scores of the questions within each area. The highest and lowest possible scores for the overall PSC, as well as for each area, are 5 and 1 points, respectively. To examine the relationship between PSC and occupational stress, the study employed an ordinal logistic regression model to test the relationship between the level of occupational stress (dependent variable) and the average overall and specific area PSC scores. A difference was considered statistically significant if the p-value was less than 0.05.

This study was approved by the Ethics Committee for Biomedical Research of Pham Ngoc Thach Hospital on March 30, 2023 (Decision No. 534/PNT-EC), and permission was granted for its implementation. The Ethics Committee for Biomedical Research of Pham Ngoc Thach Hospital is an organization affiliated with Pham Ngoc Thach Hospital, Vietnam. Our research also adheres to international ethical guidelines for biomedical research. Study participants have complete discretion to participate or leave the study at any time. Participants' rights were clearly informed before participating in the study.

3. Results and Discussion

Table 1 shows that the majority of the research subjects were female (68.2%) and nurses (56.1%). The most common age group in the study was from 30 to 40 years old, accounting for 44.9% of the research subjects. The average working time of the research subjects at Pham Ngoc Thach Hospital was 10.54 years, with a median of 9 years. The shortest tenure was less than 1 year, and the longest was 37 years. Regarding stress levels, there were 58 research subjects (15%) with stress levels ranging from mild to severe, of which there were 5 cases of severe stress, accounting for 1.3%.

Table 1. Characteristics of participants (n=390)

Characteristics	Freq	(%)
Gender		
Male	124	31.8
Female	266	68.2
Age *	38.03; 32; 28-39	
Age group		
Under 30 years old	122	31.3
30 to 40 years old	175	44.9
40 to 50 years old	49	12.6
Over 50 years old	44	11.2
Job		
Medical doctor	78	20.0
Nurse	219	56.1
Pharmacist	9	2.4
Medical Technician/Paraclinical Specialist	49	12.5
Others Bachelor	5	1.3
Housekeeper	30	7.7

Table 2. Contined

Characteristics	Freq	(%)
Position		
Head/ Deputy head	17	4.4
Chief nurse/chief technician	23	5.9
Payroll staff	222	56.9
Contract staff	128	32.8
Number of years working at the hospital (years) *	10.54; 9; 4-14	
Stress level		
Normal	332	85.1
Mild	24	6.2
Moderate	13	3.3
Severe	16	4.1
Extremly severe	5	1.3

* Mean; Median; interquartile range

Table 2 shows that the overall PSC score of all research subjects was 3.13, and the standard deviation was 0.36. There was a statistically significant difference between the stress level of healthcare workers and the PSC score in both univariate models (coefficient β : -0.25; 95% CI: -0.43; -0.07; p-value: 0.006) and multivariate models (coefficient β : -0.22; 95% CI: -0.41; -0.04; p-value: 0.017). Higher levels of stress were associated with a reduction in PSC. In addition, the stress of healthcare workers also negatively impacted the following three safety areas: teamwork, communication about errors, and hospital management supporting patient safety.

Table 2. The relationship between stress and PSC (n= 390)

Dimensions of PSC	Stress Level*					Mean PSC *	Univariate models		Multivariate models	
	Normal	Mild	Moderate	Severe	Extremely severe		Coefficient β (95% CI)	p-value	Coefficient β (95% CI)	p-value
1. Teamwork	3.38 (0.44)	3.29 (0.43)	3.24 (0.55)	3.11 (0.52)	2.57 (0.65)	3.35 (0.47)	-0.38 (-0.57; -0.19)	<0.001	-0.36 (-0.55; -0.17)	<0.001
2. Staffing and Work Pace	2.52 (0.53)	2.59 (0.53)	2.53 (0.45)	2.52 (0.49)	2.28 (0.65)	2.52 (0.52)	-0.05 (-0.23; -0.13)	0.590	-0.07 (-0.26; 0.11)	0.450
3. Organizational Learning - Continuous Improvement	3.21 (0.49)	3.14 (0.56)	3.14 (0.40)	3.04 (0.58)	2.71 (0.95)	3.19 (0.51)	-0.18 (-0.37; -0.01)	0.047	-0.16 (-0.36; 0.02)	0.082
4. Response to Error	2.48 (0.51)	2.45 (0.45)	2.61 (0.62)	2.57 (0.51)	2.17 (0.45)	2.48 (0.51)	0.04 (-0.14; 0.23)	0.628	0.05 (-0.13; 0.24)	0.582
5. Supervisor, Manager, or Clinical Leader Support for Patient Safety	3.21 (0.55)	3.15 (0.57)	3.15 (0.43)	3.14 (0.60)	3.14 (0.60)	3.20 (0.55)	-0.08 (-0.26; 0.09)	0.355	-0.10 (-0.28; 0.08)	0.269
6. Communication About Error	4.05 (0.88)	4.08 (0.73)	3.70 (0.66)	3.79 (0.79)	3.33 (1.62)	4.03 (0.88)	-0.26 (-0.44; -0.07)	0.005	-0.21 (-0.40; -0.03)	0.023
7. Communication Openness	3.24 (0.81)	3.36 (0.68)	3.00 (0.80)	3.35 (0.65)	2.42 (1.40)	3.24 (0.81)	-0.09 (-0.27; 0.08)	0.312	-0.10 (-0.28; 0.08)	0.275
8. Reporting Patient Safety Events	3.60 (1.17)	3.75 (1.01)	3.57 (1.07)	3.45 (1.13)	3.71 (1.49)	3.60 (1.16)	-0.03 (-0.20; 0.14)	0.751	0.01 (-0.17; 0.18)	0.957
9. Hospital Management Support for Patient Safety	3.25 (0.48)	3.04 (0.55)	2.96 (0.80)	2.82 (0.94)	2.23 (1.10)	3.19 (0.55)	-0.46 (-0.66; -0.26)	<0.001	-0.48 (-0.68; -0.28)	<0.001
10. Handoffs and Information Exchange	2.46 (0.62)	2.62 (0.57)	2.35 (0.78)	2.53 (0.73)	2.04 (1.14)	2.47 (0.63)	0.10 (-0.09; 0.277)	0.337	0.08 (-0.10; 0.27)	0.375
Total	3.14 (0.35)	3.15 (0.29)	3.02 (0.37)	3.03 (0.36)	2.66 (0.70)	3.13 (0.36)	-0.25 (-0.43; -0.07)	0.006	-0.22 (-0.41; -0.04)	0.017

Note: * Mean (SD)

Our cross-sectional study conducted on 390 healthcare workers directly involved in patient care at Pham Ngoc Thach Hospital, including nurses, doctors, and other specialties, revealed that 15% of the study participants experienced stress ranging from mild to severe, with 1.5% extremely severe stress.

Our research indicates a stress rate of 15% among healthcare staff at Pham Ngoc Thach Hospital. Conversely, a study by Vu Thi Cuc and colleagues using the same DASS-21 scale showed an over 80% stress rate among healthcare workers. This discrepancy can be attributed to Vu Thi Cuc et al.'s research being conducted in Ho Chi Minh City during the COVID-19 pandemic, whereas our study was conducted in November 2022, a period of relative pandemic stability in the city [14]. Despite differences in stress assessment tools (DASS-21-S and PSS-10), our study aligns reasonably with Bui Hong Cam et al.'s research conducted on 272 healthcare workers in Ho Chi Minh City's healthcare centers and local health stations in 2022, which also showed a stress rate of approximately 15% [15]. Our study also aligns with Oulyna Phannavong et al.'s research conducted on 161 healthcare workers at Xiangkhoang Provincial Hospital, Laos, in 2020, which reported a stress rate of 14.3% [16].

Our study also showed that "occupational stress" affected the overall PSC score, and four areas of patient safety: teamwork, learning organization and continuous improvement, communication about errors, and hospital management supporting patient safety. This finding is consistent with some previous studies. Two studies in Iran and one study in Turkey all suggested that occupational stress has a negative impact on PSC [6], [9], [17]. Conversely, several other studies found no correlation between stress and PSC [18]. The discrepancies could be due to differences in tools and research procedures. However, a recent systematic review supported the view of a negative relationship between occupational stress and PSC [19].

Occupational stress negatively affects "teamwork". In hospitals, patients are cared for by several healthcare workers (doctors, nurses, clinical nutritionists, clinical psychologists, etc.). Therefore, teamwork among these staff is a necessary requirement for patient care. However, when healthcare workers are stressed at work, they often reduce or eliminate some necessary communication steps with colleagues to save time for their tasks. Some studies have shown that job stress can lead to "burnout" and reduced communication [20]. Burnout can be understood as when healthcare workers become tired, lose emotion and work spirit, affecting concentration and work quality, which can impact teamwork ability. When staff no longer communicate and cooperate effectively with colleagues, it adversely impacts the efficacy of patient care processes and maintains patient safety [20]. The difference in the "teamwork" score still exists in both the univariate and multivariate models. Generally, stress reduces 0.36 to 0.38 points in the "teamwork" domain.

Occupational stress negatively impacts the facet of "continuous learning and improvement organization". It may lead to a sense of work overload, causing employees to focus more on completing their tasks rather than self-learning or continuous improvement [21]. Consequently, as occupational stress increases, the PSC Score (PSCS) related to the domain of continuous learning and improvement organization significantly decreases. Specifically, the score decreases by 0.18 with a p-value of 0.047 in the univariate model. However, this difference is not observed in the multivariate model when adjusted for demographic characteristics of the study population. Thus, occupational stress does not alter the "continuous learning and improvement organization" factor.

Occupational stress negatively impacts "communication about errors", reducing the PSCS by 0.26 to 0.21. Occupational stress may affect healthcare workers' communication abilities in sharing error information, especially when they do not feel safe in their work environment. This impedes the timely detection and prevention of potential errors, resulting in undesirable consequences for patients [9]. A study by Zabin et al. indicated that occupational stress could affect healthcare workers' communication abilities in sharing information about errors and mistakes, particularly when they do not feel safe in their work environment [19]. This impedes the timely detection and prevention of potential errors, leading to undesired consequences for patients.

Occupational stress negatively impacts "hospital management support for patient safety hospital management support for patient safety". Many studies have shown that healthcare workers' occupational stress is associated with decreased job satisfaction, loss of focus, diminished ability to assess and resolve patient safety issues, reduced support for clinical leadership, and decreased collaboration among staff [22]. This could lead to clinical leaders failing to properly prioritize patient safety improvements, negatively impacting decision-making and actions towards improving patient safety.

Our study has some limitations as it was conducted in a specialized respiratory hospital rather than a general hospital. Therefore, some characteristics of work stress in a specialized hospital may differ from those in general hospitals, health centers, or community medical stations. Future research should consider conducting a survey in various hospitals, particularly general hospitals, diverse clinics/specialty clinics, health centers, and community medical stations. Due to research resource limitations and time constraints, we used a descriptive cross-sectional study design. We acknowledge that a cross-sectional design is not robust enough to conclude a causal relationship between occupational stress and PSCS. Therefore, we suggest future studies need to be conducted with a longitudinal or repeated measures design to clarify the causal relationship between occupational stress and PSCS.

4. Conclusion and Recommendations

Our study on 390 healthcare workers at Pham Ngoc Thach Hospital shows that 15% of healthcare workers experience mild to severe occupational stress. The average PSCS is 3.13. Occupational stress causes a decrease in PSCS. Three dimensions of PSC are affected by occupational stress: teamwork, communication about error, and hospital management support for patient safety. Hospitals should consider implementing solutions to reduce workplace stress as an important factor in promoting a PSC in healthcare. This may directly affect patient health and satisfaction.

Ethical statement

Ethics committee permission was obtained from the Ethics Committee for Biomedical Research of Pham Ngoc Thach Hospital (**Ethics Committee No: 534/PNT-EC; Date: 30.03.2023**), and institutional permission was obtained from the higher education institution where the study was conducted.

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Conflict of Interest

The authors must notify of any conflicts of interest.

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Author's Contributions

M.N.T: Conceptualization, Methodology, Formal analysis, Writing (15%)

A.T.L.D: Conceptualization, Methodology, critical review (15%)

A.T.H.L: Literature review (10%)

L.T.L: Literature review, Investigation (10%)

N.T.T.D: Literature review, Investigation (10%)

N.T.B.N: Formal analysis Investigation (10%)

V.H.N.S: Formal analysis, supervise (10%)

T.H.V: Materials and resources (10%)

X.T.T.N: Conceptualization, Methodology, Writing. (10%)
All authors read and approved the final manuscript.

References

- [1] WHO. (2023, Sep. 09) ‘*Global Patient Safety Action Plan 2021-2030*’. <https://www.who.int/teams/integrated-health-services/patient-safety/policy/global-patient-safety-action-plan>.
- [2] Leape. L, *Making Healthcare Safe: The Story of the Patient Safety Movement*. Cham: Springer International Publishing, 2021.
- [3] Abusalem. S , Polivka.B , Coty. B, Crawford.T, and et al, “The Relationship Between Culture of Safety and Rate of Adverse Events in Long-Term Care Facilities”, *Journal of Patient Safety*, 17(4):p 299-304, 2021.
- [4] Kang. R , Kunkel. S, Columbo. J, Goodney. P, and Wong. S , “Association of Hospital Employee Satisfaction with Patient Safety and Satisfaction within Veterans Affairs Medical Centers”, *American Journal of Medicine.*, 132 (4),530-534, 2019.
- [5] Afshar. P, Karbasi. B, and Moghadam. M, “The relationship between patient safety culture with patient satisfaction and hospital performance in Shafa Hospital of Kerman in 2020”, *Journal of Education and Health Promotion*, 10(1), 455, 2021.
- [6] Asefzadeh. S, Kalhor. R, and Tir. M, “Patient safety culture and job stress among nurses in Mazandaran, Iran”, *Electronic Physician Journal*, 9(12), 6010–6016, 2017.
- [7] Zhang. M, Murphy. B, Cabanilla. A, and Yidi. C, “Physical relaxation for occupational stress in healthcare workers: A systematic review and network meta-analysis of randomized controlled trials”, *Journal of Occupational Health*, 63(1), 12243-12251, 2021.
- [8] Salari. N et al., “The prevalence of stress, anxiety and depression within front-line healthcare workers caring for COVID-19 patients: a systematic review and meta-regression”, *Human Resources for Health*, 18(1), 100-109, 2020.
- [9] Poursadeqiyan. M et al., “Investigation of the relationship between the safety climate and occupational fatigue among the nurses of educational hospitals in Zabol”, *Journal of Education and Health Promotion*, 9(1), 238-248, 2020.
- [10] Le. M, Tran. D, Holton. S, Nguyen. H, Wolfe. R, and Fisher. J, “Reliability, convergent validity and factor structure of the DASS-21 in a sample of Vietnamese adolescents”, *PloS One*, 12(7), 180557, 2017.
- [11] Thach. T, Tuan. T, and Fisher. J, “Validation of the depression anxiety stress scales (DASS) 21 as a screening instrument for depression and anxiety in a rural community-based cohort of northern Vietnamese women”, *BMC Psychiatry*, 13, 24-30, 2013.
- [12] AHQR. (2023, Sep.09) “*Hospital Survey on Patient Safety Culture*” [Online]. Available: <https://www.ahrq.gov/sops/surveys/hospital/index.html>.
- [13] Wu. Y, Hua. W, Zhu. D, Onishi. R, Yang. Y, and Hasegawa. T, “Cross-cultural adaptation and validation of the Chinese version of the revised surveys on patient safety culture™ (SOPS®) hospital survey 2.0”, *BMC Nursing*, 21(1),369-382, 2022.

- [14] Cuc. C, Phuc. Ng, Xuan. Ng, Nguyen V, Van. V, and Quan. Ng, “Tình trạng căng thẳng của nhân viên y tế tại một số bệnh viện điều trị bệnh nhân COVID-19 tại Thành phố Hồ Chí Minh năm 2021”, *Tạp Chí Y Học Việt Nam*, 508(2), 201-218, 2021.
- [15] Cam. B and Ngo. N, “Căng thẳng ở nhân viên y tế tại trung tâm y tế và trạm y tế phường/xã ở Thành phố Hồ Chí Minh năm 2022 và các yếu tố nghề nghiệp liên quan”, *Tạp Chí Nghiên Cứu Y Học*, 160(12V2), 120-134, 2022.
- [16] Phannavong. O and Xuan. L, “Căng thẳng nghề nghiệp của nhân viên y tế tại bệnh viện tỉnh Xiêng - Khoảng, Lào, năm 2020”, *Tạp Chí Y Học Việt Nam*, 501(2), 89-99, 2021.
- [17] Yalçın. GA and Aksoy. N, “The Relationship Between Organizational Stress Levels and Patient Safety Attitudes in Operating Room Staff”, *Journal of PeriAnesthesia Nursing*, 36(5), 499–506, 2021.
- [18] Keykaleh. M.S, Safarpour. H, Yousefian. S, Faghisolouk. F, Mohammadi. E, and Ghomian. Z, “The Relationship between Nurse’s Job Stress and Patient Safety”, *Open Access Macedonian Journal of Medical Sciences*, 6(11), 2228–2232, 2018.
- [19] Zabin. L, A. Zaitoun. R, Sweity. E, and Tantillo. L, “The relationship between job stress and patient safety culture among nurses: a systematic review”, *BMC Nursing*, 22 (1), 39-53, 2023.
- [20] Aouicha. W et al., “Evaluation of the Impact of Intraoperative Distractions on Teamwork, Stress, and Workload”, *Journal of Surgical Research*, 259(1), 465–472, 2021.
- [21] Søvold. L et al., “Prioritizing the Mental Health and Well-Being of Healthcare Workers: An Urgent Global Public Health Priority”, *Frontiers in Public Health*, 9(1), 679397, 2021.
- [22] Said. R. M and El-Shafei. D. A, “Occupational stress, job satisfaction, and intent to leave: nurses working on front lines during COVID-19 pandemic in Zagazig City, Egypt”, *Environmental Science and Pollution Research*, 28(7), 8791