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# Prevalence and Job Behavioral Risk factors cause Low Back Pain among Nursing staff in Tertiary Care Hospital

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#### Abstract

This study aimed to investigate the prevalence of and factors contributing to lower back pain among nursing staff in a tertiary care hospital. The sample group included 169 individuals, with 91.71% female and 8.28% male. Most participants were between the ages of 20-30 years and childless, working between 41-56 hours per week with a work schedule between 8:00 AM and 4:00 PM. Most of the sample group fell into the normal BMI range and reported receiving 5-6 hours of rest per day. However, the study found that more than half of the respondents did not exercise, and most reported being alcohol-free. The study identified eight operational behaviors that cause lower back pain: material lifting equipment, sitting, and working, stress from work, lifting or transporting patients in bed, lifting patients up and down from the bed, material movement, performing unnatural gestures while performing tasks, and standing while performing tasks. The results of the study show that most participants (58.03 %) were between the ages of 20-30 years. The next largest age group was the 30-40 age range (45.99%). Most of the sample group did not have children, and 53.25% of them worked between 41-56 hours per week, with a schedule between 8:00 AM and 4:00 PM. The highest percentage (76.92 %) belonged to this category. Additionally, 73.60% of the sample group had an average Body Mass Index (BMI), and over half of the respondents reported receiving 5-6 hours of rest per day. However, the study found that 55.03% did not exercise, and 91.72% reported being alcohol-free. The study also identified eight factors that cause lower back pain from operational behavior: material lifting equipment, sitting, and working, stress from work, lifting or transporting patients in bed, lifting patients up and down from the bed, material movement, performing unnatural gestures while performing tasks, and standing while performing tasks. The study found that the prevalence rate of lower back pain among nursing staff was 65.09%. The movement postures that resulted in lower back pain in the sample group were identified as follows: lifting and moving patients, 44.38%; stooping, 27.81%; lifting equipment, 15.98%; torso distortion, 15.38%; reaching across the bed, 9.47%; and pushing and pushing a nursing cart, 3.55%. Based on the data collected in this study, it can be concluded that lower back pain in nursing staff is primarily influenced by work behavior factors, including improper working posture, as well as psychological factors arising from work pressure and stress. To address this issue, hospitals should implement ergonomic management, provide training, arrange proper workspaces, and provide supportive equipment to help reduce the workload for nursing staff and minimize the impact of work-related lower back pain.

Keywords: Nursing Staff, Low Back Pain, Work Behavior.

### **Derivation of the Problems**

Disorders of the musculoskeletal system due to work, can be found in various of occupations, both occupations that require direct force such as, Production Industries, Construction Industries and

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Agricultural including, services career such as, Medical and public health work, Transportation, Service in various offices, as well as educational work etc. The nursing profession is one of the medical and public health service groups that the risk of developing in disorders of the musculoskeletal system is quite high (Keawnual et al., 2017). The study reports that, overseas nursing practitioners have a high prevalence rate of musculoskeletal disease at 73-92% (Deepak et al., 2013; Aftab et al., 2017; Ribeiro et al., 2017), for nursing practitioners in Thailand, the prevalence rate of musculoskeletal disease is at 73.3% (Luemongko& Chaiklieng, 2015) when classified by the level of health services found that those who working in primary and secondary health care facilities, the prevalence rate of musculoskeletal disease is as high at 89.1% (Deepak et al., 2013; Ribeiro et al., 2017) followed by the tertiary level, the prevalence rate of musculoskeletal disease at 86% (Aftab et al., 2017) and when considering the level of departments or divisions in health facilities, it was found that nurses working in the intensive care unit had the highest prevalence rate of musculoskeletal disease at 84.2% (Ovayolu etal., 2014) followed by the emergency department, accounting for 73.3% (Luemongko& Chaiklieng, 2015) and operating room department 66% (Nützi et al, 2015) respectively. The lower back was the location with the most symptoms of musculoskeletal disease (69.6-73%), followed by neck (34.5-53.5%) shoulder (20.9-49.5%) knee (26.4-45%) and hand (18.6-43%), respectively (Aftab et al., 2017; Apexa& Daxa, 2016). Lower back pain is a musculoskeletal disease that should be mostly prevented and treated, which is severe from general back pain with stiffness of the back muscles, stiff back, as well as pain radiating down the leg caused by herniated discs and the narrowing of the bone cavity to the point that it can cause disability (The Rheumatism Society of Thailand, 2010; Chou, 2011). Causes of lower back pain can be caused by both personal factors such as gender, age, body mass index, history of illness, number of children, part-time work apart from regular work (Luemongko& Chaiklieng, 2015; Apexa et al., Sopajareeva et al., 2013; Eriksen et al., 2004; Trinkoff et al., 2003; Trinkoff et al., 2003; D'Agostin et al., 2016; Abedini et al., 2013; Choobinehal., 2006; Arvidsson et al., 2016; Daraiseh et al., 2010; Shieh et al., 2016), working condition factors include shift work, work duration, work structure which make the body incorrect posture, lifting and flexing the patient, transferring the patient (pull/push) (Luemongko& Chaiklieng, 2015; Eriksen et al., 2004; D'Agostin et al., 2016; Shieh et al., 2016; Lipscomb et al., 2004; June& Cho, 2011) and psychosocial factors include psychosocial needs, perceived physical needs, stress and work pressure (Luemongko& Chaiklieng, 2015; Apexa& Daxa, 2016; Eriksen et al., 2004; Trinkoff et al., 2003; Alexopoulos, 2006;). Nursing staff is an important, in-demand and scarce profession (Omar et al., 2018) in the dimension of treatment and rehabilitation of patients, in which the health team cannot be without the nursing profession. Due to the shortage of professions, each nurse has to bear the burden of increasing workload, excessive physical exertion, working longer hours as they have to take care of patients (Sukadarin et al., 2016) which needs to be done quickly, resulting in injury or illness from work as a result, it was found that nursing is one of the top professions at risk for musculoskeletal disorders, which is the same syndrome as low back pain (Reed et al., 2014), the prevalence of disorders of the lower back, neck and shoulder muscles was found to be the highest rate (Nur et al., 2016; Yang et al., 2019), at the same time, nursing staff must take care of themselves in terms of their health, to reduce the risk of developing various diseases, especially lower back pain from work which will make the nursing profession work more efficiently. The researcher was therefore interested in studying the prevalence and factors causing low back pain from the work behaviors of nursing staff, to use the obtained data to develop predictive factors for the progression of occupational low back pain among nursing staff and develop a defensive behavior modification model continuously progression of low back pain from nursing staff.

### **Research Methodology**

1. Population and Sample Group.

1.1) The population used in this study was 559 of nursing staff in tertiary care hospital in Nakhon Nayok Province, both males and females, aged between

20-60 years.

1.2) The sample used in the research, the whole sample was nursing staff, including nurses, nursing assistants, and patient support staff working in tertiary care hospital in Nakhon Nayok Province, both males and females, aged between 20-60 years, totaling 169 people.

1.3) Determine size, sample size calculated using G\*Power version 3.1.9.7,

Effect size: d was set to 0.8 (Apexa& Daxa, 2016), Power of test;  $\beta$  was at 0.8,

and Probable Error;  $\alpha$  was at 0.05, get the sample size as 169 people.

1.4) Sample Group Selection,

**Inclusion Criteria**: Volunteers who apply for the research must be nursing staff such as nurses, nursing assistants and patient support staff, working at university hospitals in Nakhon Nayok Province, both males and females, aged between 20-60 years, with a health recorded of low back pain level at less score of 1-3 or moderate pain level with a score of 4-6 and consent to participate in the research.

**Exclusion criteria**: Volunteers have been injured or had an accident in the muscles or bones, have had osteomyelitis or narrowed bone cavity, have had lower back pain with severe pain level at scores 7-10, and are unable to carry out daily activities with caregivers needed, taking pain-relieving medications at potency, as well as surgical therapy and not during the retention period.

2. variable.

2.1) The initial variable was the operational behavior of nursing staff.

2.2) The dependent variable was the severity of low back pain in the nursing staff group.

3. Data analysis.

3.1) To determine the prevalence of lower back pain from the work behavior of nursing staff. Descriptive statistics were used as: percentage, mean, standard deviation. To describe the characteristics of nursing staff.

3.2) Determine the risk factors that cause lower back pain in nursing staff, by analyzing single variables one by one with statistics Ordinal Logistic Regression, analyzed multivariate correlation with multiple logistic regression statistics, presented Adjusted odds ratio (ORadj) and 95% CI at the significance level of 0.05.

# **Research Conducted**

1. Procedure to conduct the research.

1.1 Create research tools by researching textbooks, academic papers, conceptual theory, relevant researches and additional research to be used as a guideline for building tools. Questionnaire quality examine by the accuracy of the tool (validity), used content validity, the questionnaire was examined by pursuits opinions from experts in nursing, physiotherapy, behavioral sciences, physical education and a total of 5 people in health occupational section with tool reliability (reliability). The causal factors questionnaire was conducted by testing 30 registered nurses, answering the questionnaire and determining the accuracy by using the Cronbach's alpha Coefficient found at .925.

1.2 Select samples group according to selection criteria, have the sample group to complete the questionnaires on behavior, self-defense, and lower back pain from the work of the nursing staff.

1.3 Research limitations, responses to questionnaires of the sample are voluntary and the needs of the samples, with the researcher clarifying to answer as accurately or as close to the truth as possible.

1.4 Tools used in conducting research were questionnaires on performance behavior, self-protection and low back pain from the work of nursing staff.

### Results

1. General characteristics of the study participants.

This study involved a sample group of both male and female nursing staff, the total number of samples aged between 20-60 years was 169 people, 91.71% were females and 8.28% were males and the largest number of samples were 58.03%, aged between 20-30 years, followed by the age group between 31-40 years old with 45.99%, most of the sample group did not have children, most of which 53.25% had to work 41-56 hours/week and worked during 8:00 a.m. - 4:00 p.m. with highest percentage at 76.92 (Table 1)

Table 1. General characteristics of the study participants

Variables	n	%	
Sex			
Meal	14	8.28	
Female	155	91.71	
Age (year)			
20 - 30	78	46.15	
31 - 40	66	39.05	
$\geq 40$	25	14.79	
Mean		32.4	
S.D.	(	6.90	
Status			
Single	96	56.80	
Married	27	42.02	
Divorced	1	0.59	
Widowed	1	0.59	
Child			
$\geq$ 3	7	4.14	
2	27	15.97	
1	32	18.93	
None	103	60.94	
Department			
Obstetrics and Gynecology	20	11.83	
Surgery	40	23.66	
Orthopedics	16	9.46	
Medicine	50	29.58	
Pediatrics	16	9.46	
Otolaryngology Nasal Larynxology	13	7.69	
Psychiatry	14	8.28	
Working age (years)			
1-3	55	32.54	
4-6	40	23.68	
7-10	37	21.89	
> 10	37	21.89	
Working time (hr./week)			

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<u>≤40</u>	50	29.58
41-56	90	53.25
57-72	7	4.14
> 72	22	13.02
Working period		
08.00 a.m 4:00 p.m.	130	76.92
4:00 p.m 0.00 (midnight)	16	9.47
0.00 (midnight) - 08.00 a.m.	23	13.61

2. Health Behavior.

According to the study, 73.60% of the samples had a BMI within the normal range and 51.48% received 5-6 hours of rest, 55.03% of the samples did not exercise and 91.72% did not drink alcohol (Table 2).

Table 2. Health Benavior.		
Variables	n	%
BMI (Kg/m <sup>2</sup> )		
≤ 18.59	15	8.87
18.6 - 24.99	103	73.60
25.0 - 29.99	37	28.42
≥ 30	14	8.28
Sleep/day		
$\leq 4$	44	26.04
5-6	87	51.48
7-8	38	22.48
$\leq 4$	44	26.04
Exercise		
No	93	55.03
Yes	76	44.97
Alcohol Consumption		
No	155	91.72
Yes	14	8.28

#### Table 2. Health Behavior.

3. Factors from work behaviors that cause lower back pain.

The data from the research study found that the factors that cause lower back pain from work behavior can be divided into 8 aspects as follows:

- 1) In terms of lifting materials, most of the samples, 40.9% had the behavior of picking things up from far away.
- 2) In terms of working sitting, most of the samples had the behavior of working on a chair, 71.82%.
- 3) Work stress, most of them, 76.36% had a hasty working behavior.
- 4) In terms of lifting or moving patients on the bed, it was found that, most of the samples had behaviors of lifting the patient from the bed or lifting the patient on the bed, while the lifter's body is in an unbalanced manner, 47.27%.
- 5) Lifting the patient up and down from the bed, where most of the samples, 22.73%, had the behavior of lifting the patient up and down from the bed or lifting the patient on the bed without using lifting or moving support equipment.
- 6) In terms of moving materials and equipment, most of the samples had the behavior of maintaining nursing cart in good condition and ready to use at 40.00%.

- 7) In terms of unnatural postures while working, most of the samples had procedural behaviors that required bending of the body or bending their necks in a sitting position for a long time 69.09% and,
- 8) Standing while working, most of the samples have behavior standing working all the time 39.09% (Table 3).

Variables	Always	Sometime	Nope
Lifting equipment			
1. Picking up Equipment from far away.	40.9	51.82	7.28
2. Equipment picking at high altitudes overhead.	34.55	58.18	7.27
3. Lifting Equipment from floor level while sitting at work.	22.72	58.18	19.1
4. Lifting equipment above the shoulder.	10.9	69.1	20
Sitting and working			
5. Sitting and working on a chair.	71.82	26.36	1.82
6. Sitting and working on a table and chair.	63.64	30.91	5.45
7. Multiple operators using the same working desk.	61.82	25.45	12.73
8. Placing legs and feet while sitting at work.	50	40	10
Work stress			
9. Working with a rush.	76.36	16.36	7.28
10. The workload on each shift exceeds the available capacity.	57.27	26.36	16.37
11. In the workplace there is pressure from colleagues or superiors.	30.91	50	19.09
Lifting or moving a patient in bed			
12. Lifting the patient up and down from the bed or lifting the patient on the bed, while the lifter's body is in an unbalanced manner.	47.27	43.64	9.09
13. Lifting patients far from the lifter.	33.63	49.09	17.27
14. Lifting or transporting heavy patients.	29.09	63.64	7.27
15. Lifting or moving the patient's position frequently.	13.64	40.91	45.45
Lifting patients up and down from bed			
16. Lifting the patient up and down from the bed or lifting the patient on the bed without lifting or moving support equipment.	22.73	46.36	30.91
17. Lifting the patient up and down from the bed or lifting the patient on the bed alone.	12.73	54.54	32.73
Equipment material movement			
18. Maintenance of nursing cart to be in a good condition and ready for use.	40.00	42.73	17.27
Making unnatural gestures while working			
19. The procedure requires a bend of the torso or a neck bend in a sitting position for a long time.	69.09	20.91	10
20. Lifting stained cloth bags or garbage bags.	13.63	53.64	32.73
Standing while working			
21. Standing while working all the time.	39.09	48.18	12.73
22. Standing while working too long time.	32.73	50.91	16.36

Table 3. Factors from work behaviors that cause lower back pain.

4. Low Back Pain Level and Physical Movement.

According to the study, the prevalence rate of lower back pain in nursing staff was 65.09% and found that, there were postures that resulted in lower back pain in the following samples: Patient lifting and

moving 44.38%, Bending over 27.81%, Lifting equipment 15.98%, Torsion twisting 15.38%, Reaching for things across the bed 9.47%, and Shoving or pushing the cart 3.55% (Table 4).

Low Back Pain Level	n	%
No pain	59	34.91
Less pain	57	33.73
Moderate pain	42	24.85
Severe pain	11	6.51
Physical Movement factor		
Patient lifting and moving	75	44.38
Bending over	47	27.81
Lifting equipment	27	15.98
Torsion twisting	26	15.38
Reaching for things across the bed	16	9.47
Shoving or pushing the nursing cart	6	3.55

# **Discussion and Conclusion**

This research study conducted a survey on the prevalence, factors, and posture causing lower back pain among university hospital nursing staff. As for the prevalence of lower back pain among the samples, the prevalence rate of lower back pain in nursing staff was 65.09%, this is considered a relatively high level, in line with the research of Yothikul& Prabpai (2008), it was found that registered nurses had a prevalence of low back pain was 54.8% (Ping& Fuye, 1974), registered nurses were reported to have a prevalence of lower back pain as 62.7%, the prevalence of lower back pain among registered nurses in India is reported at 69.6% (Apexa& Daxa, 2016) in Pakistan 65.1% (Rasheed et al., 2017) and in Tunisia found at 58.1% (Boughattas & et al., 2017). As it has been found, nursing staff have a relatively high prevalence of lower back pain, possibly due to work habits that cause daily activity of the body to cause lower back pain, according to the data from this study showed that, behavioral factors that cause lower back pain in the samples include the 8 aspects which are:

1) Material lifting equipment, 2) Sitting and working, 3) Work-related stress, 4) Lifting or transporting patients in bed, 5) Lifting patients up and down from the bed, 6) Material movement equipment, 7) Performing unnatural gestures while completing tasks, 8) Standing while working: The operational postures that cause the most lower back pain consist of 6 postures which are : 1) Patient transport lifting, 2) Bending over, 3) Material lifting, 4) Torsion twisting, 5) Reaching across the bed, and 6) Shoving or pulsing the cart.

Hospitals play a critical role in the healthcare industry; however, they are also known to be high-stress environments that can take a toll on healthcare workers. Among the many challenges faced by hospital staff, low back pain is a prevalent issue that affects the well-being and productivity of nursing staff. To address this problem, hospitals must prioritize implementing ergonomic management strategies and providing supportive equipment. First, hospitals should ensure that their nursing staff undergo proper ergonomic training. This training should focus on teaching healthcare workers how to maintain correct body posture and use proper lifting techniques when moving patients or heavy objects. Additionally, hospitals should encourage regular breaks and exercises that target the muscles supporting the lower back, as this can help alleviate strain and prevent injury.

In terms of supportive equipment, hospitals should invest in ergonomic tools and devices specifically

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designed for healthcare professionals. Adjustable height beds, chairs, and workstations can help ensure that nursing staff maintain proper posture and minimize the risk of straining their lower back. Moreover, hospitals should provide lifting aids, such as mechanical hoists or transfer belts, to assist healthcare workers in safely moving patients without placing excessive stress on their backs. The prevalence of low back pain among nursing staff in tertiary care hospitals is a serious concern that requires proactive measures. By implementing ergonomic management strategies and providing supportive equipment, hospitals can create safer and more comfortable work environments for their nursing staff, ultimately promoting better patient care and staff well-being.

Musculoskeletal diseases are a prevalent health issue among nursing staff in tertiary care hospitals. While work behavior and psychological factors play a significant role, other vital factors contribute to its prevalence. One contributing factor is the physical demands of the job. Nursing staff are often required to lift and transfer heavy patients, adopt awkward postures during procedures, and spend extended periods standing or walking. These repetitive movements and excessive physical exertion can lead to musculoskeletal disorders, particularly those of the lower back. Inadequate ergonomics also plays a role in the high prevalence of musculoskeletal diseases among nursing staff. Workstations that are not designed to support proper body mechanics can put unnecessary strain on muscles and joints, leading to the development of chronic pain and injuries. Additionally, the use of outdated equipment or the lack of necessary assistive devices can further exacerbate the physical strain experienced by the nursing staff.

Musculoskeletal diseases among nursing staff can be influenced by factors such as age, sex, and overall physical fitness. Aging is associated with a natural decline in musculoskeletal health and resilience. Female nurses, who make up a significant portion of the workforce, may face additional challenges owing to anatomical and hormonal differences. Moreover, poor physical fitness or underlying health conditions can weaken the body's ability to handle the job's physical demands, thereby increasing the risk of musculoskeletal disorders. The prevalence of musculoskeletal disease among nursing staff in tertiary care hospitals can be attributed to various factors, including the physical demands of the job, inadequate ergonomics, age, sex, and overall physical fitness. Addressing these factors through the implementation of proper workplace practices, ergonomic interventions, and targeted physical health programs can reduce the burden of musculoskeletal disorders and enhance the overall well-being of the nursing staff.

The results of this study align with a previous research report that investigated the risk factors contributing to lower back pain among registered nurses. The report indicated that working with a computer increased the risk of lower back pain by 2.08 times. The risk of lower back pain was found to be 2.74 times higher when using the pull/push method for patient transport (Luemongko& Chaiklieng, 2015). Various studies focusing on different occupational populations have consistently found that a significant proportion of individuals with back pain attribute it to factors related to mobility within their work environment. Furthermore, research indicates that approximately 80% of the world's population has or has experienced lower back pain (Urits et al., 2019). Individuals with lower back muscle pain typically experience discomfort ranging from beneath the ribs (12th rib) to the lower part of the buttocks (Furlan et al., 2002; Posadzki et al., 2011). Most cases of lower back pain are attributed to work behavior. The collection of pain and fatigue resulting from work-related activities is commonly referred to as Office Syndrome. This condition can be caused by various factors, including prolonged sitting, lifting heavy objects, and frequent twisting or turning of the body. Prolonged sitting can specifically affect the Hip Flexor muscles, with the iliopsoas muscles being especially susceptible. The muscle responsible for flexing the hip forward, the iliopsoas muscle, is known to continuously contract. It is common for individuals who sit for extended periods or engage in activities like running to experience high tension in this muscle (Anderson, 2016). This increased tension can make the opposing muscle less active and weaker, a phenomenon known as reciprocal inhibition. As a result, a muscle imbalance occurs. Indeed,

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the increased tension in the iliopsoas muscle can contribute to lower back pain. To alleviate lower back pain caused by this condition, engaging in exercises and stretches that target this muscle group is often recommended. Additionally, taking breaks from prolonged sitting to reduce muscle tension may also be beneficial (Gupta et al., 2015). In addition to sitting and working, the study also identified specific job postures that can lead to back pain due to poor work habits. These findings align with previous research reports that have highlighted the negative impact of unfavorable postures, repetitive movements, sustained positions, and engaging in tasks that involve bending over, twisting, and lifting heavy objects. These factors have been consistently identified as risk factors contributing to the development of lower back pain (Wami et al., 2019). In addition to factors caused by work behavior, lower back pain can be caused by other aspects that are not related to the back muscles, such as nerve compression and bone degeneration. Nutritional status, excessive body weight or even psychological factors such as having to work frequently overtime or having to do hectic work play an important role that contributes to lower back pain (Zamri et al., 2017, Arvidsson et al., 2016). In this study, the psychological factors that cause lower back pain in the sample were stress factors from rushing to work and working excessively. For the treatment, lower back pain can be treated and treated with regular exercise with appropriate intensity. Because exercise helps reduce obesity. Help stretch the muscles, which is a major cause of lower back pain (Dianat et al., 2018; Noll et al.; 2016; Alnojeidi et al.; 2017, Owen et al., 2020, Rugbumrung et al., 2022). Movement of objects and equipment in appropriate posture and conditions, etc. In conclusion, the lower back pain in nursing staff is mainly caused by factors in work behavior, caused by improper working postures, as well as psychological factors resulting from work pressure and stress.

# **Recommendations and Scope for Research**

Lower back pain among nursing staff in tertiary care hospitals is a prevalent issue that can significantly impact their overall health and ability to provide quality patient care. To mitigate this problem, specific ergonomic management strategies and supportive equipment can be implemented to reduce the workload on nursing staff and minimize work-related impacts, such as the incorporation of height-adjustable workstations. These workstations allow nurses to switch between sitting and standing positions while performing various tasks, reducing strain on the lower back. Additionally, adjustable chairs with lumbar support can provide the necessary comfort and alignment of the spine, thereby diminishing the risk of low back pain.

Furthermore, supportive equipment such as mechanical lift-assist devices can significantly decrease the physical strain involved in patient-handling tasks. By using these devices, nurses can avoid excessive bending, lifting, and twisting, which are known risk factors for low back pain. Similarly, the provision of anti-fatigue mats can alleviate pressure on the feet and lower limbs, providing relief during long hours of standing and walking. The prevalence of low back pain among nursing staff in tertiary care hospitals can be addressed by implementing specific ergonomic management strategies and supportive equipment. By incorporating height-adjustable workstations, adjustable chairs with lumbar support, mechanical lift-assist devices, and anti-fatigue mats, nurses' workload can be reduced, minimizing the impact of work-related factors on their well-being. This, in turn, helps ensure that nurses provide optimal care while maintaining their health and comfort.

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