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The Correlation Between Workload And Ergonomic Position With The Incidence Of Low Back Pain In Nurses At Pringsewu Regional Public Hospital

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ABSTRACT

Background & Objective: To determine the "Relationship Correlation Workload And Ergonomic Position With The Incidence Of Low Back Pain In Nurses At Pringsewu Regional Public Hospital". **Method:** The study used a quantitative method with a descriptive correlational design and a cross-sectional approach. The study population was all nurses in the inpatient ward. A sample of 62 respondents who met the inclusion and exclusion criteria were selected using the Proportionate Stratified Random Sampling technique. The research instruments used were the Workload questionnaire, the Ergonomic Position questionnaire, and the Quebec Back Pain Disability Scale (QBPDS). Data analysis was performed using the Gamma test. **Result:** The results of the study showed a significant relationship between workload and the incidence of low back pain (p = 0.001). There was also a significant relationship between ergonomic position and the incidence of low back pain (p = 0.001). **Conclusion:** It was concluded that workload and ergonomic position can influence the incidence of low back pain in nurses.

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Introduction

Hospitals play an important role in providing public health services, where patient satisfaction is strongly influenced by the quality of care, particularly nursing services (Hanoum *et al*., 2022). Nursing services have a strategic role in improving the quality of hospital services; however, nurses' work activities that involve lifting, bending, and twisting the body pose a risk of causing low back pain (LBP) (Astuti, 2022).

Low back pain is a condition characterized by pain in the lower back area that can lead to prolonged discomfort and even disability if not properly managed, especially among nurses (Silalahi *et al.*, 2022). LBP is a global health problem with a high prevalence, including in Indonesia and Lampung Province, indicating a high incidence of lower back pain in the community (Riset Dinas Kesehatan, 2018).

The heavy and diverse tasks performed by nurses, such as transferring patients and carrying out collaborative procedures, increase the risk of LBP, particularly due to the lack of proper implementation of ergonomic principles (Sulistyaningtyas, 2022). Ergonomics focuses on adjusting work demands to human capabilities; however, nurses frequently adopt non-ergonomic working postures due to workplace environmental conditions and differences in body height (Maulina *et al*., 2023). Unnatural working postures and excessive physical exertion can cause fatigue and damage to body tissues, which may ultimately result in low back pain (Sulistyaningtyas, 2022).

Studies indicate that most nurses have non-ergonomic working postures and are at high risk of experiencing LBP, which is further exacerbated by prolonged work demands (Royani *et al*., 2025). Nurses workload encompasses all nursing care activities and is influenced by various factors such as the number of patients, work systems, available facilities, and staff shortages (Cesilia & Kosasih, 2024). Various studies have demonstrated a significant relationship between nurses' workload and complaints of low back pain, where moderate to heavy workloads increase the risk of LBP (Cesilia & Kosasih, 2024).

Preliminary data at Pringsewu Regional General Hospital indicate cases of LBP among nurses associated with non-ergonomic working postures and high workloads across several inpatient units. Based on these issues, the researcher is interested in examining the relationship between workload and ergonomic posture with the incidence of low back pain among nurses at Pringsewu Regional General Hospital.

Objective

This study aims to determine the correlation between workload and ergonomic position with the incidence of Low Back Pain at Pringsewu Regional Public Hospital.

Method

This study is a quantitative descriptive correlational study with a cross-sectional approach, which aims to determine the relationship between workload and ergonomic position with the incidence of Low Back Pain at Pringsewu Regional General Hospital. The sampling technique used is Proportionate Stratified Random Side, which is a sampling technique carried out when the population has members that are not homogeneous and stratified proportionally and carried out randomly, the respondents of this study who meet the inclusion and exclusion criteria. Data analysis in this study used the Gamma statistical test. Data collection was carried out using the Workload questionnaire, Ergonomic Position questionnaire, and The Quebec Back Pain Disability Scale (QBPDS). This study was conducted on October 22 to 28, 2025 at Pringsewu Regional Public Hospital.

Results

Univariate Analysis

TABLE 1. Respondent Characteristics

Variabel	N	%
Age		
22-34	25	40.3
35-44	26	41.9
45-55	11	17.7
Gender		
Male	20	32.2
Female	42	67.7
Education		
Diploma in Nursing	23	37.1
Bachelor's Degree in Nursing	39	62.9
Working Hours		
< 8 *Hours*	62	100.0
≥ 8 *Hours*	0	0
Work Experience		
< 5 Years	11	17.7
≥ 5 Years	51	82.3
Employee Status		
PNS	42	67.7
PPPK	20	32.3

Based on Table 1, In terms of age, respondents were divided into 3 groups; 25 respondents (41.9%) were in the 22-34 age group, 26 respondents (40.3%) were in the 35-44 age group, and 11 respondents (17.7%) were in the 45-55 age group. In terms of gender, the majority of respondents were female, with 42 respondents (67.7%), while 20 respondents were male (32.2%). In terms of education, 23 respondents (37.1%) had a Diploma III in Nursing and 39 respondents (62.9%) had a Bachelor's degree in Nursing. All respondents, namely 62 respondents (100%) had a working period of <8 hours. In terms of work experience, 11 respondents (17.7%) had work experience of <5 years and 51 respondents (82.3%). In the employee status category, it is divided into 3 categories, in the PNS category there are 42 respondents (67.7%), the PPPK category has 20 respondents (32.3%), and there are no respondents with honorary employee status.

TABLE 2. Distribution of Workload on Nurses at Pringsewu Regional Public Hospital

Workload	N	%
Heavy Workload	32	51.6
Medium Workload	18	29.0
Light Workload	12	19.4
Total	**62**	**100.0**

Based on Table 2, the majority of respondents' workloads were heavy, amounting to 32 respondents (51.6%), while those with moderate workloads were 18 respondents (29.0%), and those with light workloads were 12 respondents (19.4%).

TABLE 3. Distribution of Ergonomic Positions of Nurses at Pringsewu Regional Public Hospital

Ergonomic position	N	%
Not Ergonomic	39	62.9
Ergonomic	23	37.1
Total	**62**	**100.0**

Based on Table 3, the ergonomic position of the respondents was mostly not ergonomic with a total of 39 respondents (62.9%) and respondents with an ergonomic position numbered 23 respondents (37.1%).

TABLE 4. Distribution of Low Back Pain in Nurses at Pringsewu Regional Public Hospital

Low Back Pain	N	%
Severe Low Back Pain	10	16.1
Low Back Pain Moderate	33	53.2
Mild Low Back Pain	19	30.6
Total	**62**	**100.0**

Based on Table 4, most respondents experienced moderate low back pain, with a total of 33 respondents (53.2%). Meanwhile, 10 respondents (16.1%) experienced severe low back pain and 19 respondents (30.6%) experienced mild low back pain

TABLE 5. The Correlation Between Workload and the Incidence of Low Back Pain in Nurses at Pringsewu Regional Public Hospital

Workload	*Low Back Pain*						Total	
	Heavy		Medium		Light			
	N	%	N	%	N	%	N	%
Heavy	10	28,6	22	62,9	3	8,6	**35**	**100%**
Medium	0	0,0	10	67,7	5	33,3	**15**	
Light	0	0,0	1	8,3	11	91,7	**12**	
Total	**10**	**16,1**	**33**	**53,2**	**19**	**30,6**	**62**	
P-Value	**0,001**							
Correlation Value	**0,901**							

Based on Table 5, respondents with a heavy workload mostly experienced moderate low back pain, namely 22 respondents (62.9%), followed by 10 respondents (31.3%) experiencing severe low back pain, and 3 respondents (8.6%) experiencing mild low back pain. Among respondents with a moderate workload, 10 respondents (67.7%) experienced moderate low back pain, 5 respondents (33.3%) experienced mild low back pain, and none experienced severe low back pain. Meanwhile, among respondents with a light workload, 11 respondents (91.7%) experienced mild low back pain, 1 respondent (8.3%) experienced moderate low back pain, and none experienced severe low back pain.

The results of the statistical test using the Gamma test showed a p-value of 0.001 (<0.05), thus H1 was accepted and H0 was rejected. Furthermore, the Gamma correlation coefficient was 0.901, indicating a positive relationship with a very strong relationship strength. The direction of the positive relationship means that the heavier the respondent's workload, the more severe the low back pain they experienced. Thus, it can be concluded that there is a significant and meaningful relationship between

workload and the incidence of low back pain in nurses at Pringsewu Regional General Hospital.

TABLE 6. The Correlation Between Ergonomic Position and the Incidence of Low Back Pain in Nurses at Pringsewu Regional Public Hospital

Posisi ergonomi	***Low Back Pain***						**Total**	
	Berat		**Sedang**		**Ringan**			
	N	**%**	**N**	**%**	**N**	**%**	**N**	**%**
Tidak Ergonomi	10	30,3	21	63,6	2	6,1	**39**	**100%**
Ergonomi	0	0,0	12	41,4	17	58,6	**23**	
Total	**10**	**16,1**	**33**	**53,2**	**19**	**30,6**	**62**	
P-Value	**0,001**							
Nilai Korelasi	**0,928**							

Based on Table 6, the results showed that respondents in non-ergonomic positions mostly experienced moderate low back pain (21 respondents (53.8%). Furthermore, 10 respondents (25.6%) experienced severe low back pain, and 8 respondents (20.5%) experienced mild low back pain. Among respondents in ergonomic positions, 12 respondents (52.2%) experienced moderate low back pain, 11 respondents (47.8%) experienced mild low back pain, and none experienced severe low back pain.

The results of the statistical test using the Gamma test showed a p-value of 0.001 (<0.05), thus H1 was accepted and H0 was rejected. Furthermore, the Gamma correlation coefficient was 0.928, indicating a positive relationship with a very strong relationship. The positive direction of the relationship means that the more non-ergonomic the position, the more severe the low back pain experienced by the respondents. Therefore, it can be concluded that there is a significant and meaningful relationship between ergonomic positions and the incidence of low back pain among nurses at Pringsewu Regional Public Hospital.

Discussion

Workload

The results of the study, conducted on 62 respondents, revealed that the majority of respondents had a heavy workload, 32 respondents (51.6%), 18 respondents (29.0%) had a moderate workload, and 12 respondents (19.4%) had a light workload. Research by Wulandari *et al* (2023) shows that most nurses experience moderate to heavy workloads, influenced by limited staffing, high patient care needs, and high-risk work situations. This unbalanced workload has the potential to reduce nurse performance and impact the quality of nursing services. Therefore, hospitals need to pay attention to workload management through improving human resources and adjusting service capacity.

According to Suma'mur (2009), workload consists of quantitative and qualitative workload. Quantitative workload occurs when the number of tasks exceeds the available time, making it difficult for nurses to handle numerous patients and service demands. Qualitative workload occurs when tasks are too complex, mentally demanding, and require high skill and precision. Excessive and persistent

workloads can reduce performance, cause stress and fatigue, and impact the quality of nursing services (Sari *et al*., 2022). Researchers assume that the high workload of nurses at Pringsewu Regional Hospital is due to the numerous and diverse tasks required to ensure patient safety and the high demands of families. This situation limits nurses' time, resulting in suboptimal performance and service outcomes.

Ergonomic Position

In the results of the study conducted on 62 respondents, it was found that the majority of respondents were not ergonomic with a total of 39 respondents (62.9%) and respondents with ergonomic positions numbered 23 respondents (37.1%). These results are supported by research by Ilhamuddin (2024), which shows that the frequency distribution of respondents based on ergonomic positions shows that the majority of nurses (91 nurses) have poor ergonomic positions. Many nurses experience lower back pain due to the habit of working in a hunched position and the demands of their jobs, which require them to push various medical equipment from one place to another. The lower back is more susceptible to impact because the lower spinal structure must bear the greatest load to support the body's weight. Furthermore, this area is also the center of movement when the body bends or pushes. Abnormal working postures, such as prolonged static bending while administering IVs, providing wound care, lifting patients, and pushing or pulling beds, play a significant role in increasing musculoskeletal complaints. Conversely, adopting ergonomic work positions can reduce the risk of MSDs and support a healthier, safer, and more productive work environment (Wulandari *et al*., 2025)

According to Frederick Winslow Taylor's theory in Indah *et al* (2023), unnatural work postures, such as hunched backs or raised arms, can increase the risk of musculoskeletal disorders, especially when the body is positioned away from the center of gravity. These work postures generally arise from the demands and characteristics of the work being performed.

Researchers assume that most nurses at Pringsewu Regional Hospital still work in unergonomic positions, such as bending over, pushing objects or patients, and lifting and moving patients without assistive devices. These conditions place excessive physical strain on nurses' bodies and increase the risk of musculoskeletal disorders, particularly low back pain.

Low Back Pain

The study, conducted on 62 respondents, found that 33 (53.2%) experienced moderate low back pain. Ten (16.1%) experienced severe low back pain, and 19 (30.6%) experienced mild low back pain. This result is supported by the research results of Puspitasari (2024) which showed that of 61 respondents who experienced moderate Low Back Pain, 41 people (67.2%), this occurs because someone does many movements at one time in repeated work, so it is called repetitive movements such as giving medication and installing IVs. Many nurses complain of lower back pain, especially feeling hot in the lower back area and pain after finishing work. The feeling

of heat in the lumbar area indicates irritation or muscle tension due to excessive use of the back muscles while working.

This phenomenon is explained by Johan van Dieën's cumulative load theory, which states that repetitive mechanical exposure such as continuous lifting and bending can damage lower back tissues. Nurses' frequent patient movement results in high cumulative loads and increases the risk of chronic low back pain (Coenen *et al.*, 2023). Researchers assume that the majority of nurses at Pringsewu Regional General Hospital experience moderate to severe low back pain. Nurses always feel pain in their lower backs after performing work activities, and the majority of nurses feel a burning sensation in their lower backs. LBP causes disruptions to nurses' activities, which in turn impacts the quality and productivity of nurses in providing nursing care to patients in the hospital.

The Correlation between Workload and the Incident of Low Back Pain

Bivariate analysis showed a significant relationship between workload and the incidence of low back pain (p = 0.001). The results of the study on the relationship between workload and the incidence of low back pain in 62 respondents showed that respondents with heavy workloads mostly experienced low back pain in the moderate category, namely 22 respondents (62.9%), then 10 respondents (31.3%) experienced severe low back pain and 3 respondents (8.6%) experienced mild low back pain. In respondents with moderate workloads, 10 respondents (67.7%) experienced moderate low back pain, 5 respondents (33.3%) experienced mild low back pain, and none experienced severe low back pain. Meanwhile, in respondents with light workloads, 11 respondents (91.7%) experienced mild low back pain, 1 respondent (8.3%) experienced moderate low back pain, and none experienced severe low back pain.

These findings are supported by research by Nazar (2024), which explains the relationship between workload and the incidence of low back pain in nurses. According to Kusuma (2022), in his research, people over 35 are more susceptible to back pain because muscles weaken with age. As a person ages, their bones are more likely to lose flexibility, which can lead to lower back pain.

According to Grandjean's workload imbalance theory in 1976, the human body has a certain limit to the physical workload it can handle. If the workload exceeds the body's capacity to adapt, muscle fatigue will occur, which can lead to injuries to the musculoskeletal system. In nurses, physical activities such as lifting patients without assistance, standing for extended periods, or bending over while performing care tasks can put excessive stress on the lower back muscles (Tiblola & Levitar, 2025).

These findings indicate that high workloads require nurses to multitask, meet patient safety demands, and address the demands of patients' families. This situation forces nurses to work at high intensity and engage in repetitive and prolonged physical activity. This constant strain puts stress on the muscles and tissues in the lower back, triggering burning and pain after work. This accumulated pressure makes the lower back more susceptible to fatigue and inflammation, increasing the risk of low back pain as the workload increases.

The Correlation Between Ergonomic Position And Low Back Pain

Bivariate analysis showed a significant relationship between ergonomic position and the incidence of low back pain (p = 0.001). The results of the study on the relationship between ergonomic position and the incidence of low back pain in 62 respondents showed that respondents with non-ergonomic positions mostly experienced moderate low back pain, namely 21 respondents (53.8%). Then 10 respondents (25.6%) experienced severe low back pain, and 8 respondents (20.5%) experienced mild low back pain. In respondents with ergonomic positions, 12 respondents (52.2%) experienced moderate low back pain, 11 respondents (47.8) experienced mild low back pain, and no respondents experienced severe low back pain.

These results are supported by research by Anugrahwati & Silitonga (2024) which explains the relationship between work position and LBP complaints, showing the test results obtained a p-value of 0.037 (p < 0.05). Furthermore, according to Sanhaji & Cusmari (2023) in their study at the Haji Hospital in Jakarta, the average length of service for nurses was over 5 years (90.4%) and the average length of service was under 5 years (9.6%). The longer a person works, the greater the possibility of experiencing work-related illnesses. If someone continues to do the same job for years without being replaced by another job, then the same muscles and soft tissues will continue to work hard for a long time, this will cause nurses to experience symptoms of low back pain.

McGill's occupational biomechanics theory emphasizes that unergonomic work postures when lifting, pushing, or performing static work can increase stress on the spine and trigger low back pain. Repetitive movements with poor posture increase the risk of injury, so implementing ergonomic principles and training in proper work posture are essential for preventing low back pain and improving nurse performance (Rahayu *et al*., 2024).

These findings indicate that non-ergonomic working positions, such as frequently bending over when administering IV or EKG, and pushing equipment or patients, cause excessive pressure on the lower back. Repetitive bending and pushing movements overwork the muscles and spine, leading to tension, tissue fatigue, and complaints of heat, stiffness, and pain in the lower back.

Furthermore, length of service also contributes to the development of low back pain. The majority of nurses at Pringsewu Regional Hospital have worked for more than 5 years, resulting in prolonged exposure to non-ergonomic working positions. The accumulated physical stress of bending, pushing, and lifting patients without aids over many years increases the risk of musculoskeletal and spinal injuries, ultimately leading to low back pain.

Conclusion

The majority of nurse respondents at Pringsewu Regional General Hospital were aged 35-44 years, female, had a Bachelor's degree in Nursing, worked less than 8 hours, had more than 5 years of experience, and were civil servants. Most respondents had heavy workloads (51.6%), non-ergonomic positions (62.9%), and moderate low back pain (53.2%). Statistical analysis showed a significant relationship between workload

and the incidence of low back pain in nurses at Pringsewu Regional General Hospital (P-Value = 0.001), and there was a significant relationship between ergonomic positions and the incidence of low back pain in nurses at Pringsewu Regional General Hospital (P-Value = 0.001).

Suggestions

1. For Nurses
   Apply ergonomic principles at work, perform light stretching, and prioritize tasks to reduce the risk of low back pain.
2. For Hospitals
   Adjust workloads, provide ergonomics education, provide assistive devices, and organize workspaces to improve nurse safety.
3. For Aisyah University in Pringsewu
   Utilize research results as a reference for curriculum development and scientific publications in the field of nursing.
4. For Future Researchers
   Expand research variables, increase sample size, and use observational methods to obtain more accurate data.

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