e-ISSN: 2807-7970

AKSONA

Volume 2 Number 2, July 2022

Characteristics of Patients with Low Back Pain among Healthcare Professionals at John Piet Wanane General Hospital: A Cross-Sectional Study

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Article info

Article History:
Received Jun 17, 2022
Revised Jul 22, 2022
Accepted Jul 25, 2022
Published Jul 31, 2022

Keywords:
Healthcare professionals
Healthy lifestyle
Low back pain
Occupational health
Overweight
Risk factor

ABSTRACT

Introduction: Low back pain (LBP) is musculoskeletal pain, tension, or stiffness that occurs below the costal margin and above the inferior gluteal folds, with or without sciatica. It has been found that healthcare professionals are more likely to experience LBP than other industrial workers. Many factors contribute to higher rates of LBP, including occupation, age, obesity, family history, lack of exercise, and psychosocial condition. **Objective:** To determine LBP's prevalence and risk factors among healthcare professionals at John Piet Wanane General Hospital. **Methods:** This is a cross-sectional study that included 158 healthcare professionals. The data was collected using questionnaires and analyzed using univariate and multivariate logistic regression. **Results:** The overall prevalence of LBP in this study was 62.7%. Descriptive statistics showed that LBP was most common in the female group (71.7%), age group 35-50 years (52.5%), overweight group (61.6%), married group (80.8%), never or rarely exercise group (84.8%), non-smoking group (85.9%), non-drinkers group (84.8%), and moderate perceived stress group (63.6%). Multivariate logistic regression analysis showed that BMI was significantly associated with LBP. Compared with underweight participants, overweight participants were four times more likely to experience LBP (OR = 4.344, 95% CI: 1.297-14.552). **Conclusion:** This study demonstrates a high prevalence of LBP among healthcare professionals. High BMI, especially being overweight, increases the risk of developing LBP. Overweight and obesity among healthcare professionals may affect their credibility in providing patients with healthy nutrition and exercise advice. Healthcare professionals should maintain a healthy lifestyle to increase productivity and decrease mortality.

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Available at https://e-journal.unair.ac.id/index.php/aksona

INTRODUCTION

Low back pain (LBP) has been creating a serious health concern and is becoming the leading cause of disability that negatively impacts performance at work and daily activities worldwide for many years.[1] It is described as musculoskeletal pain, tension, or stiffness that occurs below the costal margin and above the inferior gluteal folds, with or without sciatica. It is classified as chronic when it lasts for more than 12 weeks.[2] This condition is usually self-limiting, and about 5.0% to 10.0% of cases turn into chronic cases.[3] LBP is the most prevalent issue among workers, and it is one of the major factors contributing to disability and absence, both of which have serious socio-economic consequences.[4]

Healthcare professionals have been found to have a higher risk of LBP than other industrial workers. According to several authors, the annual prevalence of LBP among healthcare professionals ranges from 39% to 74%.[5–10] A study in Malaysia reported that the prevalence of LBP was 72.5%, Nigeria 70.1%, and Ethiopia 63.6%.[5,7,10] Healthcare professionals engage in several work-related activities that expose them to a higher risk of developing LBP, such as lifting or pushing weights, forward bending, twisting, and various ergonomic issues.[4] These problems have considerable personal and occupational-related consequences, such as disability and absence from work. LBP affects most healthcare professionals, causing them to restrict their activities.[6]

Epidemiological studies have shown that various risk factors contribute to the higher rates of LBP. The occurrence of LBP was observed to be influenced by personal, occupational, and psychosocial risk factors. Personal risk factors include age, gender, body mass index, family background, smoking, alcohol intake, and physical activity levels. Workplace risk factors include forward bending, twisting, lifting weights, vibration exposure, maintaining the same posture for extended periods, and overloaded physical activity. In addition, anxiety, depression, and mental stress at work are considered psychosocial risk factors.[11]

LBP prevalence and characteristics among healthcare professionals are not well established in West Papua. Since LBP has been proposed to be a significant cause of reduced productivity, this study aims to determine the prevalence and risk factors of LBP among healthcare professionals at John Piet Wanane General Hospital, Sorong.

OBJECTIVE

This study assessed the prevalence and associated risk factors of LBP among healthcare professionals in John Piet Wanane General Hospital, Sorong, West Papua.

METHODS

This cross-sectional study was conducted at John Piet Wanane General Hospital, Sorong, West Papua. This study targeted all healthcare professionals in our center, including physicians, surgeons, nurses, and administrative staff. All participants were well-educated, including diploma and bachelor's degree graduates. The inclusion criteria were healthcare professionals who were actively employed 12 months before the study time and willing to participate by filling out informed consent. Participants who suffered from LBP due to trauma, infection, tumors, or pregnancy were excluded.

Questionnaires were used to collect data on age, gender, height, weight, marital status, physical exercise, smoking status, working hours, perceived stress score, and working unit. Participants' weights and heights were used to calculate their body mass index (BMI). According to the World Health Organization BMI cut-off points, BMI was classified as underweight (<18.5), normal (18.5 – 24.99), overweight (≥ 25), and obese (≥30).[12]

A *standardized Nordic Musculoskeletal Questionnaire* (SNQ) was used to determine the lower back musculoskeletal symptoms. The participants were asked about any symptoms of pain or discomfort and marked the appropriate location based on the body diagram on the questionnaire. A *Perceived Stress Scale* (PSS-10) questionnaire was used to assess participants' stress levels. It consisted of ten questions, and participants were asked to check the box for the response they felt was the most suitable. Scores of 0-13 indicate low perceived stress, 14-26 moderate perceived stress, and 27-40 high perceived stress.

The participants were selected by stratified random sampling. Based on sampling calculation by Slovin's (1960) formula, by considering a total population of 223 participants, the margin of error is 5%, resulting in 143 participants as the minimum sample. The participants were categorized according to working units as emergency department (ED), administration (AD), operation room (OR), inpatient unit (IU), and outpatient unit (OU). This classification roughly represents the healthcare professional's job activity and responsibility status.

Data Analysis

SPSS (Statistical Package for the Social Sciences) software, version 23, was used for analysis. This study evaluated **the validity and reliability of the translated questionnaires**. Questions' validity was analyzed using the Pearson correlation coefficient (r). The r-value of 0.05 or lower and the r-value higher than the table's r value were considered valid. A reliability test was done using Cronbach's alpha to estimate the consistency among items in the

instrument. Cronbach's alpha values of 0.7 or higher indicate an acceptable level of reliability. Descriptive statistics were presented as frequencies and percentages. Univariate and multivariate logistic regression analyses were performed to analyze the data. In order to minimize the effect of potential confounders, independent variables with p-values < 0.2 in the univariate logistic regression were exported to the multivariate logistic regression model. The significant correlation was defined at $p \leq 0.05$ with 95% CI and odds ratios (ORs).

Ethical Considerations

This study was approved by the Institutional Ethical Review Board of the Politeknik Kesehatan Sorong (Reference #: DM.03.05/6/048/2021).

RESULTS

A total of 180 questionnaires were distributed. One hundred fifty-eight participants returned completed valid questionnaires eligible for the analysis, giving a response rate of 87.7%. All translated questions from the questionnaire were valid with r = 0.204 to r = 0.637 and p < 0.05. The reliability of Cronbach's alpha score for the SNQ and PSS questionnaires was 0.99 and 0.70, respectively.

Descriptive statistics for demographic data are shown in Table 1. Participants with LBP were mostly reported among healthcare professionals in the inpatient unit (42.4%), administration (19.2%), emergency department (16.2%), operation room (11.1%), and outpatient unit (11.1%). The participants were between 35 – 50 years old, with a median age of 36.5 years (interquartile range: 31.75 – 44). All participants worked for 7 to 10 hours per day.

The prevalence of LBP in this study was 62.7% of all healthcare professionals. The prevalence increased with age, from 38.4% (20-34 years old group) to 52.5% (35-40 years old group). The gender distribution was female predominate, and LBP incidents were reported higher in females (71.7%) than in males (28.3%).

This study showed that LBP was reported higher in overweight participants (61.6%), followed by normal (23.2%), obese (10.1%), and underweight (5.1%). Moreover, 84.8% of LBP sufferers were not doing exercise regularly. Regarding alcohol consumption and smoking habit, this study showed that 84.8% and 85.9% of participants with LBP were non-drinkers and non-smokers, respectively.

Of all participants with LBP, 63.6% had moderate perceived stress scores, 31.3% had low PSS scores, and 5.1% had high PSS scores. Univariate logistic regression analysis is shown in Table 2.

The univariate logistic regression analysis showed that age 35-50 years, overweight, and smoking could be exported to the multivariate logistic regression analysis. The multivariate logistic regression analysis confirms that being overweight had a four-times higher likelihood of experiencing LBP than being underweight (95% CI: 1.297-14.552). Multivariate logistic regression analysis is shown in Table 3.

DISCUSSION

The prevalence of LBP in this study was 62.7% (n= 158). It was relatively comparable with those studies in Malaysia (72.5%), Saudi Arabia (73.9%), China (61%), and Pakistan (58%).[5,6,8,9] A recent meta-analysis study in African healthcare facilities stated that the lowest and the highest reported prevalence of LBP were 44.1% and 82.7%, respectively.[13] The variability in the literature may be explained by the methodological heterogeneity used to assess LBP, personal criteria differences, and working conditions among populations.[6]

LBP has become the most common musculoskeletal problem among productive age workers, increasing the probability of being absent from work.[4] A study in Saudi Arabia reported a significantly higher risk of LBP in the 30 to 40-year-old age group, as this age group is the most productive.[6] This finding is similar to our study, which showed that the age group 35-50 years is more likely to suffer from LBP complaints (OR = 1.021, 95% CI: 0.979-1.065).

This study reported that the risk of LBP was higher in women than in men. This result relates to a study involving hospital workers, which reported that the female gender was a risk factor for developing LBP.[14] Generally, women are expected to do nearly all household chores due to cultural and social norms, leading to an increased risk of LBP. Moreover, women are more likely to report problems as they generally have a lower pain threshold than men.[15]

This study reported that 61.6% of the participants with LBP were overweight. Their risk of developing LBP was four times more likely than underweight (OR =4 .344, 95% CI: 1.297-14.552). A recently published meta-analysis showed that the risk of having LBP is higher for people who are overweight or obese. Excess weight increases the mechanical strain on the lower back during various physical activities. A rise in cytokines and acute-phase reactants, followed by activating pro-inflammatory pathways, will increase pain intensity. Dyslipidemia conditions also have an essential role in the formation of atherosclerosis, which can lead to decreasing vascularity in the disc structures.[16]

Obesity has become an important issue as it impacts the morbidity of healthcare professionals.

Some studies in Indonesia found that healthcare professionals have a high prevalence of obesity.[17–19] A study in Malaysia also found that the prevalence of obesity among healthcare professionals was higher than the general population due to factors related to their job conditions, such as prolonged working hours, poor diet, and stress at work.[20]

Unlike the result of a meta-analysis study by Shiri *et al.*, which found a positive association between smoking and LBP, this study found otherwise. Smoking is known to have indirect consequences on lower back structures. It may result in diminished intervertebral disc perfusion via vasoconstriction and atherosclerosis. Impaired blood supply may lead to degeneration of spinal structures and interfere with the healing process. Additionally, smoking increases the amount of pro-inflammatory cytokines in the blood, stimulating the central nervous system and amplifying pain. Smoking alters the intervertebral disc's gene expression, up-regulates aggrecan and tissue inhibitor of metalloproteinase-1 genes, and down-regulates collagen genes.[21]

Several studies have shown the benefits of physical exercise against LBP.[6,22] This study showed a similar result where regular physical exercise protects against LBP (OR = 0.875, 95% CI: 0.365-2.098); however, it was not statistically significant. This result could be explained as some of the physical activity performed by the participants may not aim precisely at strengthening the lower back muscles and could otherwise be detrimental. In addition, the total of participants who never or rarely exercise predominates in this study.

The correlation between stress perception and LBP varies in the literature. Tsuboi *et al*. reported that high perceived stress is independently associated with a higher prevalence of LBP. Vinstrup *et al*. also found a significant correlation between LBP and perceived stress.[23,24] However, our study reported that perceived stress scores were not significantly associated with LBP (p = 0.479). These results are similar to a study by Lindegaard *et al*. that found no correlation between stress and LBP.[25] Stress is a major factor in regulating the pain system through various neurotransmitters (norepinephrine, dopamine, serotonin), peptides (vasopressin), and hormones (cortisol). The hypothalamic-pituitary-adrenal axis (HPA) is one of the major pathways regulating pain responses.

A healthy workforce is the foundation of increased productivity and profitability. Occupational health practices should be included in healthcare professionals' curriculum to increase awareness of the issue. Managing LBP is an excellent way to increase healthcare professionals' productivity, improve patient safety, and reduce healthcare costs.

This study has several limitations. First, it is a simple survey of low back pain and its associated risk factors without a more detailed assessment of occupational or ergonomic factors. Second, the participant's weight and height were not directly measured by the researchers. Third, surveys using self-report techniques in questionnaires may lead to information bias. Fourth, cross-sectional design has limitations in identifying possible factors that lead to LBP.

CONCLUSION

This study found a high prevalence of LBP among healthcare professionals, and high BMI especially being overweight, increases the risk of developing LBP. Overweight and obesity among healthcare professionals may affect their credibility in providing patients with healthy nutrition and exercise advice. Therefore, healthcare professionals should maintain a healthy lifestyle to increase productivity and decrease mortality. Further research on LBP and its related risk factors, especially ergonomics factors in the hospital, may be required to achieve more comprehensive results.

ACKNOWLEDGEMENTS

The authors would like to thank the healthcare professionals of John Piet Wanane General Hospital who devoted their time to taking part in this study.

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ATTACHMENT

Table 1. Relationship between variables with migraine incidence

Characteristics	n	%
Age		
- 20-34	68	43
- 35-30	75	47.5
- >50	15	9.5
Sex		
- Male	46	29.1
- Female	112	70.9
BMI		
- Underweight	14	8.9
- Normal	43	27.2
- Overweight	86	54.4
- Obese	15	9.5
Marital status		
- Married	124	78.5
- Single	34	21.5
Physical esercise		
- Yes	25	15.8
- No	133	84.2
Smoking		
- Yes	18	11.4
- No	140	88.6
Alcohol		
- Regular-consumer	22	13.9
- Non-consumer	136	86.1
PSS Score		
- Low	48	30.4
- Moderate	101	63.9
- High	9	5.7

Table 1. Relationship between variables with migraine incidence

Characteristics	n	%
Working Unit		
- Emergency room	24	15.2
- Administration	30	19
- Operation room	21	13.3
- Inpatient unit	62	39.2
- Outpatient unit	21	13.3

Table 2. Univariate logistic regression analysis between risk factors and LBP among participants

Characteristics	LBP				cOR (95% CI)	*p-value*
	Yes		No			
	n	%	n	%		
Age						
- 20 – 34	38	38.4	30	50.8	1	
- 35 – 50	52	52.5	23	39	1.785 (0.899-3.543)	**0.089***
- >50	9	9.1	6	10.2	1.184 (0.379-3.697)	0.771
Sex						
- Male	28	28.3	18	30.5	1	
- Female	71	71.7	41	69.5	1.113 (0.550-2.255)	0.766
BMI						
- Underweight	5	5.1	9	15.3	1	
- Normal	23	23.2	20	33.9	2.070 (0.595-7.201)	0.253
- Overweight	61	61.6	25	42.4	4.392 (1.339-14.410)	**0.015***
- Obese	10	10.1	5	8.5	3.600 (0.778-16.662)	0.101
Marital status						
- Not married	19	19.2	15	25.4	1	
- Married	80	80.8	44	74.6	1.435 (0.664-3.102)	0.358
Physical exercise						
- No	84	84.8	49	83.1	1	
- Yes	15	15.2	10	16.9	0.875 (0.365-2.098)	0.765
Smoking						
- No	85	85.9	55	93.2	1	
- Yes	14	14.1	4	6.8	2.265 (0.709-7.237)	**0.168***
Alcohol						
- Non-consumer	84	84.8	52	88.1	1	
- Regular consumer	15	15.2	7	11.9	1.327 (0.507-3.470)	0.565
PSS Score						
- Low	31	31.3	17	28.8	1	
- Moderate	63	63.6	38	64.4	0.909 (0.445-1.859)	0.794
- High	5	5.1	4	6.8	0.685 (0.162 – 2.898)	0.608
Working Unit						
- Emergency department	16	16.2	8	13.6	1	
- Administration	19	19.2	11	18.6	0.864 (0.280-2.667)	0.799
- Operation unit	11	11.1	10	16.9	0.550 (0.165-1.836)	0.331
- Inpatient unit	42	42.4	20	33.9	1.050 (0.386-2.860)	0.924
- Outpatient department	11	11.1	10	16.9	0.550 (0.165-1.836)	0.331

*p-value parameters with <0.2 were exported to the multivariate logistic regression model

Table 3. Multivariate logistic regression analysis

Risk Factors	aOR (95% CI)
Age (35-50 years)	1.021 (0.979-1.065)
BMI (overweight)	**4.344 (1.297-14.552) ***
Smoking (yes)	2.411 (0.716-8.119)

*statistically significant (p<0.05)