INNOVATIVE: Journal Of Social Science Research
Volume 4 Nomor 4 Tahun 2024 Page 13574-13581
E-ISSN 2807-4238 and P-ISSN 2807-4246
Website: https://j-innovative.org/index.php/Innovative

Determinant Factors of Low Back Pain Complaints on Teachers At SDN Wates 5 In Mojokerto City

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Abstrak

Low back pain merupakan gangguan yang mengakibatkan disabilitas di seluruh dunia, peningkatan jumlah kasus sebanyak 60%, tahun 2020 diperkirakan sekitar satu dari 13 orang secara global mengalami *low back pain* yang setara dengan 619 juta orang. Tujuan penelitian ini adalah menganalisa hubungan faktor determinan (usia, jenis kelamin dan serum total kolesterol) terhadap keluhan *low back pain*. Penelitian ini menggunakan desain analitik korelasional dengan pendekatan cross-sectional. Populasi dalam penelitian ini adalah seluruh guru di SDN Wates 5 Kota Mojokerto. Jumlah sampel dalam penelitian adalah 38 guru yang diambil dengan menggunakan teknik total sampling. Hasil uji independensi *Chi-Square* pada faktor determinan yang berhubungan dengan keluhan *low back pain* menunjukkan variabel jenis kelamin dengan X2(1) = 0,041, p = 0,839, V = 0,38, sedangkan untuk variabel usia menunjukkan X2(1)=21,00, p = 0,000, V = 0,743, dan untuk variabel serum total kolesterol X2(1)=26,68 , p = 0,000 , V = 0,838. Uji analisis yang digunakan dalam penelitian ini ialah uji *Chi-Square*. Faktor determinan yang berhubungan signifikan dengan keluhan *low back pain* adalah usia dan serum total kolesterol, sedangkan untuk jenis kelamin tidak mempunyai hubungan yang signifikan, akan tetapi variabel serum total kolesterol memiliki tingkat hubungan yang lebih kuat dibandingkan variabel lain. Diet rendah kolesterol, merupakan faktor yang dapat dimodifikasi dan menjadi faktor yang penting untuk diperhatikan dalam pencegahan terhadap keluhan *low back pain.*

Kata Kunci: *Jenis Kelamin, Low Back Pain, Serum Total Kolesterol, Usia*

Abstract

Low back pain is a disorder that causes disability worldwide, with a 60% increase in cases. In 2020, it was estimated that about one in 13 people globally experienced low back pain, which is equivalent to 619 million people. This research aims to analyze the relationship between determinant factors (age, gender, and total serum cholesterol) and complaints of low back pain. The research design of this study used a correlational analytical design with a cross-sectional approach. The population in this study is all the teachers at SDN Wates 5 in Mojokerto City. The sample size in the study is 38 teachers, selected using the total sampling technique. The results of the Chi-Square independence test on the determinant factors related to low back pain complaints show that the gender variable has X2(1) = 0.041, p = 0.839, V = 0.38, while the age variable shows X2(1) = 21.00, p = 0.000, V = 0.743, and for the total serum cholesterol variable, X2(1) = 26.68, p = 0.000, V = 0.838. The analysis test used in this study was the Chi-Square test. The determinant factors significantly related to complaints of low back pain are age and total serum cholesterol, while gender does not have a significant relationship. However, the variable of total serum cholesterol has a stronger correlation compared to other variables. A low-cholesterol diet is a modifiable factor that is important to consider in the prevention of low back pain complaints.

Keywords: *Age, Gender, Low Back Pain, Serum Total Cholesterol*

INTRODUCTION

Low back pain is a common complaint and a leading cause of disability worldwide (Yoshimoto et al., 2018). According to the (WHO - World Health Organization, 2023), since 1990 there has been a 60% increase in the number of cases, and by 2020 it is estimated that about one in 13 people globally experienced low back pain, which is equivalent to 619 million people. In Indonesia, based on reports from healthcare professionals, 11.9% have been diagnosed with the condition, while 24.7% report symptoms (Andini, 2015). Low back pain is a pain in the lower back and is not a disease but rather a complaint of pain felt in the affected anatomical area, particularly in the lower back region. The pain experienced can be either localized pain or radicular pain, which may radiate down to the legs (Hartvigsen et al., 2018).

Causes of low back pain are multifactorial, including physical and psychological disturbances. One of the mechanisms that causes low back pain is atherosclerosis in the lumbar arteries, which can lead to decreased blood supply in the lumbar area and is a cause of disc degeneration (Yoshimoto et al., 2018). The source of nociceptive pain from low back pain has not been determined for almost all patients reporting low back pain complaints; this condition is referred to as "non-specific low back pain." Cases of lower

back pain caused by serious conditions are relatively small in percentage, including those due to cancer, spinal injuries, infections, or inflammatory diseases such as axial spondyloarthritis, which require special treatment (Maher et al., 2017).

A comparison of the number of cases reporting lower back pain with those that do not, for individuals who have low back pain, often complain of discomfort in other parts of the body and broader physical and mental health issues, which may be caused by other conditions and comorbidities that can exacerbate the situation (Maher et al., 2017). In addition, being over 35 years old, being a smoker, having a family history of musculoskeletal disorders, work position, body mass index, and blood lipid profile are risk factors associated with complaints of low back pain (Hartvigsen et al., 2018; Heuch et al., 2014; Maher et al., 2017; Purika et al., 2019). Research examining age, gender, and lipid profiles of low back pain has been conducted. However, studies on total serum cholesterol using inexpensive and easy tests have not yet been carried out. This type of examination could serve as a control to prevent and manage low back pain complaints. This research aims to identify the determinant factors influencing the occurrence of low back pain associated with age, gender, and total serum cholesterol levels.

RESEARCH METHOD

The research design for this study used a correlational analysis with a cross-sectional approach. The population in this study was all the teachers at SDN Wates 5 in Mojokerto City. The sample size in the study was 38 teachers, selected using the total sampling technique. The instrument used the Pain and Distress Scale Questionnaire, which consists of 20 statement items measured using a 1-4 Likert scale. (1: never, 2: seldom, 3: often, 4: always). The indicator consists of complaints of low back pain. The total score was 80, with the lowest score being 0 and the highest score being 80. For the low back pain category, the score range is 36 – 80, while for those non-low back pain, the score range is 0 – 35. The research instrument for total serum cholesterol used the Easy Touch GCU meter device. The test results were classified as normal (< 220 mg/dl) and high (> 220 mg/dl). Age was classified into <45 years and >45 years, while gender was differentiated as male and female. The determining factors in this study include age, gender, and total serum cholesterol, which will be analyzed about low back pain using the Chi-Square Test.

RESULTS AND DISCUSSION

Table 1 Determinants factors of the variables of gender, age, and total serum cholesterol with complaints of low back pain at SDN 5 Wates, Mojokerto City

Categories	Low Back Pain			
	LBP	Non-LBP	$\chi 2$	*V*
Gender				
Male	19 (61,3%)	12 (38,7%)	0,839*	0,38
Female	4 (57,1%)	3 (42,9%)		
Age				
< 45 years old	4 (22,2%)	14 (77,8%)	0,000	0,743
> 45 years old	19 (95%)	1 (5%)		
Serum Total Cholesterol				
High (< 220 mg/dl)	21 (95,5%)	1 (4,5%)	0,000	0,838
Normal (> 220 mg/dl)	2 (12,5%)	14 (87,5%)		
**p< 0,05*				

Source: Primary data 2024

Based on Table 1, it was found that the number of male respondents experiencing low back pain was 19 (61.3%), while 12 (38.7%) did not experience low back pain. Meanwhile, the number of female respondents experiencing low back pain was 4 (57.1%), and 3 (42.9%) did not experience low back pain. The results of the chi-square independence test with a value of $\chi^2(1) = 0.041$, $p = 0.839$, $V = 0.38$, indicate that there is no significant association between gender and complaints of low back pain. Meanwhile, for the age variable, the number of individuals under 45 years old experiencing low back pain is 4 (22.2%), while those not experiencing it is 14 (77.8%). For individuals over 45 years old, 19 (95%) experience low back pain, and 1 (5%) does not. Based on the results of the chi-square independence test with a value of $\chi^2(1) = 21.00$, $p = 0.000$, $V = 0.743$, this shows that there is a significant relationship between age and complaints of low back pain.

For the total serum cholesterol variable, it was found that among respondents with total serum cholesterol levels > 220 mg/dl, 21 (95.5%) experienced low back pain, while 1 (4.5%) did not. Whereas, among respondents with total serum cholesterol levels < 220 mg/dl, 2 (12.5%) experienced low back pain, and 14 (87.5%) did not. Based on the results of the chi-square independence test with a value of $\chi^2(1)=26.68$, $p = 0.000$, $V = 0.838$, it indicates that there is a significant association between total serum cholesterol and

complaints of low back pain.

DISCUSSION

The gender factor shows that the results of the chi-square independence test indicate that the gender variable is not related to complaints of low back pain. However, based on the percentage, it was found that complaints of low back pain were more prevalent among male respondents (61.3%) compared to female respondents (57.1%) of the total respondents. This is in line with research conducted by(Steven & Andriani, 2023), which shows that complaints of low back pain can occur in both men and women. However, women are 1.3 times more likely to experience low back pain compared to men. This finding is in line with the study conducted by (Muzammilia Nadraini et al., 2024), which concluded that women have a greater tendency to experience complaints of low back pain, due to differences between men and women in activity patterns, hormones, and the anatomical structure of the intervertebral discs. The findings are supported by the theory from the literature review (Wong et al., 2017), which states that women experience hormonal changes, specifically a decrease in estrogen levels during menopause that occurs in later life, thereby affecting spinal bone density and increasing the risk of low back pain.

For the age variable, age is related to complaints of low back pain, which can occur at any age, especially in those over 45 years old. In this regard, several reports are indicating that complaints of low back pain are experienced by individuals over 30 years old, middle-aged, and elderly individuals (Muzammilia Nadraini et al., 2024; Nadifatuzzahroh et al., 2024; Wong et al., 2017; Yoshimoto et al., 2018). Low back pain is a complaint caused by disorders of the bones, which will experience degeneration as one age, starting from the age of thirty. The degenerative process that occurs can lead to damage to the structure of the intervertebral discs. This can be caused by tears and tissue replacement that result in the growth of scar tissue, a decrease in joint fluid, a shortening of the intervertebral disc space, and a loss of stability in the bony segments (Nadifatuzzahroh et al., 2024).

In addition, the findings of the research conducted by (Br Silitonga & Utami, 2021; Muzammilia Nadraini et al., 2024) indicate that the risk of experiencing low back pain tends to increase with age. At the age of over 42 years old, due to a decline in sensory and motor muscle strength. Complaints of pain in the lower back may largely be influenced by factors including a decrease in muscle strength. Based on the literature review conducted by (Wong et al., 2017), shows that the causes of low back pain complaints are more susceptible to occur in older age, as it allows for the emergence of specific low back pain

complaints, which can be caused by vertebral fractures due to osteoporosis, infections, tumors, and lumbar spinal stenosis.

The total serum cholesterol variable shows that complaints of low back pain are strongly related to total serum cholesterol levels. The total serum cholesterol variable is one of the factors that have a strong level of correlation. The results of this study are in line with the findings by (Yoshimoto et al., 2018), indicating that the lipid profile consisting of LDL-C and HDL-C has a significant relationship with the occurrence of low back pain, as the lipid profile can lead to atherosclerosis, particularly in the lumbar spinal area. However, this study contrasts with the results obtained by (Heuch et al., 2014), which showed that the lipid profiles of HDL-C, LDL-C, and triglycerides have a significant relationship with the occurrence of low back pain, but not with total serum cholesterol.

The long-term effects of lipid metabolism disorders are an essential factor in the process of atherosclerosis formation in blood vessels (Halimuddin, 2017), particularly in the blood vessels in the lumbar area, leading to intervertebral disc herniation. Fat metabolism is related to body mass index, for body mass index in the obesity category, lipid profiles do not directly cause low back pain but are instead a result of mechanical load on the lumbar structure (Purika et al., 2019; Yoshimoto et al., 2018).

CONCLUSION

In this study, the determinant factors of age and total serum cholesterol have a significant relationship with complaints of low back pain, while gender does not have a significant relationship. Furthermore, among the two determinant factors that are related, namely age and total serum cholesterol, there is a stronger correlation with the variable of total serum cholesterol. Through the findings obtained from this research, the implementation of prevention measures for low back pain complaints is highly recommended. Diet management, especially a low-cholesterol diet, is an important factor to consider in the prevention of low back pain complaints and is a modifiable factor.

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