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PREVALENCE AND RISK FACTOR OF LOW BACK PAIN IN FISHERMAN IN BENGKULU CITY: A CROSS SECTIONAL STUDY

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ABSTRACT

Background: Low back pain (pain or discomfort below the costal margin and above the inferior gluteal fold accompanied by leg pain or not) is considered one of the work-related musculoskeletal disorders.
Aims and scope of paper:Identifying the prevalence and risk factors for lower back pain in fishermen in Bengkulu City.
Methods: A total of 93 fishermen were included in the study, selected using a simple random sampling technique. An observational analytical method with a cross-sectional approach was employed in this study, and data analysis was performed using the Kolmogorov Smirnov for normality test and the Pearson test for bivariate analysis.
Result: In Bengkulu City, low back pain was experienced by a total of 68 fishermen (73.12%) and disability was experienced by 39 fishermen (41.9%). The dominant age group in this study was 20 – 39 years with 42 fishermen (45.16%). Normal BMI dominated with 50 fishermen (53.76%). Work duration of more than 7 hours was reported by 70 fishermen (75.26%). Consumption of 1-20 cigarettes per day was reported by 68 fishermen (73.12%). Awkward postures with a high risk level were experienced by 41 fishermen (44.08%).
Conclusion: The risk factors potentially involved in this case are age and BMI. Meanwhile, the incidence of low back pain was found to have no significant relationship with work duration ($p = 0.635$), smoking habit ($p = 0.58$), or work posture ($p = 0.063$).
Keywords: Low back pain, Work Related Musculosceletal Diseases, Posture, Occupational disease

INTRODUCTION

Based on data from the World Health Organization (WHO) in 2019, musculoskeletal disorders were experienced by around 1.71 billion people (WHO, 2019). According to the Health and Safety Executive in 2022, it was recorded that work-related musculoskeletal disorders were experienced by 477,000 workers (HSE, 2022). According to data from the International Labor Organization, in South Korea, the number of musculoskeletal disorders saw a drastic increase from 1,634 incidents in 2001 to 5,502 incidents in 2010 (ILO, 2013). In 2011-2012, approximately 40% of all cases of occupational disease in the UK were associated with musculoskeletal disorders (ILO, 2013). Lower back pain is considered one of the musculoskeletal diseases related to work (Jia et al., 2022).

Low back pain is considered a musculoskeletal disorder with the highest incidence (Yosef et al., 2019). Lower back pain is experienced by as many as 568 million people and is recognized as a cause of disability in 160 countries and predicted to increase every year (Cieza et al., 2019 in Aprisandi and

Silaban, 2023). Lower back pain due to work can be experienced in several types of work, such as patient-lifting by nurses, hotel housekeepers, vegetable greenhouses, and other tasks involving heavy lifting (Wami et al., 2019, Jia et al., 2022, Ibrahim et al., 2019). Work-related lower back pain among fishermen can be caused by their work posture, including actions such as lowering and raising nets, rowing, lifting and pulling weights, and bending and twisting during work (Krisdianto, 2015 in Lombonaung and Lihi, 2022). The ergonomic challenges posed by the fishermen's body positions when pulling nets, prolonged sitting, and bending contribute to the occurrence of lower back pain (Maulina, Dewi, and Lestari, 2020).

Up to 37% of back pain incidents worldwide are caused by occupational risk factors (Punnett et al., 2005 in Yosef et al., 2019). Complaints of lower back pain can be attributed to factors such as work duration and body posture during work (Ningsih and Hakim, 2022). Additionally, age, repetitive movements, workload, stress, medical history, gender, length of service, BMI, work position, smoking, and exercise habits are all factors associated with the incidence of lower back pain (Sahara and Pristya, 2020). The productivity of fishermen is disrupted by numerous risk factors influencing the occurrence of lower back pain (Tafui et al., 2021).

According to the Central Statistics Agency in 2022, Bengkulu Province is encompassed by an area of 19,919.33 km2 with a coastline extending 525 km. As noted by Zamdial et al., (2018), the majority of the Bengkulu City area is characterized by a coastal environment directly facing the Indian Ocean, upon which the livelihoods of Bengkulu City's residents depend. According to the 2017 Central Statistics Agency, in 2016, 21,097 individuals in Bengkulu Province were employed as fishermen in marine capture fisheries, and according to Riskesdas 2018, joint disease was experienced by as many as 15.56% of fishermen in Bengkulu Province.

Based on interviews conducted by researchers with several fishermen in Bengkulu City, pain in their lower back and legs was frequently complained about. The productivity of fishermen in carrying out their work is hampered by these complaints. There is no available data regarding the prevalence and risk factors that can be influenced by the incidence of lower back pain in fishermen in Bengkulu City. Therefore, this research was conducted by the researchers to determine the prevalence and risk factors for lower back pain in fishermen in Bengkulu City.

METHODS

Participants / Subject / Population and Sample

The research design, involving observational analytics using a cross-sectional method, was conducted in Bengkulu City in February 2024 with 93 fishermen as participants. In this study, the Oswestry Disability Index questionnaire, the Rapid Entire Body Assessment questionnaire, and the Numeric Pain Rating Scale questionnaire will be utilized and tested for validity and reliability using IBM SPSS statistics version 29. The inclusion criteria for this study include fishermen who consented to participate, those aged 18 years and older, and those who have experienced or are currently experiencing lower back pain. Exclusion criteria encompass anatomical abnormalities (such as scoliosis, femur fractures, and spine fractures), history of spinal fractures, musculoskeletal disorders, spinal cord disorders, nerve disorders, neoplasms, infections, gastroenterological referred pain, and a

history of hernias. The independent variables considered in this study are age, BMI, duration of work, smoking habits, and work posture. Lower back pain is the dependent variable in this research.

Procedure and Data Analysis

How this research operates includes the calculation of research samples, preparation of research ethics, preparation of information sheets, identity and consent forms, validation and reliability testing of the Oswestry Disability Index questionnaire, administration of the Numeric Pain Rating Scale questionnaire, and the Rapid Entire Body Assessment questionnaire. Data collection and documentation of work postures are conducted, REBA values are calculated using Kinovea software, and data analysis is performed. IBM SPSS statistics version 29 software is used for data processing, followed by data analysis conducted through univariate and bivariate analyses utilizing the Pearson correlation test.

RESULT AND DISCUSSION

Sub Result

The research in Bengkulu City was conducted in February 2023. The commencement of the research followed the reception of an Ethics Committee Approval letter from Bengkulu University's Medical Study Program, Faculty of Medicine and Health Sciences, numbered 245/UN30.14.9/LT/2023.

Table 1 Distribution of subject characteristics in the study.

Variable	Criteria	Frequency (n)
Age	20 – 39	42
	40 – 59	41
	>60	10
	Underweight (<18.5)	9
	Normal (18.5 – 22.9)	50
	Overweight (23 – 24.9)	14
	Obesity I (25 – 29.9)	19
	Obesity II (≥30)	1
	1 – 7 hours	33
	>7 hours	70
Cigarette/day	Not heavy (1 – 20 cigarettes)	68
	Heavy (>20 cigarettes)	25
Work posture	Neglible risk	0
	Low risk	4
	Medium risk	39
	High risk	41
	Very high risk	9

Table 2 Prevalence and Rate of Low Back Pain

Variable	Frequency (n)
No lower back pain	25
Low back pain	68
Mild	18
Moderate	44
Severe	6

Table 3 Prevalence and Rate of Disability

Variabel	Frekuensi (n)
No disability	14
Disability (*mild*)	54

Table 4 Relationship Between Risk Factors And the Incidence of Low Back Pain

Variabel	Nyeri Punggung Bawah	
Usia	Nilai *p*	<0.001*
	Nilai *r*	0.888
IMT	Nilai *p*	<0.001*
	Nilai *r*	0.353
Durasi kerja	Nilai *p*	0.635
	Nilai *r*	0.050
Rokok	Nilai *p*	0.580
	Nilai *r*	0.058
Postur kerja	Nilai *p*	0.063
	Nilai *r*	-0.194

Table 5 Relationship between risk factors for low back pain and disability

Variabel	Disabilitas	
Usia	Nilai *p*	<0.001*
	Nilai *r*	0.465
IMT	Nilai *p*	0.193
	Nilai *r*	0.180
Durasi kerja	Nilai *p*	0.767
	Nilai *r*	-0.041
Rokok	Nilai *p*	0.867
	Nilai *r*	0.023
Postur kerja	Nilai *p*	0.572
	Nilai *r*	-0.079

The research results indicated that among the 93 research subjects, the highest age group comprised 42 subjects (45.16%) aged 20 to 39 years. In this study, the group with the highest BMI was the normal range of 18.5 – 22.9, totaling 50 individuals (53.76%). The group with the longest work duration, exceeding 7 hours, consisted of 70 people (75.26%). The highest cigarette consumption group, consuming 1 to 20 cigarettes per day, included 68 individuals (73.12%). A high ergonomic risk assessment score was observed in 41 people (44.08%).

Lower back pain was prevalent among 68 people (73.12%) of fishermen in Bengkulu City, with 54 individuals (79.41%) experiencing mild disability. In a study detailing occupational diseases among fishermen in Tamasaju Village, North Galesong District, Takalar Regency, lower back pain was reported by 83 people (84.7%), while 15 others did not report it (15.3%) (Pratiwi and Diah, 2023). Factors such as the load carried during work, duration of work, and frequency of lifting and carrying may influence the high incidence of lower back pain (Mayasari et al., 2019). Fishing activities conducted at night can disturb circadian rhythms, leading to intervertebral disc degeneration and tissue disruption, which contribute to lower back pain (Morris et al., 2021; Zhang et al., 2020).

Based on the results of the Pearson correlation test between age and disability (p = 0.001), indicating a moderate degree of correlation between the two variables. Similarly, based on the results

of the Pearson correlation test between age and the incidence of low back pain (p = 0.001), indicating a moderate degree of correlation between these variables. With increasing age, cell aging occurs, leading to decreased intervertebral disc metabolism, increased production of reactive oxygen species, and decreased antioxidant levels in the intervertebral discs (Wen et al., 2022; Meiliana, Dewi, and Wijaya, 2018). The aging process involves the accumulation of non-proliferating cells in the discs, changes in the biomechanical properties of the disc structure, sensitization of nerve endings with the release of mediators, and neurovascular growth into the discs, contributing to a degenerative process that causes lower back pain (Meiliana, Dewi, and Wijaya, 2018; Wu and Huang, 2017).

Based on the results of the Pearson correlation test between BMI and disability (p = 0.193), indicating that the two variables are not correlated. Similarly, based on the results of the Pearson correlation test between BMI and the incidence of lower back pain (p = 0.001), indicating a moderate degree of correlation between these variables. The incidence of lower back pain increases with higher BMI (Su et al., 2018). A normal BMI reduces the risk of lower back pain compared to a high BMI (Lionel, 2014 in Siddiqui et al., 2022). Obesity leads to disc overload and degeneration, resulting in narrowing of the disc space, increased spinal pressure during activities due to greater mechanical load on the back, reduced disc hydration, alterations in biomechanics, and changes in lumbar function, thereby increasing the risk of low back pain (Siddiqui et al., 2022; Samartzis et al., 2012)

Based on the results of the Pearson correlation test between duration of work and disability incidence (p = 0.767), indicating that the two variables are not correlated. Similarly, based on the results of the Pearson correlation test between duration of work and incidence of lower back pain (p = 0.635), indicating that duration of work according to ODI is not correlated with incidence of lower back pain. According to the International Labour Organization's standards on fishermen, categorization of work duration includes full-time, part-time, and occasional or unspecified work. Fishermen in this study are classified under unspecified work duration. Fishing work for fishermen begins from early morning until late at night (Dabholkar, Nakhawa, and Yardi, 2014). Fishermen go to sea based on natural conditions such as seasonal changes, marine ecosystems, overfishing reducing the number of fish caught, uncertainty of the quantity of fish obtained, and limitations of supplies, which cause fishermen to adjust their work duration (Rahayu, 2014 in Yogiswara and Sutrisna, 2021; Rahmasari, 2017).

Based on the results of the Pearson correlation test between the number of cigarettes consumed and the incidence of disability (p = 0.867), indicating no correlation between these variables. Similarly, based on the results of the Pearson correlation test between the number of cigarettes consumed and the incidence of lower back pain (p = 0.584), indicating no correlation between these variables. In this research, the number of cigarettes consumed by fishermen in Bengkulu City varies daily and depends on income factors. Smoking and alcohol consumption among fishermen and sailors are often associated with coping with work-related stress, acting as anti-depressants, and improving physiological responses to stress (Grappasonni et al., 2019). Men who have smoked for over 20 years and consume more than 20 cigarettes per day are at increased risk of lower back pain (Kostova and Koleva, 2001). However, smoking as a cause of lower back pain is influenced by other factors, including the type of cigarettes chosen, duration of smoking from initial exposure to present, differences in body response, genetic makeup, and individual interactions with their environment (Astuti et al., 2019).

Based on the results of the Pearson correlation test between working posture and the incidence of disability (p = 0.572), indicating no correlation between these variables. Similarly, based on the results of the Pearson correlation test between working posture and the incidence of lower back pain (p = 0.063), indicating no correlation between these variables. Factors influencing the occurrence of awkward postures include high frequency of movement, long duration of movement, and large posture tilt angles (Forde and Bucholz, 2004; Marras, 2006). The working period (annual) and frequency of work among fishermen in Bengkulu City were not studied. Young fishermen exhibit intrinsic enthusiasm, enabling them to perform work posture movements more freely than older fishermen. Categorization of work postures according to the division of work of each fisherman is not carried out, so that incidents of lower back pain that are not related to work posture can occur.

CONCLUSION AND SUGGESTION

Age is highly correlated with complaints of low back pain and moderately correlated with the level of disability. BMI shows a moderate correlation with complaints of low back pain but no correlation with the level of disability. Duration of work shows no correlation with complaints of lower back pain or the level of disability. Smoking habits and working posture are also not correlated with complaints of lower back pain or the level of disability.

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