

Prevalence of low back pain in handcrafters

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ABSTRACT

Background: Low back pain is a musculoskeletal disorder caused by incorrect ergonomic conditions at work. It is located at the inferior gluteal fold and the coastal border and lasts more than 24 hours. This study aimed to determine the prevalence of low back pain complaints in handcrafters.

Methods: This research used an observational analytic design with a cross-sectional approach. The sampling technique used was purposive sampling. The inclusion criteria for this study were handcrafters of *serati banten* aged 45-55. In contrast, the exclusion criteria were injuries in the lower back region. The total number of respondents who participated in this study was 50 people. The research location was in Gianyar, Bali. Data was collected from January to October 2023. Data were collected by measuring VAS and REBA. VAS measured the severity and relief of pain, while the REBA questionnaire analyzed work posture.

Results: The results of research regarding the prevalence of low back pain in handcrafters of *serati banten* in Gianyar Regency based on internal factors showed the majority experienced low back pain of mild intensity (60%), and external factors showed that the majority of pain incidents occurred in respondents with a working period of >5 years (52%), working in a sitting position (56%) with moderate risk working postures (64%).

Conclusion: The frequency of low back pain occurrences due to external factors was dominated by respondents with less than five years of working experience who worked in a sitting position with a medium-risk work posture.

Keywords: handcrafters, low back pain, musculoskeletal disorders, *serati banten*, sitting position.

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INTRODUCTION

Gianyar Regency on the island of Bali is known for its strong culture, customs, and religion. The abundance of culture and religious events there cannot be separated from making offerings, better known as "*banten*" in Balinese culture, closely related to "*serati*." Serati have expertise in creating religious ceremonial equipment, especially *banten* and offerings, and have good ethics in Hindu society.¹ The number of *serati banten* in Gianyar is quite large, reaching around 200 members of several *pasraman* groups spread throughout the sub-districts in Gianyar Regency. In performing their work, *serati* usually spend 7-8 hours completing one *banten*, often sitting or standing for long periods, resulting in ergonomic problems. Work postures that are not ergonomic will make the muscles contract continuously, which can cause tension or shortening of the muscles.²

As a worker who spends much time in a static position such as *serati*, there is undoubtedly a connection with the body's position while working, be it sitting or standing, and performing repetitive tasks using only one type of muscle. The job of a *serati* requires a high level of concentration and good coordination of movements in performing its duties. These movement changes occur rapidly, depending on the working position, and the limited frequency of movement over a long period can cause pressure on the back, spine, and neck, leading to inertial pressure and intrabdominal distress. This increases the risk of senior complaints of low back pain.³

Low back pain (LBP) is a feeling of discomfort in the form of pain often felt in the lower back area. LBP is also a musculoskeletal disorder caused by poor body activity.⁴ Older people usually experience it, but young people can also feel it. Indeed, almost 50% to 80%

of people aged 20 years and above have felt or experienced back pain. Pain is often felt in the lumbar region and arises from the spine, nerves, muscles, or other structures.⁵ One of the risk factors for LBP is an occupational aspect, specifically work attitude. Job attitude refers to the body's position when carrying out job activities. Working attitudes include standing, sitting, bending, crouching, walking, etc. Working in an unsafe and static position for an extended period increases the chance of acquiring LBP.^{6,7}

Several factors, including demographic factors such as age, gender, and occupation, influence this. These demographic characteristics can affect the pathogenesis and pathophysiology of low back pain. It is essential to know the factors that can influence its occurrence due to the effects of this disease, which can cause loss of working hours and a person's work efficiency.⁸ Therefore, researchers want to know the prevalence of low back pain

in *serati banten*. Hopefully, this research will help physiotherapists increase their insight. Physiotherapists are also expected to be able to determine appropriate preventive measures and interventions for *serati banten* who experience low back pain so that they remain optimal when working.

METHODS

The research employed an analytic observational descriptive study design. Sampling was done through non-probability sampling techniques, specifically purposive sampling. The study focused on the *serati banten* group in Gianyar. There were 50 respondents, and the pain was assessed using the visual analog scale (VAS), while work postures were evaluated using the rapid whole body assessment (REBA) method.

Inclusion criteria comprised *serati banten* aged 45-55 years, female, and engaged in static work positions, either sitting or standing, for 7 hours daily. Exclusion criteria involved subjects who withdrew from the study or had lower back injuries. Data analysis was performed using SPSS, and univariate analysis was applied to the collected data.

The research received approval from the Ethics Commission of the College of Medicine, Universitas Udayana, with reference number 573/UN14.2.2.VII.14/LT/2023, following a thorough review process. Each participant provided voluntary consent to participate in the study, expressing their willingness to be involved. Participants also signed an informed consent form indicating their comprehension of the research objectives, procedures, and potential risks.

RESULTS

Table 1 shows 50 female respondents aged 45-55 years, with 24 (48%) aged 45-50 years and 26 (52%) aged 51-55 years. The length of service was divided into three groups: less than five years (52% of the total), five to ten years (42%), and more than ten years (6%). Twenty-eight respondents (56%) worked in a sitting position, while 22 (44%) worked in a standing position. Regarding posture at work, 32 respondents (64%) had moderate-risk work postures,

Table 1. Frequency distribution of *serati banten* characteristics

<i>Serati banten</i> characteristics	n	Percentage (%)
Age		
45-50	24	48.0
51-55	26	52.0
Gender		
Male	0	0
Female	50	100.0
Working period		
≤5 years	26	52.0
5 – 10 years	21	42.0
≥10 years	3	6.0
Working position		
Sit	28	56.0
Stand	22	44.0
REBA score		
Low risk	18	36.0
Medium risk	32	64.0

n, frequency; REBA, Rapid Entire Body Assessment

Table 2. Frequency of low back pain based on age

Age	Lightweight (1-3)	Medium (4-6)	Heavy (7-10)	Total
45-50	15 (30%)	7 (14%)	2 (4%)	24 (48%)
51-55	15 (30%)	10 (20%)	1 (2%)	26 (52%)
Total	30 (60%)	17 (34%)	3 (6%)	50 (100%)

n, frequency; REBA, rapid entire body assessment

Table 3. Frequency of low back pain based on length of service, work position, and work posture

Variable	Lightweight 1-3	Medium 4-6	Heavy 7-10	Total
Working period				
≤5 years	14 (38%)	9 (18%)	3 (6%)	26 (52%)
5 – 10 years	11 (22%)	10 (14%)	0 (0%)	21 (42%)
≥10 years	2 (4%)	1 (2%)	0 (0%)	3 (6%)
Total	27 (54%)	20 (40%)	3 (6%)	50 (100%)
Working position				
Sit	6 (30%)	9 (18%)	3 (6%)	28 (56%)
Stand	14 (30%)	8 (16%)	0 (0%)	22 (44%)
Total	30 (60%)	17 (34%)	3 (6%)	50 (100%)
REBA score				
Low risk	18 (36%)	12 (24%)	2 (4%)	32 (64%)
Medium risk	12 (24%)	5 (10%)	1 (2%)	21 (42%)
Total	30 (60%)	17 (34%)	3 (6%)	50 (100%)

REBA, rapid entire body assessment

and 18 respondents (32%) had low-risk work postures.

Table 2 shows most respondents aged 45-55 experienced low back pain with mild intensity, reaching 60%. In addition, there were also cases with moderate and severe intensity, at 34% and 6%, respectively. The highest frequency of the total incidence of low back pain occurred in the 51-55 age

group, reaching 52%, while in the 45-50 age group, it was 48%.

Table 3 shows most of the incidence of low back pain occurred in respondents with a working period of fewer than five years, reaching 52%. At the same time, the incidence of working periods between 5-10 years and more than ten years occurred with less frequency, namely 42%

and 3%, respectively. Regarding working position, respondents who worked in a sitting position had a higher incidence of low back pain, reaching 56% of the total, compared to respondents who worked in a standing position, whose frequency reached 44%. In addition, most low back pain complaints occurred in respondents with medium-risk work postures, reaching 64% of the total incidence, while respondents with low-risk work postures had a lower incidence of low back pain, at 42%.

DISCUSSION

In this study, respondents were dominated by respondents with mild pain intensity. The most significant frequency of the total incidence of low back pain in respondents occurred in the 51-55-year age group. This is because as a person gets older, degeneration of the bones will occur, and bone density decreases, so it is easy to experience musculoskeletal complaints, causing pain.⁹ At the age of 30 years, degeneration happens in tissue damage, tissue replacement into acute tissue, and fluid reduction so that stability in bones and muscles decreases until there is a decrease in bone elasticity, which causes lower back pain. At the age of 50-60 years, muscle strength decreases by 25%.¹⁰

The frequency of low back pain based on external factors, namely tenure, showed that most low back pain events occurred in respondents with less than five years of tenure. However, there were also several incidents in respondents with a working period between 5 - 10 years and more than ten years.¹¹ This is due to the body's adaptation at the beginning of the working period, where the body has not had time to adapt appropriately to the new job, especially for individuals involved in jobs that require sitting or standing for a long time. This situation causes new sensations in the back muscles that are not accustomed to handling the new workload optimally. In addition to the lack of body adaptation, lack of experience with ergonomic positions can also trigger lower back pain.¹²

Working in a sitting position has a higher incidence of low back pain than the total incidence in research respondents

compared to those working in a standing position.¹³ This occurs because the longer a person sits, the tension of the muscles around the back and the stretching of the ligaments in the back, especially the posterior longitudinal ligament, increases. It is known that the posterior longitudinal ligament layer is the thinnest among 31 other ligaments as high as L2-L5, which is the area of low back pain.¹⁴ This situation results in more often occurring disorders or damage resulting in fatigue and tissue ischemia around the area, then added to the many pain-sensitive tissues around the lumbar vertebrae so that they have more significant potential to become painful due to hyperalgesia conditions. Furthermore, if this pain is not resolved as soon as possible, the disturbance and damage will cause the spinal nerve cushion (nucleus pulposus) to be burdened and depressed.¹⁵

Aside from muscle fatigue, another cause of low back pain is excessive pressure on the intervertebral discs caused by prolonged sitting and inhibition of the diffusion of cerebrospinal fluid into the intervertebral discs, resulting in a lack of oxygenation and nutrition to the intervertebral disc.^{16,17} Myofascial syndrome, muscular spasms, mechanical LBP, back sprains, or back strain can cause low back pain. This ailment causes the body to have limited movement and complains of lumbar pain. Pain is frequently generated by the body's protective mechanism reacting to an injury. Nociceptors around the tissue lesion convey signals to the spinal cord, which then sends signals to the brain, resulting in pain. The brain will then direct the muscle to contract to protect the muscle in that area.^{18,19}

Most serviettes work in a static position, either sitting or standing, with a non-ergonomic work posture that is sitting in a position that tends to slump for a long time. The body can only tolerate slouching postures in one position for only 20 minutes.²⁰ Deviation from non-ergonomic postures when working can cause an increase in the lumbosacral angle, which is usually 300 - 400, which is the angle between the L5 and S1 vertebral segments, or an increase in the lumbar lordotic curve for a long time, as well as causing a shift

in the fulcrum of body weight which is usually on the midline about 2.5 cm in front of the S2 vertebral segment.²¹ The increase in the lumbosacral angle and the shift in the center of the body weight will cause ligament tearing and muscle contraction while still trying to maintain normal posture. This results in a sprain or strain on the ligaments and muscles in the lower back area, which causes pain.²²

This study has significant limitations, including a limited sample size, which may not be sufficient to generalize findings to all the handcrafters of the *serati* population. Although the univariate analysis was performed, the study could be improved by conducting a multivariate analysis to clarify the correlations between the variables under examination. Furthermore, the limitation of including only female respondents within a specified age range may limit the application of the study findings to the total handcrafters of the *serati* population.

CONCLUSION

The prevalence of low back pain in *serati* handcrafters was investigated using internal parameters (age), and all of them had discomfort, the majority of which was light. The prevalence of low back pain based on external characteristics (length of service, job position, and work posture) demonstrates that respondents with a work period of less than five years and who work in a sitting position with a medium-risk work posture had the highest incidence. Future research should aim to include a larger and more diverse sample size that encompasses all handcrafters of the *serati* population to enhance the generalizability of the findings.

ETHICAL CLEARANCE

The Research Ethics Commission of the Faculty of Medicine, Universitas Udayana, stated that this research was ethically feasible with number 573/UN14.2.2.VII.14/LT/2023.

CONFLICT OF INTEREST

The authors declare that there are no conflicts of interest.

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AUTHOR CONTRIBUTIONS

PAC developed the research design, collected and processed the data, and wrote the manuscript. AAGESU, AANTND, and NWT directed data collection and revised the manuscript.

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