



Factors Associated with Shoulder Pain in Office Workers

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ABSTRACT

Background: Shoulder pain is a common musculoskeletal complaint among office workers due to monotonous work activities, static postures, and long work hours. Factors such as age, tenure, daily work hours, and work posture are thought to contribute to shoulder pain. **Objective:** This study aims to analyze the relationship between age, length of service, length of work, and work posture with the incidence of shoulder pain in office workers. **Method:** This research is a quantitative analytical study with a cross-sectional design. The sample consisted of 40 office workers at Kesdam II Sriwijaya who experienced shoulder pain, selected using a total sampling technique. Data collection was conducted using a structured questionnaire to obtain data on age, length of service, daily work hours, shoulder pain complaints, and work posture assessment based on respondents' self-reports. Data analysis was performed bivariate using the chi-square test to determine the relationship between variables. **Results:** As many as 75% of respondents reported complaints of shoulder pain. The results of the bivariate analysis showed a significant relationship between age ($p = 0.023$), length of service ($p = 0.012$), and length of service ($p = 0.041$) with shoulder pain. However, no significant relationship was found between work posture and shoulder pain ($p > 0.05$), either individually or after combining the p-values ($p = 0.507$). **Conclusion:** There was a significant association between age, length of service, and length of work with the incidence of shoulder pain in office workers, while work posture did not show a statistically significant association. Preventive measures through ergonomic interventions, work duration management, and increased awareness of work posture are still needed to reduce the risk of shoulder pain in office workers.

INTRODUCTION

Occupational diseases remain a significant occupational health problem both globally and nationally, with musculoskeletal disorders being the leading cause of morbidity in workers. The International Labour Organization (ILO) reports that nearly 2.78 million cases of occupational accidents and diseases occur annually worldwide (ILO, 2018). The prevalence of shoulder pain in workers is reported to range from 18–26%, and can increase to 30–50% in office workers who use computers for prolonged periods. This condition is closely related to non-ergonomic work postures, such as shoulder elevation and prolonged neck flexion (Cote et al. 2016). These high rates indicate that exposure to workplace risks, including physical factors, ergonomics, and work organization, remains uncontrolled and contributes significantly to the decline in workers' health and work capacity.

Most occupational diseases experienced by workers are directly related to the characteristics of their work activities, including office work, which is generally static and repetitive. Office work requires prolonged computer use in a relatively fixed sitting position, and often involves unergonomic upper body postures. Worker interaction with workstation components such as chairs, desks, monitors, keyboards, and mice can increase the biomechanical load on the muscles of the neck, shoulders, and lower back. This condition leads to increased static muscle activity, decreased local blood flow, and accumulated muscle fatigue, ultimately increasing the risk of work-related musculoskeletal disorders (Putri & Susilowati, 2023).

According to the World Health Organization (WHO, 2021) and the Ministry of Health of the Republic of Indonesia (2019), musculoskeletal disorders still rank among the highest occupational diseases both globally and nationally. Among various musculoskeletal complaints, shoulder pain is one of the most frequently reported among office workers and computer users. Research in Indonesia shows that the highest prevalence of musculoskeletal complaints occurs in the neck (42.6%), shoulders (36.7%), and lower back (27.3%) areas in computer users (Wulandari & Sudarmono, 2022). Furthermore, the prevalence of left shoulder pain was reported at 54.9% and right shoulder pain at 53.5%, indicating a high workload on the upper extremities during office work activities (Santosa & Suwandi, 2019).

Shoulder pain not only impacts work comfort but also impacts worker performance and productivity. Biomechanically, work activities involving raised arm positions, repetitive movements, and prolonged static muscle contractions can increase stress on shoulder structures, such as the rotator cuff tendons and subacromial bursa. If this condition persists without adequate management, shoulder pain can develop into chronic musculoskeletal disorders, such as tendinitis, impingement syndrome, or frozen shoulder, potentially leading to functional limitations and work absences (Punnett & Wegman, 2004).

The risk factors for shoulder pain in office workers are multifactorial, encompassing individual characteristics and occupational factors. Age and length of service are associated with accumulated long-term exposure to physical workload, while long daily work hours and insufficient rest periods increase the static load on the shoulder muscles. Furthermore, non-ergonomic work postures, inappropriate placement of work equipment, and low levels of physical activity and muscle stretching habits also increase the risk of shoulder pain. Therefore, identifying these risk factors

is crucial as a basis for developing strategies for preventing and controlling musculoskeletal disorders in the office work environment (Putri & Susilowati, 2023).

Extensive research on shoulder pain in office workers has shown that static work postures, prolonged computer use, and non-ergonomic workstation design are major risk factors for musculoskeletal disorders. However, research specifically examining the risk factors for shoulder pain in office workers in military health settings, particularly at the Sriwijaya II Military Command, is still very limited, despite the unique characteristics of work in the Military Command environment, which combines static administrative work with the demands of military service, which can increase exposure to ergonomic risks.

Based on the description, this study aims to analyze the factors related to the incidence of shoulder pain in office workers at Kesdam II Sriwijaya Palembang, including age, length of service, length of work, and work posture. The relationship between office work factors and shoulder pain in this study is explained consistently through the theory of ergonomics and occupational health, which states that the mismatch between work demands and workers' physical capacity causes an increase in biomechanical loads, prolonged static muscle contractions, and accumulation of tissue fatigue in the shoulder muscles, thus triggering pain. Therefore, this study is needed to provide contextual scientific evidence as a basis for developing ergonomic interventions and promotive-preventive programs for musculoskeletal disorders and supporting increased productivity of office workers in the Kesdam environment.

RESEARCH METHODS

This research is a descriptive analytical study with a cross-sectional design conducted on office workers at the Sriwijaya II Regional Military Command in Palembang. Forty workers were selected as the research sample (total sampling) with complaints of shoulder pain described subjectively based on respondents' reports using the Nordic Musculoskeletal Questionnaire. Work posture assessment was conducted through a self-report approach using a demographic and work characteristics questionnaire covering age, length of service, length of service, and work posture habits perceived by respondents. Data collection was conducted in the period December 2023–February 2024.

Data analysis was performed univariately and bivariately using statistical software. Univariate analysis was used to describe the characteristics of respondents, while bivariate analysis was used to determine the relationship between age, length of service, length of service, and work posture with shoulder pain complaints using the Chi-Square test at a significance level of $\alpha = 0.05$. Fisher's exact test or Kolmogorov–Smirnov was used as an alternative test if the Chi-Square requirement was not met.

RESEARCH RESULT

The individual characteristics examined in this study include age, length of service, and workload. The following describes these variables:

Table 1. Distribution of Respondents' Individual Characteristics (n = 40)

Characteristics	frequency	Percentage (%)
Age		
25–34 years	8	20.0
35–44 years	17	42.5
45–54 years	10	25.0
≥ 55 years	5	12.5
Working Mass		
< 1 year	5	12.5
1–3 years	10	25.0
4–6 years	10	25.0
> 6 years	15	37.5
Length of working		
< 4 hours/day	0	0.0
4–6 hours/day	5	12.5
7–9 hours/day	35	87.5
≥ 10 hours/day	0	0.0

Table 1 shows that The majority of respondents were in the 35–44 age group, 17 people (42.5%), followed by the 45–54 age group, 10 people (25%), the 25–34 age group, 8 people (20%), and the ≥55 age group as the smallest, 5 people (12.5%). Based on length of service, most respondents had a work period of more than 6 years, 15 people (37.5%), while the 1–3 and 4–6 years work period each had 10 people (25%), and a work period of less than 1 year, 5 people (12.5%). Meanwhile, based on the length of work per day, almost all respondents worked for 7–9 hours per day, 35 people (87.5%), and only 5 people (12.5%) worked for 4–6 hours per day, with no respondents working less than 4 hours or ≥10 hours per day. This distribution shows that most office workers are of active working age with relatively long work experience and long daily work duration, thus potentially increasing the risk of musculoskeletal disorders, especially shoulder pain, due to exposure to static work postures and lack of movement variation during work.

Table 2. Frequency Distribution of Respondents Based on Work Posture (n = 40)

Work Posture Variables	frequency	Percentage (%)
PBody Position While Working		
Sit up straight with full support	8	20.0
Slightly bent over	12	30.0
Slightly bent over	10	25.0
Leaning far back	10	25.0
Monitor Position		
In line with eye sight	14	35.0
Too high	5	12.5
Too low	13	32.5
Beside (not parallel)	8	20.0
Shoulder Activity While Using Mouse/Keyboard		
Never	6	15.0
Sometimes	14	35.0
Often	15	37.5
Always	5	12.5
Stretching Habits While Working		
Yes, regularly	5	12.5
Only when feeling pain	10	25.0
Seldom	15	37.5
Never	10	25.0

Table 2 shows that Most respondents exhibited poor ergonomic work habits. The majority sat in a slightly hunched position (30%), leaned sharply forward (25%), or leaned far back (25%), with only a small proportion sitting upright with full backrest (20%). Furthermore, most respondents positioned their computer monitors in an unergonomic position (65%), particularly too low or not at eye level. Shrugging or reaching while using a mouse or keyboard was also quite common, with 50% of respondents reporting doing these habits frequently to always. Stretching habits at work were also relatively low, with only 12.5% of respondents stretching regularly. These unergonomic work postures and minimal stretching practices have the potential to increase muscle tension and the risk of shoulder pain in office workers.

Table 3. Relationship between Independent Variables and Dependent Variables at the Research Location

Variables	Dependent variable		p-value		
	Shoulder Pain	No Shoulder Pain			
	n	%	n	%	
Age					
25–34	3	37.5	5	62.5	
35–44	13	76.5	4	23.5	
45–54	9	90.0	1	10.0	
≥ 55	5	100	0	0	0.023
Years of service					
< 1 year	1	20.0	4	80.0	
1–3 years	6	60.0	4	40.0	
4–6 years	9	90.0	1	10.0	
> 6 years	14	93.3	1	6.7	0.012
Working hours/day					
< 4 hours	0	0.0	0	0.0	
4–6 hours	3	60.0	2	40.0	0.041
7–9 hours	27	77.1	8	22.9	
≥ 10 hours	0	0.0	0	0.0	
Work posture					
Sitting Position	30	75.0	10	25.0	
Monitor Position	30	75.0	10	25.0	0.507
Shoulder Shrug Frequency	30	75.0	10	25.0	
Stretching Frequency	30	75.0	10	25.0	

Source: Primary Data, 2024

Table 3 shows that age ($p = 0.023$), length of service ($p = 0.012$), and length of work per day ($p = 0.041$) have a significant relationship with the incidence of shoulder pain in office workers of Kesdam II Sriwijaya Palembang. As age, length of service, and duration of work per day increase, the risk of shoulder pain tends to increase due to the accumulation of static loads and changes in the musculoskeletal system. Meanwhile, work posture did not show a statistically significant relationship with shoulder pain ($p = 0.507$), although clinically, non-ergonomic work postures still have the potential to increase the risk of musculoskeletal disorders in the long term.

DISCUSSION

Variables: Age, Length of Service, Work Mass

The results of this study indicate that age, length of service, and daily work hours are significantly associated with the incidence of shoulder pain in office workers at Kesdam II Sriwijaya Palembang ($p < 0.05$). Workers in the age group over 35 years showed a higher proportion of shoulder pain compared to younger age groups. This finding cannot be interpreted as a causal increase in risk, but rather indicates a link between age and shoulder pain complaints. Theoretically, this can be explained by natural degenerative processes, such as decreased tissue elasticity, muscle strength, and musculoskeletal tissue regeneration capacity, which can contribute to the emergence of shoulder pain complaints in older age, especially when combined with static and repetitive work (Mahmud et al., 2020; Punnett & Wegman, 2004; Putra & Wulandari, 2021).

In addition to age, longer tenure also showed a significant association with the incidence of shoulder pain. Workers with more than six years of tenure were more likely to report shoulder pain than workers with shorter tenure. These findings suggest an association between prolonged exposure to office work and musculoskeletal complaints, possibly related to the accumulation of static loads and exposure to relatively similar working postures over the long term. However, these results cannot be conclusively interpreted as proof that tenure causes shoulder pain, but rather as an indication that tenure plays a role as a factor associated with the onset of such complaints. These findings align with research by Shariat et al. (2018) and Mahmud et al. (2020).

Daily work duration also showed a significant association with shoulder pain, especially in workers with a workday of 7–9 hours. Physiologically, prolonged sitting can cause prolonged static muscle contractions, decreased muscle blood flow, and accumulated muscle fatigue. However, in the context of this study, these findings should be understood as statistical associations, not as causal evidence that daily work duration directly causes shoulder pain. These results are consistent with studies by Ardalan Shariat et al. (2018) and Wulandari & Sudarmono (2022), which also reported an association between static work duration and shoulder pain complaints in office workers.

Work Posture Variables

The results of this study indicate that work posture does not have a statistically significant relationship with the incidence of shoulder pain ($p = 0.507$). Thus, the initial hypothesis of the study stating a relationship between work posture and shoulder pain is not supported by the results of this study. Although descriptively, most respondents have a less ergonomic work posture, the results of statistical tests indicate that work posture is not a factor significantly related to shoulder pain in this study. This insignificant relationship may be influenced by several factors, including the measurement of work posture using a self-report approach, which is highly dependent on the subjective perception of respondents, and the possibility of long-term postural adaptation that makes respondents no longer feel direct complaints despite a less ergonomic work posture. In addition, the dominant influence of age, length of service, and length of work per day may also obscure the role of work posture in the statistical analysis.

Although this study did not show a significant relationship, non-ergonomic work posture cannot be ignored as an occupational health factor, as various previous studies have shown that poor work posture can contribute to long-term musculoskeletal disorders (Putra & Wulandari, 2021; Mahmud et al., 2020). Therefore, discussing work posture remains relevant as part of a prevention context, but is not empirically supported by the statistical results of this study.

Research Limitations

This study has several limitations, including: 1) the cross-sectional design does not allow researchers to determine the causal relationship between independent variables and the incidence of shoulder pain; 2) measurements of shoulder pain and work posture were conducted using self-report questionnaires, thus potentially introducing subjectivity bias and recall bias; 3) the relatively small and homogeneous sample size at one work location may limit the generalizability of the study results to a wider population of office workers. In addition, this study did not consider other factors such as work stress levels, physical activity outside of work, and previous health conditions that may also influence the incidence of shoulder pain.

CONCLUSIONS AND SUGGESTIONS

Based on the results of a study of 40 office workers at Kesdam II Sriwijaya Palembang, it can be concluded that the prevalence of shoulder pain is relatively high, namely 75%, which indicates that shoulder pain is an important occupational health problem in the office environment. Statistical analysis shows a significant relationship between age, length of service, and length of work per day with the incidence of shoulder pain ($p < 0.05$), where the risk of shoulder pain increases with increasing age, length of service, and long daily work duration. Meanwhile, work posture variables including sitting position, monitor position, shoulder shrugging habits, and stretching did not show a statistically significant relationship with shoulder pain ($p > 0.05$), although descriptively there is a tendency for higher complaints in non-ergonomic work postures. Therefore, it is recommended that agencies implement a sustainable work ergonomics program, provide ergonomic work facilities, and encourage active breaks and regular stretching, while workers are expected to increase awareness of correct work posture and do stretching regularly. In addition, further research is recommended to involve a larger sample size and consider other risk factors such as body mass index, work stress levels, physical activity, and the use of specific work equipment to obtain a more comprehensive picture of the risk factors for shoulder pain in office workers.

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