JMU
Jurnal Medika Udayana

ISSN: 2597-8012 JURNAL MEDIKA UDAYANA, VOL. 13 NO.12, DESEMBER, 2024

Received: 2023-12-19 Revision: 2024-10-05 Accepted:01-11-2024

THE RELATIONSHIP BETWEEN AGE, LIFTING LOAD, LIFTING FREQUENCY, AND WORKING DURATION WITH THE OCCURRENCE OF UPPER TRAPEZIUS MYOFASCIAL PAIN SYNDROME IN PORTERS AT THE PANORAMA MARKET BENGKULU

Daniella Vanessa Callista[1], I Nyoman Gede Wardana[2*], I Gusti Ayu Widianti[2], Muliani[2]
[1]Bachelor of Medicine and Medical Profession Study Program, Faculty of Medicine, Udayana University
[2]Department of Anatomy Faculty of Medicine Udayana University Denpasar
E-mail: mandewardana@unud.ac.id

ABSTRACT

Myofascial Pain Syndrome (MPS) is a condition characterized by muscle pain which associated with the hyperirritability of myofascial trigger points (MTrPs) to pressure. Several factors can elevate the risk of MPS among workers, such as age, lifting load, lifting frequency, and excessive working duration. This study aims to analyze the relationship between age, lifting load, lifting frequency, and working duration with the occurrence of upper trapezius MPS among porters at the Panorama Market Bengkulu City. The research employed an analytical cross-sectional approach. The study subjects comprised of 85 laborers selected through purposive sampling techniques. Data were gathered through questionnaire interviews and physical examinations. Statistical analysis involved the Chi-Square test, with a significance level set at α=0.05. The Chi-Square test results demonstrated a significant relationship between the variables of age (p = 0.042, OR = 0.376), lifting load (p = 0.000, OR = 11.647), lifting frequency (p = 0.038, OR = 2.963), and working duration (p = 0.025, OR = 4.160) with the occurrence of upper trapezius MPS. In conclusion, this research found an occurrence rate of upper trapezius MPS among porters at Panorama Market Bengkulu City at 67.1%, with associated factors including age, lifting load, lifting frequency, and working duration. The most significantly associated factor with the occurrence of MPS in the upper trapezius is the lifting load.

Keywords: myofascial pain syndrome., upper trapezius., porters., age., lifting load., lifting frequency

INTRODUCTION

Musculoskeletal Disorders (MSDs) are the most prevalent work-related ailments affecting workers. One of these conditions is myofascial pain syndrome, characterized by muscular pain involving sensory, motor, or autonomic functions, associated with myofascial trigger points (MTrPs).[1] Myofascial trigger points are areas where there is a hyperirritable spot in the tensed muscle structure. These trigger points are often found in the neck and back. When pressure is applied to these areas, it can cause local pain or radiating discomfort.[2] Pressure on related trigger points will cause mild to severe muscle pain that does not disappear on its own. The pain activates several areas in the central and peripheral nervous systems and is a multidimensional process involving sensory and perceptual components that can cause persistent pain that may refer to motor dysfunction.[3,4]

A study conducted in Thailand revealed that among 431 patients experiencing pain lasting less than a week, myofascial pain syndrome was diagnosed as the primary condition in 36% of cases.[5] A study in Malaysia found that 51% of the total respondents experienced myofascial pain, while in Indonesia, the prevalence reached 40% within one year, with upper trapezius myofascial trigger points being the most commonly reported complaint.[6]

The clinical manifestations of myofascial pain syndrome (MPS) in workers is muscle pain in the engaged areas used during work, marked by hyperirritable MTrPs, particularly in the neck and back regions due to excessive muscle exertion, leading to muscle tension. Myofascial pain syndrome in the upper trapezius can also result in functional disturbances such as limited lateral cervical flexion and shoulder depression. This indirectly affects daily activities and impedes work productivity.[7]

Work is carried out under various conditions, including high-intensity work, static muscle loads, and repetitive tasks. Physical and biological issues such as aging contribute to a decline in workers physical capabilities, increasing the risk of work-related accidents.[8] Several factors can elevate the risk of developing myofascial pain syndrome, including age, gender, physical condition, history of trauma, smoking habits, duration of employment, and length of working hours. Other contributing factors encompass bad body posture, nutritional deficiencies, and metabolic disturbances.[9] Working while bearing static loads for extended periods and at high frequencies poses a significant risk for the development of complications or muscular ailments.[10]

Porters applies manual handling techniques that involve muscular exertion to lift and transport heavy loads repeatedly. Inappropriately manual load handling can lead to work-related injuries and increase the risk of myofascial pain syndrome.[11] The objectives of this study was to analyze the relationship between age, lifting load, lifting frequency, and work duration with the occurrence of upper trapezius myofascial pain syndrome in porters at Panorama Market, Bengkulu City. Based on the high

incidence of MPS in porters, researchers are interested in conducting research on this topic.

MATERIALS AND METHODS

The method employed in this research is an observational analytical study utilizing a cross-sectional design.[12] This research conducted at the Groceries Market in Panorama Market, Bengkulu City. This study was conducted after the issuance of ethical clearance by the Ethics Commission of the Faculty of Medicine, Udayana University with the number 445/UN14.2.2.VII.14/LT/2023. The study began in February 2023 to September 2023, with the sample used being porters at the Pasar Panorama grocery store in Bengkulu City.

The sample size for this study consists of 85 individuals selected based on inclusion criteria using purposive sampling. The inclusion criteria for this research sample are male porters in Panorama Market, Bengkulu City, aged between 20 to 60 years, who are willing to participate in the research and provide informed consent. Exclusion criteria involve porters with a history of musculoskeletal injuries in the neck and shoulder region in the last 3 months, such as shoulder strains and dislocations, osteoarthritis of the neck or shoulder joints, fractures of the clavicle or shoulder bone, and inflammation of the tendons in the shoulder area.

Data will be collected through questionnaire-based interviews and physical examinations based on five major criteria and three minor criteria for diagnosing upper trapezius myofascial pain syndrome. The data will be analyzed using SPSS version 25.0 with a confidence level of 95%. Findings will be presented in tables and narrative form for interpretation.

\

RESULTS

The research indicates that out of 85 respondents, there were 57 respondents (67.1%) who met the criteria for the diagnosis of MPS (Myofascial Pain Syndrome) in the upper trapezius muscle. The characteristics of the research sample, including age, lifting load, lifting frequency, and duration of work, which can be observed in **Table 1** below.

Based on age groups, there were 27 people (31.8%) aged 21-30 years old and 21 people (24.7%) among them experienced upper trapezius myofascial pain syndrome (UTMPS). There were 31 people (36.5%) aged 31-40 years old and 22 people (25.9%) among them experienced UTMPS. Other than that, there were 20 people (23.5%) aged 41-50 years old and 13 people (15.3%) among them experienced UTMPS. Meanwhile, there were 7 people (8.2%) aged over 50 years old and 1 person (1.2%) among them experienced UTMPS.

In the research sample, there were 71 people (83.5%) with lifting loads of more than 40 kg and 54 of them (63.6%) experienced UTMPS. Meanwhile, among the 14 people (16.5%) with a lifting load less than or equal to 40 kg, only 3 people (3.5%) experienced UTMPS.

Based on the lifting frequency within one hour, there were 66 people (77.6%) with a lifting frequency of more than 12 times and 48 individuals (56.5%) among them experienced UTMPS. Additionally, there were 19 people (22.4%) with a lifting frequency of less than 12 times within the same duration and 9 people (10.6%) among them experienced UTMPS.

Based on the work duration, there were 72 people (84.7%) who worked more than 8 hours per day and 52 people (61.2%) among them experienced UTMPS. Additionally, there were 13 people (15.3%) who worked less than or equal to 8 hours per day, and 5 people (5.9%) among them experienced UTMPS.

Table 1. Characteristics of the research sample and the prevalence of Upper Trapezius Myofascial Pain Syndrome (UTMPS) among porters at Panorama Market in Bengkulu

Variables	Total		UTMPS
	n	%	n (%)
Age			
21-30 years old	27	31.8	21 (24.7)
31-40 years old	31	36.5	22 (25.9)
41-50 years old	20	23.5	13 (15.3)
>50 years old	7	8.2	1 (1.2)
Lifting load			
11-20 kg	4	4.7	0 (0)
21-30 kg	2	2.4	1 (1.2)
31-40 kg	8	9.4	2 (2.3)
>40 kg	71	83.5	54 (63.6)
Lifting frequency			
> 12 times	66	77.6	48 (56.5)
≤ 12 times	19	22.4	9 (10.6)
Working duration			
> 8 hours	72	84.7	52 (61.2)
≤ 8 hours	13	15.3	5 (5.9)
Total	**85**	**100**	**57 (67.1)**

UTMPS : Upper Trapezius Myofascial Pain Syndrome

Table 2. Chi Square test result of factors associated with Upper Trapezius Myofascial Pain Syndrome in porters at Panorama Market Bengkulu

Variables	UTMPS		Total n (%)	*p*-Value	OR	CI 95%	
	Yes n (%)	No n (%)				Lower	Upper
Age							
> 40 years old	14 (16.5)	13 (15.3)	27 (31.8)	0.042	0.376	0.144	0.978
≤ 40 years old	43 (50.6)	15 (17.6)	58 (68.2)				
Lifting load							
> 40 kg	54 (63.6)	17 (20)	71 (83.5)	0.000	11.647	2.907	46.672
≤ 40 kg	3 (3.5)	11 (12.9)	14 (16.5)				
Lifting Frequency							
>12 times	48 (56.5)	18 (21.2)	66 (77.6)	0.038	2.963	1.036	8.475
≤12 times	9 (10.6)	10 (11.7)	19 (22.4)				
Working duration							
>8 hours	52 (61.2)	20 (23.5)	72 (84.7)	0.025	4.160	1.215	14.241
≤8 hours	5 (5.9)	8 (9.4)	13 (15.3)				
Total			**85 (100%)**				

UTMPS: Upper Trapezius Myofascial Pain Syndrome

Based on **Table 2.** above, the results of chi square statistical test shown that variables associated with the occurrence of UTMPS are age (p = 0.042, OR = 0.376, CI 95% = 0.144 - 0.978), lifting load (p = 0.000, OR = 11.647, CI 95% = 2.907 – 46.672), lifting frequency (p = 0.038, OR = 2.963, CI 95% = 1.036 – 8.475), and working duration (p = 0.025, OR = 4.160, CI 95% = 1.215 – 14.241)

Table 3. Relationship between lifting load and Upper Trapezius Myofascial Pain Syndrome in porters at Panorama Market Bengkulu

Variables	*p*-value	Exp (B)	95% CI	
			Lower	Upper
Lifting load	0.001	11.647	2.907	46.672

Table 3. above is the final model of the multivariate analysis and the last step of logistic regression testing, and the results show that the variable that has the most significant relationship with the occurrence of upper trapezius myofascial pain syndrome is lifting load.

DISCUSSION

Relationship between Age and Upper Trapezius Myofascial Pain Syndrome

Based on age groups, upper trapezius myofascial pain syndrome was experienced by 43 people (50.6%) aged less than or equal to 40 years old and 14 people (16.5%) aged over 40 years old. This aligns with the study conducted by Rahman in 2021, which stated that between the ages of 30 to 40 years old, a person will experience a decrease in physiological function and work capability so that the possibility of muscle tissue damage is higher. The peak is at the age of 40 to 50 years old, in the human body there are chemical changes in tissue and muscle cells leading to decreased elastin and ATP, causing the sarcomeres to be unable to return to their original length before contraction. This elevates the risk of upper trapezius myofascial pain syndrome.[13]

Muscle tissue damage also can lead to muscle strength decline which caused by several factors, with the primary factor being a reduction in muscle mass. The decline in muscle strength typically begins around the age of 40 and accelerates further after the age of 75.[14]

Relationship between Lifting Weight and Upper Trapezius Myofascial Pain Syndrome

The Chi-Square test results regarding lifting load and its relation to upper trapezius myofascial pain syndrome show a p-value of 0.000, OR = 11.647 (95% CI = 2.907 – 46.472). This indicates a significant association between lifting load and upper trapezius myofascial pain syndrome. The odds ratio value of 11.647 signifies that the lifting load variable has a risk 11.647 times higher for the occurrence of upper trapezius myofascial pain syndrome.

Based on the categories of lifting load, upper trapezius myofascial pain syndrome was experienced by 54 people (63.6%) who had a lifting load of more than 40 kg and 3 people (3.5%) who had a lifting load of less than or equal to 40 kg. Porters require significant force to lift excessive weight over prolonged periods. Jobs that require substantial force can lead to significant mechanical stress on muscles, tendons, ligaments, and joints, resulting in irritation, inflammation, fatigue, and damage to muscles and tendons, as well as other tissues.[15] This aligns with

the study conducted by Wahyuni in 2019, stating that the weight of the load carried by porters in the study was above 40 kg, which significantly affects muscle tissue damage, subsequently leading to muscle pain. Excessive manual load handling poses a high risk of work-related accidents.[16]

Porters can lift several sacks of groceries at once, surpassing the lifting load capacity set by the ILO, which is 40 kg for a single lift. Excessive and continuous muscle exertion leads to the formation of taut bands in the muscle tissue (tightened parts of the muscle), making these areas hypersensitive to pressure.[17]

Relationship between Lifting Frequency and Upper Trapezius Myofascial Pain Syndrome

Regarding lifting frequency, upper trapezius myofascial pain syndrome occurs more frequently in porters with a lifting frequency of more than 12 times in one hour, there are 48 people (56.5%), while in porters with a lifting frequency of less than 12 times there are 9 people (10.6%). The Chi-Square test results indicate a p-value of 0.038, OR = 2.963 (95% CI = 1.036 – 8.475), signifying an association between lifting frequency and upper trapezius myofascial pain syndrome. The odds ratio value indicates that the lifting frequency variable has a risk 2.963 times higher for the occurrence of upper trapezius myofascial pain syndrome.

This aligns with Rachmawati's research in 2016, which stated that a high and continuous lifting frequency can decrease the physical condition and productivity of workers. Repetitive stimulation on the upper trapezius results in a shift in activity distribution towards the muscle's lower regions during lifting tasks. Changes in activity distribution across different muscle regions may have significant implications for the persistence and exacerbation of neck-shoulder pain during repetitive tasks.[18]

In contrast, a study by Purwosusilo in 2015 found no association between lifting frequency and complaints of upper body parts among workers. This discrepancy may occur because, in that study, workers could relax and take breaks between their tasks. However, in this research, porters are required to complete tasks based on specific targets, leading to continuous lifting activities without specific rest intervals. The less rest time, the greater the weight lifting activity and load on the body's muscles.[22]

The repetitive motions performed by porters with heavy loads and high frequency cause constant muscle contractions and reduced blood circulation within the muscle tissue. This can increase the activation of trigger points in the upper trapezius muscles and result in pain in the neck and shoulder areas for the workers.[19]

Relationship between Working Duration and Upper Trapezius Myofascial Pain Syndrome

In relation to the duration of work, the occurrence of upper trapezius myofascial pain syndrome was experienced by 52 people (61.2%) with a work duration of more than 8 hours per day and 5 people (5.9%) with a work duration of less than or equal to 8 hours per day. The Chi-Square test results show a p-value of 0.025, OR = 4.160 (95% CI = 1.215 – 14.241), which means that there is a relationship between work duration and the incidence of upper trapezius myofascial pain syndrome. The odds ratio value shows that the duration of work variable has a risk 4.160 times higher for the incidence of upper trapezius myofascial pain syndrome.

These results are aligns with research conducted by Utami, et al., in 2017 which stated that there was a significant relationship between the duration of work and musculoskeletal disorders in rice farmers in Ahuhu Village in 2017. Their study highlighted inadequate rest hours in comparison to the extensive working hours (>8 hours/day), resulting in heightened workload on the skeletal muscles.[20]

Additionally, Setyowati's research in 2017 stated that short and frequent rest periods were more effective in preventing such disorders compared to longer but less frequent rest periods. Prolonged manual handling of heavy loads with high frequency over extended durations can lead to sustained mechanical stress. This prolonged stress may contribute to an increased risk of myofascial pain syndrome and muscle fatigue.[21]

In this study, there is a relationship between work duration and the occurrence of upper trapezius myofascial pain syndrome which can be caused by high daily work targets so that workers have to carry out heavy lifting activities continuously for more than 8 hours per day. Apart from that, workers also do not have enough rest time to relax their working muscles, so there is a risk of upper trapezius myofascial pain syndrome. According to recent studies, there is a relationship between long working hours and repetitive tasks and increased fatigue. The longer a worker's working period, the higher the risk of the worker experiencing myofascial pain syndrome.[23, 24]

SUMMARY

Based on this research, it was concluded that 57 people (67.1%) out of the total 85 respondents experienced upper trapezius myofascial pain syndrome. There is a relationship between age, lifting load, lifting frequency, and duration of work with the occurrence of upper trapezius myofascial pain syndrome among porters.

The variable that has the most significant relationship with the occurence of upper trapezius myofascial pain syndrome is the lifting load.

Suggestions for other researchers who wish to conduct similar research are to improve this research by exploring other predisposing factors that can trigger the occurrence of upper trapezius myofascial pain syndrome and complementing the physical examination with a pain scale. Research can also be carried out with a larger number of samples to obtain more accurate results.

REFERENCES

1. Atmadja, A.S. “Sindrom Nyeri Myofascial”. Cermin Dunia Kedokteran. 2016;43:176–9.
2. Kisilewicz, A., Janusiak, M., Szafraniec, R., Smoter, M., Ciszek, B., Madeleine, P., et al. “Changes in Muscle Stiffness of the Trapezius

Muscle after Application of Ischemic Compression into Myofascial Trigger Points in Professional Basketball Players". J Hum Kinet. 2018;64(1):35–45.
3. Silva, C.E.A., Guimarães, R.M., Cunha T.M. "Sensory Neuron-associated Macrophages as Novel Modulators of Neuropathic Pain". Lippincott Williams and Wilkins; 2021;6.
4. Fernández-de-las-Peñas, C., Dommerholt, J. "International Consensus on Diagnostic Criteria and Clinical Considerations of Myofascial Trigger Points: A Delphi Study". Pain Medicine (United States). 2018;19(1):142–50.
5. Maruli, W.O., Sutjana, I.D., Indrayani, A.W. "Perbandingan Myofascial Release Technique dengan Contract Relax Stretching terhadap Penurunan Nyeri pada Sindrom Myofascial Otot Upper Trapezius". Majalah Ilmiah Fisioterapi Indonesia. 2014;2(3).
6. Mila, D.Z., Endaryanto, A.H., Priasmoro, D.P., Abdullah, A. "Hubungan Antara Postur Tubuh Dalam Menggunakan Komputer Dengan Keluhan Myofascial Pain Syndrome Pada Karyawan di RSU Aminah Blitar". Jurnal Keperawatan Muhammadiyah. 2021;6(4):147–52.
7. Kharismawan, P.M., Winaya, I.M.N., Adiputra, I.N. "Perbedaan Intervensi Muscle Energy Technique dan Infrared dengan Positional Release Technique dan Infrared terhadap Penurunan Nyeri Myofascial Pain Syndrome Otot Upper Trapezius". Majalah Ilmiah Fisioterapi Indonesia. 2016;4.
8. Budiman, A., Husaini, Arifin, S. "Hubungan Antara Umur dan Indeks Beban Kerja dengan Kelelahan pada Pekerja di PT. Karias Tabing Kencana". Jurnal Berkala Kesehatan. 2016;1(2):121–9.
9. Koukoulithras, I., Plexousakis, M., Kolokotsios, S., Stamouli, A., Mavrogiannopoulou, C. "A Biopsychosocial Model-Based Clinical Approach in Myofascial Pain Syndrome: A Narrative Review". Cureus. 2021;13(4):1–11.
10. Mumtaz, R.F. "Karakteristik Individu, Faktor Pekerjaan, dan Keluhan Nyeri Bahu pada Porter Pendaki Gunung Raung di Wonorejo Kalibaru Banyuwangi pada Tahun 2020". Repository Universitas Jember. 2020.
11. Pratiwi, H.M., Widjasena, B., Suroto. "Analisis Praktik Menggendong pada Buruh Gendong Wanita di Pasar Induk Buah pada Sayur Giwangan Kota Yogyakarta". Jurnal Kesehatan Masyarakat. 2015;3(2):147–57.
12. Sastroasmoro, S., Ismael, S. "Dasar-dasar Metodologi Penelitian Klinis". 5th ed. Sagung Seto; 2014. 130–132 p.
13. Aktifah, N., Saputri, D. "Kejadian Myofacial Pain Syndrom Otot Upper Trapezius Berdasarkan Usia dan Lama Kerja pada Pekerja Batik Tulis di Kecamatan Wiradesa". Jurnal Fisioterapi dan Rehabilitasi. 2020;4(2):26–33.
14. Lintin, G.B.R., Miranti. "Hubungan Penurunan Kekuatan Otot dan Massa Otot dengan Proses Penuaan pada Individu Lanjut Usia yang Sehat Secara Fisik". Jurnal Kesehatan Tadulako. 2019;5(1):1–62.
15. Hanifa, E., Koesmayadi, D., Susanti, Y. "Hubungan Beban Kerja Fisik dengan Kejadian Low Back Pain pada Kuli Panggul Beras di Pasar Induk Gedebage". Jurnal Integrasi Kesehatan & Sains. 2020;2(2):122–5.
16. Wahyuni, E.S. "Hubungan Berat Beban terhadap Tingkat Kejadian Nyeri Punggung Bawah pada Pekerja Buruh Angkut Pasar Legi Surakarta". Jurnal Terpadu Ilmu Kesehatan. 2019;8(2):130–219.
17. Makmuriyah, Sugijanto. "Iontophoresis Diclofenac Lebih Efektif Dibandingkan Ultrasound Terhadap Pengurangan Nyeri Pada Myofascial Syndrome Musculus Upper Trapezius". Jurnal Fisioterapi. 2013;13(1):17–31.
18. Falla, D., Cescon, C., Lindstroem, R., Barbero, M. "Muscle Pain Induces a Shift of the Spatial Distribution of Upper Trapezius Muscle Activity during a Repetitive Task". Clinical Journal of Pain. 2017;33(11):1006–13.
19. Wijayanti, I.A.S, Budiarisma, P.Y., Govindasamy, S. "Nyeri Miofasial". Unud Repository. 2017.
20. Utami, U., Karimuna, S.R., Jufri, N. "Hubungan Lama Kerja, Sikap Kerja dan Beban Kerja dengan Muskuloskeletal Disorders (MSDs) pada Petani Padi di Desa Ahuhu Kecamatan Meluhu Kabupaten Konawe Tahun 2017". Jurnal Ilmiah Mahasiswa Kesehatan Masyarakat Unsyiah. 2017;2(6).
21. Hadyan, M.F., Saftarina, F. "Hubungan Usia, Lama Kerja, Masa Kerja dan Indeks Massa Tubuh (IMT) terhadap Kejadian Low Back Pain (LBP) pada Petani di Desa Munca Kabupaten Pesawaran". Jurnal Kedokteran Universitas Lampung. 2017;7(4):141–6.
22. Mahestri S, Jayanti S, Wahyuni I. "Hubungan Berat Beban, Frekuensi Angkat, dan Postur Kerja dengan Keluhan Thoracic Outlet Syndrome pada Penambang Pasir Tradisional Desa Banjarparakan." Jurnal Kesehatan Masyarakat FKM Undip. 2021 Jan;9(1):72–8.
23. Guo F, Liu L, Lv W. "Biomechanical analysis of upper trapezius, erector spinae and brachioradialis fatigue in repetitive manual packaging tasks: Evidence from Chinese express industry workers". Int J Ind Ergon. 2020 Nov 1;80:103012.
24. Wirayani NKM, Widnyana M, Wahyuni N, Sugiritama IW. "Hubungan antara Postur Kerja dan Masa Kerja dengan Terjadinya Myofascial Pain Syndrome Otot Upper Trapezius pada Penjahit Garmen di Batubulan Gianyar". Majalah Ilmiah Fisioterapi Indonesia. 2020;8(1):63.