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ASSOCIATION OF MUSCULOSKELETAL PAIN WITH WEIGHT LIFTING IN CONSTRUCTION WORKERS OF LAHORE

Original Research

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Abstract

Background: Globally, musculoskeletal pain is the primary cause of disability and affects the muscles, tendons, ligaments, nerves, and bones. Workers who perform physically demanding jobs, such as heavy lifting and manual handling, are especially vulnerable to musculoskeletal problems related to their jobs.

Objective: The objective of this study is to assess the prevalence and association of musculoskeletal pain with manual weightlifting among construction workers, aiming to identify risk factors and recommend preventive strategies.

Methods: This study sought to evaluate the prevalence of musculoskeletal pain and its association with weightlifting among laborers. A total of 147 male construction workers, aged 18 to 40, who performed weight-bearing duties, had at least a year of experience, and lifted more than ten kg, participated in the cross-sectional observational study. Data was collected from the construction areas in Wapda Town and Johar Town in Lahore. Consent was acquired, the data collection involved utilizing the Nordic Musculoskeletal Questionnaire (NMQ) alongside the Quick Exposure Check (QEC).

Result: Data analysis was performed using SPSS-25, results revealed an average height of 1.697 m, weight of 62.38 kg, age of 30.23 years, and BMI of 21.74. Five people achieved a score of 30 on the NMQ assessment, and almost 8% of participants received a score of 23 on the NMQ assessment. The QEC assessment indicated varying discomfort levels among participants. A significant positive correlation ($p<0.003$) was found between manual weightlifting and musculoskeletal pain in laborers.

Conclusion: This study showed that manual weightlifters had an increased chance of developing musculoskeletal pain, especially in the hands, shoulders, and low back. These findings highlight the significance of improving workplace health and safety protocols.

Keywords: musculoskeletal disorder, laborers, disability, occupation, low back pain, Construction workers, ergonomic adjustments, labor safety, lower back pain, manual weightlifting, occupational health, preventive strategies, risk factors, work-related injuries.

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INTRODUCTION

Chronic musculoskeletal pain, affecting 20–33% of the global population (about 1.75 billion people), is the leading cause of disability worldwide. It impacts bones, muscles, ligaments, tendons, and nerves, leading to various forms of pain, including neuropathic and localized types. This condition significantly reduces quality of life, increases drug use, sick leave, and disability claims, and raises healthcare costs. Common causes include neck pain, shoulder discomfort, chronic lower back pain, fractures, sprains and arthritis. While the risk increases with age, it can affect individuals at any age, severely impacting their mental, emotional, and financial well-being (1).

The construction industry, vital and expanding rapidly worldwide and in GCC countries, is fraught with high risks of fatal accidents and occupational diseases. This study examines various physical attributes and discomfort among construction laborers, who often experience pain in the knees, lower back, neck, shoulders, and legs. Irregular sleep patterns contribute to chronic discomfort. Despite its economic importance for developing countries, construction remains one of the riskiest sectors, with high rates of musculoskeletal disorders due to intense physical labor, long hours, and challenging conditions (2). Work-related musculoskeletal disorders (WMSDs) are injuries affecting blood vessels, muscles, tendons, ligaments, joints, and nerves, leading to severe pain and disability among workers globally. These disorders result in missed workdays, increased medical costs, and lower living standards (3).

Construction workers face high risks of work-related musculoskeletal disorders (WMSDs) due to factors like handling heavy materials, awkward postures, and constant machinery use. Research shows that individual traits (age, education, exercise) and psychosocial factors (work stress, support) also play a role. Studies link WMSDs in construction to time constraints and job demands, with prevalence varying by location and job role within the industry (4). This article investigates the link between lifting weights and musculoskeletal pain, identifying risk factors and recommending preventive strategies to reduce the incidence. It emphasizes the importance of understanding this relationship for improving ergonomic practices, safety protocols, and laborer well-being.

MATERIAL AND METHODS

This observational cross-sectional study seeks to explore the relationship between musculoskeletal pain and weightlifting among construction workers, approved by the Research & Ethical Committee of University of Management and Technology Lahore (RE-124-2024). A convenient sampling technique was used, the study included male workers aged 18-40 years, (5) who perform tasks involving heavy loads, such as lifting, carrying, pushing, or pulling (6). The participants had at least one year of experience and performed weight-bearing activities for 20 hours per week (7)(8). Excluded those with advanced osteoarthritis, rheumatoid arthritis, spinal cord injuries, recent musculoskeletal injuries, (9) temporary or seasonal workers, and night or rotating shifts (10).

A sample size of 147 laborers is chosen with a confidence level of 0.95 to facilitate the study (11). Data was collected from under-construction buildings in Johar Town and Wapda Town, Lahore, using NMQ and QEC. The Nordic Musculoskeletal Questionnaire assesses the nature, duration, and severity of musculoskeletal symptoms and their impact on work and daily life. Widely used in research, the NMQ scores up to 30 points: 0 indicates no disorder, 1-10 mild, 11-20 moderate, and 21-30 severe disorder (12)(14). The Quick Exposure Check (QEC) questionnaire assesses the risk factors in the workplace that could contribute to musculoskeletal disorders focusing on manual handling, postures, and repetitive movements. It assesses job types, frequency, and pain levels.

The QEC includes 8 questions on manual weight handling, daily task duration, force exertion, vehicle driving, use of vibrating tools, and task difficulty and stress (15). For statistical analysis, data was entered into SPSS version 25. Frequency and descriptive statistics were computed, including standard deviation, mean, and median. Histograms illustrated age, weight, height, BMI, and NORDIC questionnaire scores. Bar and pie charts displayed QEC results and pain areas. The Chi-square test assessed the association between pain area and weight lifting, while Pearson correlation tested the relationship between musculoskeletal pain area and weight lifting. Consent was obtained from participants and their data was kept confidential. Participants were informed about the study's purpose and significance.

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RESULTS

The study involved 147 male laborers aged 18 to 40 years, with mean values for age, weight, height, and BMI being 30.23±6.27 years, 62.38±7.84 kg, 1.70±0.08 meters, and 21.74±3.07, respectively. It aimed to assess the association between weightlifting and musculoskeletal (MSK) pain using the Nordic questionnaire (mean score 9.08±7.22) and the Quick Exposure Check (QEC). Results showed that 29.93% experienced lower back pain, 22.45% had shoulder pain, 8.84% suffered wrist and hand pain, 7.48% had upper back pain, 6.80% reported knee and neck pain, 6.12% felt elbow pain, 4.08% experienced hip/thigh pain, 3.40% had ankle pain, and 4.08% reported no pain.

Table 1 Descriptive Statistics of Demographics

	N	Minimum	Maximum	Mean	Std. Deviation
Age of Participants	147	18	40	30.23	6.271
Weight of Participants	147	40	95	62.38	7.844
Height of Participants	147	1.4	1.9	1.697	.0772
BMI of participants	147	12.37	30.14	21.7437	3.06514

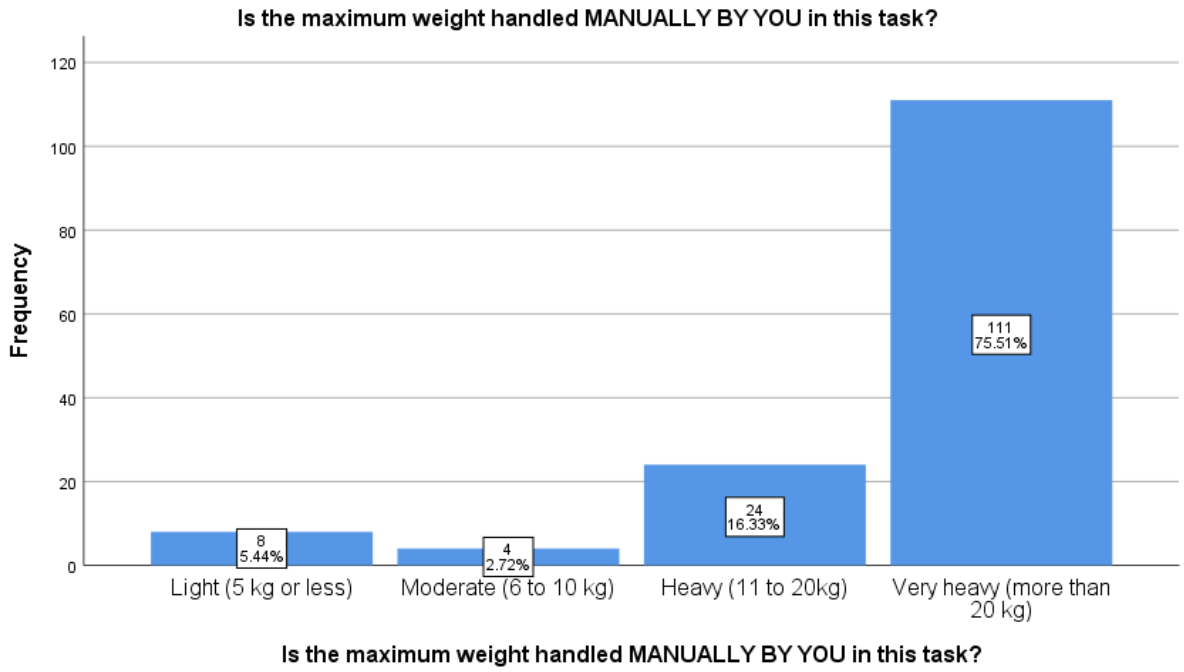


Figure 1 Bar chart showing varieties of manually weight handling

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Table 2 Descriptive Statistics of Nordic MSK questionnaire

	N	Min	Max	Mean	Std. Deviation
Have you at any time during the last 12 months had trouble (ache, pain, discomfort) in	147	0	12	4.03	3.136
Have you at any time during the last 12 months been prevented from doing your normal work (at home or away from home) because of the trouble	147	0	9	2.24	2.310
Have you had any trouble at any time during the last 7 days	147	0	9	2.84	2.421
Total Score In Nordic Questionnaire	147	0	30	9.08	7.215
Valid N (listwise)	147				

Table 2 presents the descriptive statistics of the Nordic Musculoskeletal Questionnaire (NMQ) responses among 147 participants. The average score for experiencing trouble (ache, pain, or discomfort) in the last 12 months is 4.03 (SD = 3.136), with scores ranging from 0 to 12. Additionally, the mean score for participants prevented from performing their normal work due to musculoskeletal issues in the past year is 2.24 (SD = 2.310), with a range of 0 to 9. For trouble experienced in the last 7 days, the mean score is 2.84 (SD = 2.421), also ranging from 0 to 9. The total score for the NMQ, indicating overall musculoskeletal issues, shows a mean of 9.08 (SD = 7.215) with a range from 0 to 30, reflecting the varying severity of discomfort reported among participants.

Table 3 Correlation Between Weightlifting and Musculoskeletal Pain Scores

Pearson Correlation			
		Weightlifting (kgs)	Total Score of Nordic Questionnaire
Weightlifting (kgs)	Pearson Correlation	1	.154
	Sig. (2-tailed)		.003*
	N	147	147
Total Score of Nordic Questionnaire	Pearson Correlation	.154	1
	Sig. (2-tailed)	.003*	
	N	147	147

Table 3 shows the Pearson correlation analysis between weightlifting (measured in kilograms) and the total score of the Nordic Musculoskeletal Questionnaire among 147 participants. The correlation coefficient is 0.154, indicating a weak positive relationship between weightlifting and musculoskeletal pain scores. The significance value (p = 0.003) confirms that this correlation is statistically significant, suggesting that as the weight lifted increases, there is a slight increase in reported musculoskeletal pain.

DISCUSSION

The study investigated the correlation between weightlifting and musculoskeletal pain in 147 male laborers aged 18-40. Results showed a significant correlation (p=0.003) between weightlifting and musculoskeletal pain, indicating the need for improved safety measures. The participants reported various pains, including low back, shoulder, wrist, hand, upper back, knees, neck, hips, thighs, ankles, and elbows. Kashif Muhammad et al conducted a study in 2019 with a sample size of 666 construction workers. For data entry SPSS was used. The questionnaire used for study was NMQ. Furthermore, a pain rating scale was used. The most affected area was the low back (16). Similar to the above study, this study also used SPSS for data entry. Also, NMQ was used for pain evaluation which showed

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significant results in lower back with prevalence of 29.93%. In contrast to the above study, the only difference is sample size (147) and use of QEC questionnaire.

Shaukat, N et al did a cross-sectional survey among 321 laborers working in construction firm. NMQ-E questionnaire was used to find the frequency of WRMSP. Also used logistic regression analysis tool to check factors responsible for MSKP. The most common complaint of study was low back pain (27.8%). Similarly, this study showed lower back (29.93%) as the region most frequently affected by pain, But the difference of QEC questionnaire in addition to NMQ and sample size of 147 showed difference (17). Kawakami et al presented a cross-sectional study among 308 people working in the construction field having experience of at least one year in this occupation. Modified Nordisk Scale was used to check morbidity of MSK issues and A structured questionnaire was employed to gather information on work-related factors and sociodemographic details. The lower back, wrist and shoulder were most affected sites (18).The present study also includes laborers having at least 1 year of experience in this occupation. It also concludes the most affected areas are lower back, shoulders, wrists and hands. Comparatively, NMQ and QEC questionnaires were used for data collection.

Mbada CE et al did a cross-sectional survey in 2022 to check the prevalence and risk factors for WMSD among 130 Nigerian plumbers. The questionnaires used were NMQ and Job Factor Questionnaire. The most prevalent region of pain was lower back (19).This study includes 147 participants almost equal to the above study and the area being most affected was lower back. The only difference is QEC in addition to NMQ and inclusion of different construction workers instead of plumbers. B. Adhikari et al. (2021) studied 402 construction workers, identifying lower back pain as the most significant issue, using semi-structured interviews and R programming for analysis (20). Similarly, the current study also found lower back pain to be a major concern. However, while Adhikari's study focused on lower back pain risk factors, this study examines work-related musculoskeletal disorders (WRMSDs) among laborers and used SPSS for analysis.

Lee, Y.C et al presented a study in 2023 which was a cross-sectional survey among 380 laborers. A self-reported structured questionnaire was used which was consisted of three sections: the first part was compromised of demographic data, second part contained characteristics related to work and last part was compromised of NMQ questionnaire in Chinese language. The most affected area of pain was the neck (24.7%) (4).The present study also includes QEC in addition to Nordic questionnaire. The sample size is 147 and most importantly the affected most area is lower back (27.8%). The study highlights innovations for the construction industry and laborers in Pakistan, suggesting that proper training, ergonomic adjustments, and frequent breaks can reduce MSK pain. It also emphasizes the role of psychosocial factors in MSK issues and discusses key policy implications for worker benefits, safety, and healthcare. These findings can guide the development of evidence-based strategies to improve laborer wellbeing and reduce MSK pain (16).

This study has some limitations because most of the laborers were illiterate and not able to complete surveys themselves. So, the collection of data was conducted verbally which put difficulty in communication. MSK pain is reported subjectively in this study instead of objective assessment. The implication of study is only for particular populations of construction laborers and geographic areas. The laborers reporting MSK pain might have been involved in other activities instead of heavy weightlifting (17). For future researchers, it is recommended to have a look at varieties of weightlifting (e.g. mechanical weightlifting) to find the relation with musculoskeletal pain and consider the root risk factors responsible for the most prevalent pain in this study which is lower back. It is recommended for health professionals and physiotherapists to educate the safety guidelines (proper postures and techniques) through different awareness campaigns to handle heavy weight (13). They must play a role in making and implementing interventions to lessen MSK pain. It is advised for laborers that they must follow the principles and ergonomics of proper handling and report early MSK pain to nearest health care center (20).

CONCLUSION

This study concludes that musculoskeletal pain in laborers is significantly caused by manual weight handling. The most affected areas due to weightlifting are lower back, shoulders, wrists and hands. The results display serious concerns for occupational health and safety. By fostering effective interventions and preventive strategies, the well-being and productivity of workers in physically demanding occupations may be improved.

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