



Original Article

Prevalence of Musculoskeletal Pain among Weight-lifters; A Cross-sectional Survey

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ABSTRACT

Background: Weight lifting is considered one of the most widely used sports for strength training focusing on lifting maximum weight in a single repetition. It is not exclusive to weight lifters only, rather all athletes perform this as a substantial physical exercise to gain power, strength and muscle mass. **Objective:** To evaluate the prevalence of musculoskeletal pain among weight-lifters in Lahore, Pakistan. **Methods:** This cross-sectional study was completed within six months after taking data from weight-lifters from various gyms, health clubs and universities in Lahore, Pakistan using a convenient sampling technique. About 240 weight-lifters aged between 18 to 45 years, both gender and those who worked out at least three times per day were included while those were excluded from this study who had a previous history of comorbid conditions such as liver, cardiac and neurological diseases. For collecting data, the Nordic musculoskeletal questionnaire was used. Descriptive statistics were presented in the form of percentage, frequency and mean. Fisher's exact test was used to calculate the difference in the prevalence of pain in different regions of the body of the weight lifters. An odd ratio was used to determine the risk involved for each joint of the body. Logistic regression was employed to calculate the confidence interval. **Results:** The prevalence of musculoskeletal pain in shoulders was 88.75%, elbow 84.58%, neck 84.16%, wrists/hands 84.16%, upper back and lower back 92.08%, hips 93%, knees 92.9% and ankles/foot 22.08% in weight-lifters of Lahore. **Conclusion:** This study concludes that there is a high prevalence of musculoskeletal pain among weight lifters in shoulders, elbows, wrists and hands, upper and lower back, neck, knee and hip joints.

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Keywords: musculoskeletal pain;
prevalence; weight- lifters

Citations: Asghar Z, Tahir MJ, Zulfiqar A, Tariq M, Basit M, Waqas M. Prevalence of musculoskeletal pain among weight-lifters; A cross-sectional survey. The Healer Journal of Physiotherapy and Rehabilitation Sciences. 2023;3(4):488-496.

INTRODUCTION

The expenditure on musculoskeletal injuries costs about two trillion United States dollars globally in the form of interruption in daily production, sick leaves and compensation for work. As a result, this causes a severe burden on the physical, psychosocial and economic condition of a country and it also leads directly towards spending extra cost on production and leads to less efficiency.^{1,2} Developed and underdeveloped countries both are severely burdened by these musculoskeletal disorders.²⁻⁵

Weight lifting is an extensively used sport for training an athlete for more strength, focusing on maximal weight lifting in a single repetition. This activity of weight lifting is not specifically exclusive to weight-lifters only, rather almost all athletes perform weight lifting as a substantial physical exercise to gain strength, power and muscular mass.⁶ Bodybuilders also utilize this regime to develop and refine their athletic bodies. Talking about the Olympics, weight lifting is measured as strength power, lifting, balance and coordination between two quick movements, for example, clean and jerk and lifts the snatch.⁶

Two important proceedings that take place during weight lifting are the snatch and the clean and jerk. The first one is snatching which is probably the most powerful and the most quickest movement an athlete can perform. This demands the weight-lifter to perform a single unremitting movement to lift the barbell from in front of his or her legs to above his or her head while the arms are in a locked position. The weight-lifter is not supposed to either drop the bar without touching his or her knees to the floor nor he or she is supposed to interrupt the upward motion. Then the weight-lifter has to hold the weight overhead for at least two seconds up

until he or she receives the referee's consent.⁷

Weight-lifting is a technique that the training of strength and endurance in which a load is either pulled or pushed in the form of resistance.^{8,9} The loads which are used are mostly free-weight, which can be, barbells, dumbbells, kettlebells, weight-selectorized machines, cable and pulley machines and plate-loaded machines. Weight lifting might also be used as a fragment of an exercise regime or as an entire program to build muscular endurance and strength.¹⁰ It can also aid in developing muscular hypertrophy which is effective for preventing injuries during other sports and has a relatively low incidence of injuries when compared to various other sports activities.^{11,12}

Some other benefits might also include, improvement in blood lipid profile, resting metabolic rates, improvement in bone mineral density, reduction in resting blood pressure, improvement in mental health, reduction for the risk for diabetes type II, reduction in risk for colon cancer, reduction in the transit time for gastrointestinal activity, improvement in the maximum capacity of aerobics, reduction in pain and discomfort for those who are suffering from osteoarthritis, decreased low back pain and improved flexibility.^{13,14}

Regardless of all these benefits, weight lifting similar to all other physical activities, disposes the weight-lifters to musculoskeletal injuries as weight lifting involves certain vigorous movements and the use of heavy equipment.^{15,16}

Kerr and co-workers showed us that 25,335 injuries related to weight training were observed in the United States out-patients department from the year 1990 to 2007. The data which was collected during this study

showed us a yearly increase in recreational injuries related to weightlifting across this period.¹⁷ Grier and his co-workers showed us that during a weight training of 12 months, the rate of prevalence was 4.5 for men and 0.6 for women, considering the population of the United States army division.¹⁸

Talking about the body areas anatomically which are at a higher risk of injury during weight lifting are the lower back, upper back, knees, shoulders, elbows and wrists/ hands, especially considering leisure weight-lifting activities.^{15,17} Most of the injuries were reported to have occurred in the upper extremity, most commonly in the shoulder and lower back.^{17,19,20} Regardless of all this research, there is still a scarcity of literature focusing on the prevalence and pattern of pain and injuries among weight-lifters around the world.⁸

It is crucial to comprehend the profile of the injury so the adverse effects might be reduced and the benefits which weight lifting provides can be maximized. Consequently, this current study is designed to determine the prevalence of pain among weight-lifters in Lahore, Pakistan. The research provides evidence on the prevalence of musculoskeletal pain and musculoskeletal injuries which lead to chronic pain and disorders among this population of weight lifters. More evidence is needed especially in Pakistan so that this information can add more to preparing more reliable precautionary, preventive and treatment measures for this population.

This specific population needs to be studied exclusively considering their specific musculoskeletal injuries and their symptoms so that exclusive precautionary, preventive, and therapeutic exercise regimes could be implemented on this population exclusively. This current study will add more to the research evidence focusing on the prevalence

of musculoskeletal pain among weight lifters which will help motivate future researchers to conduct more studies focusing on this specific population.

METHODS

This cross-sectional study was conducted after the approval of the ethical committee of the university and completed within six months after the approval of its synopsis. Then their informed consent was gained in the native language after they agreed to participate in this study. Data for this study were collected from weight-lifters from various gyms, health clubs and universities in Lahore, Pakistan. Printed consent forms in Urdu and English were given to every participant to sign their consent. A convenient sampling technique was used to collect data from the weight-lifters recruited in this study.

The sample size for this study was projected to be 240 by considering a 90% confidence interval and 10% response rate.²¹ The following formula was utilized for calculating the sample size, $n = z^2 \times (1-p)/e^2$ where n is population size 3000, e is the margin of error (percentage in decimal form) 5% and z is the z score. Weight-lifters of age between 18 years to 45 years, both gender and those who worked out at least three times per day, participated previously in university or local weight-lifting competitions and took part in weight-lifting regimes for their fitness and well-being were included in this study.²² Those weight lifters were excluded from this study who had a previous history of comorbid conditions such as liver, cardiac and neurological diseases, for example, ischemic heart diseases, hepatitis and cerebellar disease.²²

For collecting data Nordic musculoskeletal questionnaire was used. This scale is used to determine the universal complaints of

musculoskeletal disorders in epidemiological cross-sectional studies and surveys by the Nordic Council of Ministers. The validity and reliability of this tool are very well established and recognized in the literature.²³ The socio-demographic forms and the questionnaire were filled out to gather data. The data was analyzed using Statistical Package for Social Sciences version 23. Descriptive Statistics was presented in the form of percentage, frequency and mean.

Various graphs, tables and charts were used to represent the frequency, means and percentages. Fisher's exact test was used to calculate the difference in the prevalence of pain in different regions of the body of the weight lifters. An odd ratio was used to determine the risk involved for each joint of the body. Logistic regression was employed to calculate the confidence interval.

RESULTS

Tables II and III showed that the relation between the spine (upper and lower back) and

peripheral joints along with an odd ratio (OR) that indicates that pain in one joint increases the risk of pain in the other joint. A strong relationship was found between the spine and shoulder, hip and knee respectively while the pain in the knee, elbow and ankle was not significantly associated with the high risk of pain in the spine.

DISCUSSION

The results of this current cross-sectional study showed us that there is a higher rate of prevalence of neck pain among weight-lifters of Lahore. About 202 out of 240 weight-lifters reported neck pain with a prevalence of 84.16%. The other studies also found a similar relationship between weight-lifters and pain in the neck and lifetime prevalence rates were found to be around almost 48.3%. The literature indicated that pain in the neck is strongly associated with an athletic overuse injury. It has been also declared in previous studies and mentioned in the literature that pain in the cervical region is commonly associated with microtrauma and overuse

Table I: Frequency and Prevalence of Musculoskeletal Pain in Weight-lifters

Body Region	Frequency	Percentage (%)
Shoulder	213	88.75
Elbow	203	84.58
Neck	202	84.16
Wrist/Hands	202	84.16
Upper Back	221	92.08
Lower Back	221	92.08
Hips	224	93
Knees	223	92.9
Ankles/Feet	53	22.08

Table II: Relationship of Pain in Joints During the Last Week

Variables	p-value	Odd Ratio (95% Confidence Interval)
Neck versus Shoulders	0.010	5.56 (1.58–19.49)
Neck versus Hips	0.004	12.73 (2.13–76.12)
Neck versus Knees	0.016	5.40 (1.31–22.25)
Wrists versus Thoracic Spine	0.019	17.60 (1.73–178.76)
Wrists versus Hips	0.043	12.00 (1.63–88.29)
Thoracic versus Lumbar Spine	0.009	6.87 (1.62–29.09)
Lumbar Spine versus Hips	0.0006	N.A
Lumbar Spine versus Knees	0.030	4.69 (1.16–19.00)

Table III: Relationship of Pain Between Joints During the Last Year

Variable	p-value	Odd Ratio (95% Confidence Interval)
Neck versus Shoulders	0.019	4.18 (1.37–12.71)
Neck versus Elbows	0.056	4.36 (0.99–19.32)
Neck versus Thoracic Spine	0.0002	11.69 (1.54–88.58)
Neck versus Lumbar Spine	0.045	3.58 (0.94–13.68)
Elbows versus Wrists	0.003	16.50 (2.51–108.64)
Elbows versus Ankles	0.008	7.24 (1.86–28.11)
Wrists versus Thoracic Spine	0.051	6.56 (1.17–36.84)
Wrists versus Hips	0.019	8.96 (1.75–45.91)
Wrist versus Ankles	0.040	6.83 (1.38–33.96)
Thoracic versus Lumbar Spine	0.003	9.47(1.90–47.28)
Lumbar Spine versus Hips	0.043	8.44 (0.85–83.61)

studies and mentioned in the literature that pain in the cervical region is commonly associated with microtrauma and overuse injuries among the best athletes.^{24,25} The current study coincides with these previous findings and showed us a high prevalence of musculoskeletal pain in the back region of weight-lifters (Table I). Literature also proves to us that some sports impose severe demands on the back region of the human body. Therefore, musculoskeletal injuries at the back are very much common among weight-lifters. The findings of magnetic resonance images also verified that abnormalities in the back and spinal region such as reduction in disc height, disc bulge and Schmorl's nodes very common among weight-lifters.^{25,26}

The current study supports all these findings showing a high prevalence rate of 92.08% of musculoskeletal pain in the back region of the weight-lifters. The above researchers also concluded that the growth of spurs is commonly observed in overuse injuries., which means that most of the injuries are already at the borderline. Over time sports and exercise often lead to deterioration with aging.²⁷⁻²⁹ Sometimes it gets impossible to find out the exact diagnosis of the patients, therefore this current study only reported the frequency and prevalence of musculoskeletal pain in weight-lifters.

There are few studies present in the literature that showed a higher rate of prevalence of elbow pain and disorders. The reason for this higher prevalence of pain in elbows in athletes is mostly due to involved overhead activities.^{24,30} This current study strongly agrees with this fact that the pain in wrist and injuries were also quite common among weight-lifters as compared to other athletes.^{30,31} This current study determined the prevalence of hip pain among weight-lifters which came out to be 93%. No previous study was conducted specifically to measure the

prevalence of hip injuries among weight-lifters. This current study found out the prevalence of pain in the hips of this population.

The prevalence of musculoskeletal pain in the ankles and feet of the weight-lifters was 22.08%. Some other studies also showed us similar findings.^{24,32,33} This is an interesting fact that the prevalence of pain in the ankle and feel is less than in other athletes, specifically runners who run on hard surfaces.²⁴ This current study also showed that there is a strong relationship between pain in the spine and other parts of the body of the weight-lifters (Tables II & III).

This study also recommends future researchers determine the pattern of this pain to completely comprehend these findings. One finding of our current study is very important and interesting that is the relationship between spinal and hip pain. This relationship might be recognized as a hip-spine syndrome. Future researchers are recommended to work on and elaborate on this relationship in details among this population of weight-lifters.³⁴⁻³⁶ The above-mentioned correlation was also recognized in the earlier case study.

A case study elaborated that sudden and acute pain in the gluteal region of the body is a result of a disc lesion. Their study suggested that the functioning of the lumbopelvic region is convolutedly associated with hip pain due to its close immediacy and nearness to this region.³⁷ This current study coincides with their findings as well. Talking about the body areas anatomically which are at a higher risk of injury during weight lifting is the lower back, upper back, knees, shoulders, elbows and wrists/hands, especially considering leisure weight-lifting activities.^{15,17} Most of the injuries were reported to have occurred in the upper extremity, most commonly in the shoulder and lower back.^{17,19,20} This current

study strongly agrees with this fact as this current study shows a higher rate of prevalence of pain in this region and proves these findings to be true. The results and findings of this current study should be interpreted cautiously as the sample size of this study is small and there are certain chances that relationships that might exist but not very well established through the current study. Consequently, there is a chance of error type II, even though the rate of response of this current study was brilliant.

Future researchers are recommended to conduct studies to find out the prevalence of pain in the spine and proximal joints among weight-lifters and other athletes. As this might further emphasize the need to take preventive measures for the weight-lifters and other athletes to prevent future chronic and life-threatening injuries.

This current study recommends health-professional workers and physiotherapists providing more guidance and information to the weight-lifters about the proper biomechanics and ergonomics of their body postures and body positioning during weight-lifting and their weight-lifting environment respectively so that they can be saved from chronic, prolonged and life-threatening musculoskeletal injuries.

Future researchers are recommended to conduct a study with a rather greater sample size and covering more area geographically for more generalized results. A study with random sampling on a larger scale must be conducted in the future. Considering this population of weight-lifting future researchers are recommended to include a psychosocial assessment of this population as well as outcome measures to determine the other factors which might be associated with these

kinds of musculoskeletal signs and symptoms. The limitation of this study was that this survey did not include information about the psychosocial aspect of the weight-lifters, this was substantial information that was left out which might have caused a reduction in the genuine impact of the musculoskeletal injury.

CONCLUSION

This current study concludes that there is a high prevalence of musculoskeletal pain among weight lifters in shoulders, elbows, wrists and hands, upper/lower back, neck, knee and hip joints. This study also concludes that there is a strong association between musculoskeletal pain in the spine and shoulder, knee and hip respectively. While pain in the elbow, knee and ankles is not significantly associated with a higher risk of pain in the spinal region which designates that pain in the spine does not increase the risk of pain in these regions.

DECLARATIONS

Consent to participate: Written consent had been taken from patients. All methods were performed following the relevant guidelines and regulations.

Availability of data and materials: Data will be available on request. The corresponding author will submit all dataset files.

Competing interests: None

Funding: No funding source is involved.

Authors' contributions: All authors read and approved the final manuscript.

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