



Musculoskeletal Injuries Among Weight Lifters With or Without Supervision ? A Comparative Cross Sectional Study

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Significance:

Weightlifting is very popular among athletes and youngsters. Where on one hand it has many benefits like improvement of posture, gain in bone mineral density, maintenance of weight etc., on the other hand it also pose high risk of injury. Occurrence of shoulder and low back injuries is more in unsupervised weightlifting. Supervised weightlifting reduces the chances of injuries. Chances of musculoskeletal injuries due to weightlifting and powerlifting can be decreased.

Abstract

Background: People nowadays have developed a new passion of weightlifting. Weightlifting focuses on vigorous muscle development. But injuries are also common in weightlifting. This study aims to compare the injury rates among supervised and non-supervised weightlifters.

Methods: A group of 138 weight lifters was divided into two groups i.e. who did training under supervision and the other who did training without any supervision. Injuries related to musculoskeletal system were identified using Nordic musculoskeletal questionnaire. Data was analyzed using SPSS. Chi square test was used to see the association of musculoskeletal pain among weightlifters with or without supervision.

Results: Significant association found between musculoskeletal injuries and supervision. Injuries lesser in number among supervised weightlifters as compared to unsupervised weightlifters. Mean age of weight lifters under supervision and without supervision was 21.99 (SD 3.81) and 24.64 (SD 5.01) respectively. Mean workout days /week among weight lifters under supervision was almost same i.e. 5.67 (SD .63) and was 5.62 (SD .81). Out of 51 participants who work-out for 46-60 min, 30 were not under supervision while 31 weightlifters who work-out for 61-90 min were working out under supervision. Injury rate was more in the region of shoulder in both groups supervised and unsupervised groups while hip/thigh region was less involved in both supervised and unsupervised groups.

Conclusion: Overall results showed significant association between musculoskeletal injuries and supervision. Injury rate was more among weightlifters who work without supervision as compared to those who work under supervision. Care should be taken and weight lifting and exercises must be performed under expert's supervision.

Introduction

Passion for weightlifting has increased in the past few years, by idealizing "RAMBO" (1). Weightlifting focuses on the use of vigorous muscle power and is employed in many athletic activities such as fitness training & sports training (2). Most professional athletes hire personal trainers to help in their workout. This not only helps them save time but also help in avoiding injuries. The right type of angle is required in several exercises like crunches and V-ups, and to achieve that properly one must position his body accordingly. If there is a slight change in angle, a muscle might twitch causing musculoskeletal injuries such as ruptured ligaments, dislocation of joints, injuries of spine and fractures. Dumbbell extensions often put the muscles under a lot of stress which could be avoided under proper supervision (1).

According to several studies, it was observed that after following resistance training protocols under supervision, the leg press strength performance along with squat and bench press strength of several trainees increased (1). Powerlifting includes squats, bench press, and deadlift whereas weight training includes resistance exercises using machines to gain strength. Studies also show that weight training is more likely to cause injuries than weightlifting. The number of injuries increase with the number of exercises taken up by an individual. One must be well aware of the common injuries caused by powerlifting. Several musculoskeletal injuries like tendon ruptures and dislocations of specific joints are caused by specific types of resistance exercises e.g. dislocation of the hip joint is more likely to be caused by a jerk and split snatch exercises (2). Supervision can most likely decrease the musculoskeletal injuries as indicated in the studies mentioned earlier. The relative improvement in strength is observed under the supervision and less injury prevails. According to a study, the prevalence of weight lifting related injuries is 2.6 injuries per 1000 hours of activity, with most common injuries being sprains, strains, tendon avulsions, compartment syndrome and overuse syndrome (3). Severe injuries may include shoulder dislocations, tendon ruptures of the pectoralis muscle, biceps, and triceps; stress fractures of the distal clavicle, humerus, radius, and ulna; traumatic fractures of the distal radius and ulna in adolescent weightlifters; and compressive and stretch neuropathies (4).

This research focuses on the group of people involved in any kind of strength training whether weightlifting or

powerlifting. Most of the youngsters are involved in strength training so injuries are common. Previous studies only focused on the injuries and frequency of injuries of weightlifters, whereas this study is a comparative study between supervised and non-supervised weightlifters. No research has been published on this topic before.

The objective of this study was to find comparison of injury rate among weightlifters with and without supervision. It would be beneficial for powerlifters; as by this, they will be aware whether injury rates are more under supervision or non-supervision. Furthermore, teenagers don't have enough information regarding the importance of trainers and supervised training, and they end up getting injured. The study also aimed at reducing injury rate. Health and quality of life could be improved by the practical implementation of this study.

Materials and Methods

Study design: Comparative Cross sectional study.

Duration: This study was completed in estimated period of 3 months.

Ethical Considerations: Ethical approval was obtained from Azra Naheed Medical College / Superior University Research Ethics Committee.

Setting: Data was collected from different gymnasiums and fitness centres mentioned as follows:

- Qasim gym, Kot Khawaja Saeed, Lahore Y GYM.
- Shapes gym, Gulberg, Lahore
- Shoaib gym, Chah Miran, Lahore
- LUMS gym, Lahore

Sample size: The sample size was calculated using the online Raosoft sample size calculator.

$$X = Z(c/100)^2 r(100-r)$$

$$N = N_x / ((N-1)E^2 + x)$$

$$E = \text{Sqrt}[(N - n)x / n(N-1)]$$

In this formula

n = sample size

E = Margin of error

N= Population size

r =fraction of responses

Z(c/100) = critical value for the confidence level c.

In this sample size formula, we calculated sample size by taking following values:

E = 5%

Confidence level: 95%

N = 20000

r = 90%

It gave 138 as sample size.

Sample selection: Gym going males of age 15-35

Sampling technique: Non probability convenient sampling technique was used.

Inclusion criteria:

1. Only males
2. Only weightlifters/ powerlifters
3. Age 15-35
4. At least 3-4 days workout in a week.

Exclusion criteria:

1. Pathological, orthopedic or genetic causes of musculoskeletal symptoms.
2. Metabolic or neoplastic diseases

Tool of Data Collection: Nordic musculoskeletal questionnaire was used to assess neck pain, shoulder pain and back pain.

Data collection procedure: Informed consent was taken from the subjects. subjects were divided into two groups i.e. Group A trained under supervision and the Group B trained without any supervision. Musculoskeletal pain was assessed using the Nordic musculoskeletal questionnaire.

Data was analysed using SPSS version 21. Frequency tables and descriptive statistics were used. Chi-square was used to see the association of pain in different regions with supervision or without supervision.

Results

A group of 138 weight lifters was divided into two groups i.e. who did training under supervision and the other who did training without any supervision. Mean age of lifters under supervision was 21.99 (SD 3.81) and those without supervision was 24.64 (SD 5.01) as shown in Table 1. Mean workout days per week among weight lifters under supervision was 5.67 (SD .63) and was 5.62 (SD .81) in those not under supervision as shown in Table 2

Table 1 Descriptive statistics of age among weight lifters with or without supervision

	<i>Supervised</i>	<i>Non-Supervised</i>
<i>Mean</i>	21.99	24.64
<i>Standard Deviation</i>	3.81	5.01
<i>Range</i>	24	19
<i>Minimum</i>	16	17
<i>Maximum</i>	40	36
<i>Count</i>	69	69

Table 2 Descriptive statistics of workout days per week in weightlifters with or without supervision

	Supervised	Non-Supervised
Mean	5.67	5.62
Standard Deviation	0.63	0.81
Range	4	4
Minimum	3	3
Maximum	7	7
Count	69	69

Out of 51 participants who work-out for 46-60 min (Figure 1), 30 were not under supervision While (n=31) weightlifters who work-out for 61-90 min (Figure 1) were working out under supervision as shown in Table 3.

Figure 1 Frequency distribution of workout time among weight lifters with or without supervision

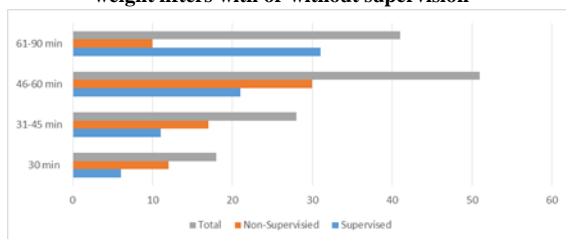


Table 3 Frequency distribution of workout time among weight lifters with or without supervision

		Supervision		
		Yes	No	Total
Workout time	30 min	6	12	18
	31-45 min	11	17	28
	46-60 min	21	30	51
	61-90 min	31	10	41
Total		69	69	138

Injury rate was more in the shoulder region among both supervised (N=9) and non-supervised (N=14) groups. While the injury rate was less commonly seen in the hip/thigh region in both supervised (N=0) and unsupervised (N=1) groups Table 4.

Table 4 Frequency of musculoskeletal pain region wise in both groups supervised and unsupervised.

Region	Supervised(n=69)		Non-supervised(n=69)	
	Yes	No	Yes	No
Neck	1	68	2	67
Shoulder	9	60	14	55
Upper back	1	67	4	65
Wrist/hand	1	68	4	65
Lower back	7	62	14	55
Hip/thigh	0	69	1	68
Knee	3	66	2	67

Supervised weightlifters had less musculoskeletal injuries (N=22) as compared to non-supervised weightlifters (N=40). Weightlifters without supervision were more likely to have musculoskeletal injuries (n=69) as compared to the weightlifter under supervision (n=69) (Table 5 & 6).

Table 5 Descriptive Statistics of Weightlifters under supervision

	Neck	Shoulder	Upper Back	Wrist/Hand	Low Back	Hip/Thigh	Knee
Mean	0.01	0.13	0.01	0.01	0.10	0.00	0.04
Standard Deviation	0.12	0.34	0.12	0.12	0.30	0.00	0.21
Range	1	1	1	1	1	0	1
Minimum	0	0	0	0	0	0	0
Maximum	1	1	1	1	1	0	1
Count	69	69	69	69	69	69	69

Table 6 Descriptive Statistics of Weightlifters without supervision

	Neck	Shoulder	Upper Back	Wrist/Hand	Low Back	Hip/Thigh	Knee
Mean	0.03	0.20	0.06	0.06	0.20	0.01	0.03
Standard Deviation	0.17	0.41	0.24	0.24	0.41	0.12	0.17
Range	1	1	1	1	1	1	1
Minimum	0	0	0	0	0	0	0
Maximum	1	1	1	1	1	1	1
Count	69	69	69	69	69	69	69

Chi square test of independence showed significant association between musculoskeletal injuries and

supervision i.e. $\chi^2 (1, N 138) = 9.489, p < .05$. Weightlifters without supervision were more likely to have musculoskeletal injuries (n=69) as compared to the weightlifter under supervision (n=69).

Table 7 Results of Chi Square Analysis

Pearson chi square	Value	df	p value
	9.489	1	0.002

*p value of ≤ 0.05 was set as standard for significance

Discussion

This study shows the comparison between injury rates among supervised and non-supervised weightlifters. A research conducted by Hamil, B.P., regarding the safety related to weightlifting and weight training among school students suggests that weightlifting and weight training, both are safe activities when supervised (5). The result of this study predicts the same thing that supervision is necessary to carry out weightlifting exercises (6).

Siewe, J., et al., conducted a study on the overuse injuries in powerlifting, results of this study show that the most injured region was the shoulder, lower back, and the knee and lumbar belt increases the injury rate of the lumbar region (7). This study, also found that the most affected region of injury is shoulder and lower back among weightlifters. Furthermore, injuries are more common when the weightlifting is done without supervision, and weightlifting and weight training, both are safe activities when supervised. Youngsters must perform these activities under proper and full supervision. Research by Gulhane, T., was conducted in 2015 which discussed the causes, symptoms, treatment, and prevention from sports injuries. This study suggests that no warm up, poor training or accidents can be cause of injuries (10). The current study also suggests the same.

The results of this study are based on weightlifters' response from a few gyms. There was less discussion with the trainer due to close-ended questions in the scale. Also, weightlifters were hesitant and non-cooperative in giving data regarding research due to time constraints and other reasons.

Conclusion

Care should be taken and weight lifting and exercises must be performed under expert's supervision. A significant association found between musculoskeletal injuries and supervision. Weightlifters without supervision were more likely to have musculoskeletal injuries as compared to the weightlifter under supervision. Shoulder and low back injuries are more common as compared to other regions in case of weightlifting without any supervision but with weightlifting under proper supervisor reduces the risks of injuries in shoulder and low back. Chances of injury to shoulder region are more, as shoulders provide a greater amount of movement with less stability. But hip and thigh regions were not that much involved in both groups.

Conflict of interest: Authors declare no conflict of interest.

Disclosure: None

Human/Animal Rights: No human or animal rights were violated during this study.

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