ORIGINAL ARTICLE

Prevalence, Types, Anatomical Locations, Risk Factors, and Causes of Musculoskeletal Injuries among Bodybuilders Engaged in Weightlifting in Saudi Arabia

Abdulmalik B. Albaker[1], Fahad A. Alsayali[2], Sulaiman S. Alsubaie[3], Zahraa A. Alnakhli[4], Al-Shima Z. Al Abri[5], Abdulaziz W. Murad[6], Namar A. Alzubaidi[7], Alwaleed M. Alshamrani[8], Khames T. Alzahrani[9]

[1]Department of Surgical Subspecialties, College of Medicine, Majmaah University, Majmaah, Saudi Arabia, [2]Department of Orthopedics, College of Medicine, King Saud bin Abdulaziz University for Health Sciences, Jeddah, Saudi Arabia, [3]Department of Orthopedics, College of Medicine, King Faisal University, Al-Hasa, Saudi Arabia, [4]Department of Orthopedics, King Salman Armed Forces Hospital, Tabuk, Saudi Arabia, [5]Department of Orthopedics, College of Medicine and Health Sciences, Sultan Qaboos University, Muscat, Oman, [6]Department of Orthopedics, Faculty of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia, [7]Department of Orthopedics, College of Medicine, King Abdulaziz University, Jeddah, Saudi Arabia, [8]Department of Orthopedics, College of Medicine, Jeddah University, Jeddah, Saudi Arabia, [9]Department of Endodontics, Stanford University, Saudi Board of Endodontics, King Faisal Specialist Hospital and Research Centre, Riyadh, Saudi Arabia

Abstract

Background: Musculoskeletal injuries are a frequent consequence of weightlifting and bodybuilding due to repetitive strain, improper technique, and heavy load-bearing. Despite the global popularity of these strength-based sports, there is limited epidemiological data in Saudi Arabia assessing injury types, anatomical locations, and associated risk factors. **Objective:** This study aims to assess the prevalence, types, anatomical distribution, risk factors, and causes of musculoskeletal injuries among Saudi bodybuilders engaged in weightlifting. **Methodology:** A descriptive cross-sectional survey was conducted between July and December 2025 among Saudi male and female gym-goers aged 18 and above. Participants were recruited through convenience sampling using social media platforms. Data were collected using a structured, pre-validated online questionnaire available in Arabic and English, covering demographics, training history, injury experience, and prevention awareness. A minimum sample size of 384 participants was calculated using standard statistical formulas. Data were coded and analyzed using the Statistical Package for the Social Sciences version 20. **Results:** A total of 437 eligible participants were included (81.2% male; mean age 27.8 ± 9.7 years). Overall, 214 respondents (49.0%) reported at least one musculoskeletal injury related to weightlifting/bodybuilding. The shoulder was the most frequently affected site (54.7%), followed by the knee (27.6%) and lower back (27.1%). Reported diagnoses were dominated by tendinopathy/tendinosis (31.3%) and muscle strain (28.5%), with 50.9% reporting recurrent injuries in the same anatomical region. Pain (82.7%) and limited mobility (45.8%) were the most common immediate symptoms. Injury status was significantly associated with age group ($P = 0.032$), residential area ($P = 0.001$), monthly income ($P = 0.011$), training duration ($P = 0.026$), training under a certified trainer ($P = 0.040$), and using social media as an injury-prevention advice source ($P = 0.011$). **Conclusion:** Nearly half of Saudi bodybuilders reported musculoskeletal injuries, most commonly affecting the shoulder and characterized by tendinopathy and muscle strain, with substantial recurrence and training disruption. Targeted prevention strategies emphasizing safe load progression, technique supervision, and evidence-based education, particularly regarding social media guidance, may reduce injury burden.

Key words: Bodybuilding, injury prevalence, injury prevention, injury risk factors, musculoskeletal injuries, powerlifting, resistance training, Saudi Arabia, sports medicine, weightlifting.

Address for correspondence:
Khames T. Alzahrani, BDS, PGD Endo from Stanford University, Saudi Board of Endodontics, King Faisal Specialist Hospital and Research Centre, Riyadh, Saudi Arabia.
E-mail: dr.khames.alzahrani@gmail.com

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INTRODUCTION

Musculoskeletal injuries are common health problems in athletes and are defined as conditions affecting muscles, tendons, ligaments, bones, or joints.[1] They occur frequently in sports involving repetitive high-intensity training, such as bodybuilding and weightlifting, where mechanical stress is consistently placed on the musculoskeletal system.[2] These injuries may be acute, resulting from sudden trauma, or chronic, developing gradually due to overuse.[3] Injuries related to weightlifting are notably common in certain areas of the body, such as the shoulders, lumbar spine, knees, and elbows.[4] Inappropriate lifting techniques, insufficient warm-up routines, and overly high training volumes have been recognized as key factors leading to these injuries.[5] Given the growing global appeal of weightlifting and bodybuilding, it is critical to comprehend the types, distribution, and causes of these injuries to create safer training methods and preventative measures.

Powerlifting participation rates are generally increasing for both men and women across all age groups, training levels, and competitive levels.[6] The squat, bench press, and deadlift are the three movements that make up powerlifting. The athlete has three chances to lift the most weight possible in a single repetition. Classic weightlifting gave way to it in the USA in the 1950s, and the first official championship was held in 1965.[7] Powerlifting and Olympic weightlifting are two sports that put the body through a lot of strain. These two expanding sports lack a thorough assessment of injury characteristics.[8]

Multiple studies have shown that gym-related injuries are highly prevalent among fitness enthusiasts. In Bangladesh, 34.5% of gym members reported at least one injury, with the lower back (17.2%), shoulder (11.0%), and knee (7.6%) being the most affected areas.[9] In contrast, a study in Saudi Arabia found a much higher prevalence, with 57% of participants sustaining injuries, most often muscle strains (37%), especially involving the knee (84.3%) and shoulder (83.3%).[10] In addition, another Saudi study reported that strains or muscle tears (35.7%), tendinopathy (17.9%), and muscle spasms (19.3%) were the most common overuse injuries among gym-goers.[11] These were most often linked to bodybuilding, weightlifting, and long training sessions, especially when proper technique or supervision was lacking.

Previous studies have examined the prevalence and types of injuries among weightlifters and bodybuilders; however, their findings have been inconsistent due to methodological differences, variations in sample sizes, and heterogeneous study populations. While bodybuilding is rapidly gaining popularity in the Kingdom of Saudi Arabia as both a recreational and competitive sport, there remains a lack of evidence specifically addressing injury patterns within this population. This highlights a critical gap in the literature. Therefore, there is a need for localized research to provide an accurate understanding of musculoskeletal injury risks among bodybuilders and weightlifters in Saudi Arabia. Such research could be implemented in enhancing performance, promoting longevity in sport, and improving overall health.

The study aims to determine the prevalence, types, anatomical locations, risk factors, and causes of musculoskeletal injuries among bodybuilders engaged in weightlifting. By identifying the patterns and contributing factors of these injuries.

MATERIALS AND METHODS

Study design and setting

This was a descriptive, survey-based cross-sectional study conducted in Saudi Arabia from July to December 2025.

Participants, recruitment, and sampling procedure

The study included Saudi males and females aged 18 years and above who attended gyms across Saudi Arabia. Participants were recruited using convenience sampling through social media platforms, including Twitter, Instagram, Snapchat, WhatsApp, Facebook, and Telegram. A digital survey link was distributed, and electronic informed consent was obtained from all participants before survey completion.

Sample size

The sample size was calculated using means and standard deviations and determined through Raosoft, Inc. (Seattle, WA, USA) to be 384 participants, considering a maximum allowable margin of error of 0.05 and a standard deviation corresponding to a 95% confidence interval (Z = 1.96). The calculation was as follows:

$$n = \frac{(1.96)^2 \times 0.50 \times 0.50}{(0.50)^2} = 384$$

This represented the minimum number of participants required for the study.

Inclusion and exclusion criteria

Participants were included if they were Saudi males or females aged 18 years or older, regularly engaged in resistance training for at least 6 consecutive months, and free from acute illness or injury at the time of data collection that would prevent participation. Exclusion criteria included non-Saudi residents, individuals under 18 years, those with recent fractures, surgeries, or injuries unrelated to training within the past 6 months, individuals diagnosed with rheumatological or chronic musculoskeletal disorders, and those participating exclusively in non-resistance-based exercise modalities.

Data collection and instrument

Data were collected through an online, self-administered questionnaire specifically designed for this study and distributed electronically through multiple social media platforms to maximize reach and facilitate convenient access across Saudi Arabia. The questionnaire was available in both Arabic and English to ensure accessibility. Participants provided electronic informed consent before starting the survey.

The questionnaire, developed and modified by the research team based on previous literature and similar epidemiological studies, consisted of the following sections:

- Informed consent
- Sociodemographic information, including gender, age, region, education level, and income
- Training profile and injury prevention knowledge, including training duration, trainer involvement, gym session length, frequency, and sources of injury prevention advice
- Injury history and details, including occurrence, anatomical area, diagnosis, medical consultation, treatment, and interruption in training
- Injury consequences and timing, covering onset relative to training duration, recurrence, and immediate symptoms.

Pilot test

A pilot test was conducted with 20 members of a local weightlifters' club to assess the clarity, comprehensibility, and relevance of the questionnaire items. Feedback was collected regarding question wording, response options, and time required to complete the survey. Minor modifications were made to improve clarity and flow. Data from the pilot test were excluded from the final analysis.

Data entry and analysis

The collected data were initially entered into Microsoft Excel (2016) for Windows and subsequently exported to IBM Statistical Package for the Social Sciences Statistics for Windows, Version 20 (Armonk, NY: IBM Corp.) for statistical analysis. Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarize the data. Inferential statistics, including Chi-square tests, were performed to assess associations between the occurrence of musculoskeletal injuries and factors such as injury type, anatomical location, and cause. Statistical significance was set at $P < 0.05$.

RESULTS

A total of 437 eligible Saudi resistance-training participants were included in the analysis. As shown in Table 1, the sample was predominantly male (81.2%) and largely composed of young adults aged 18–30 years (79.4%). The mean age was 27.8 ± 9.7 years (range 18–67), with a mean height of 170.8 ± 18.1 cm and a mean weight of 78.3 ± 15.9 kg. Participants were mainly from the Western (41.6%) and Central (33.9%) regions, and 54.0% reported a bachelor's degree. Income was broadly distributed (1,000–5,000 SAR: 27.0%; <1,000 SAR: 25.4%; 5,001–10,000 SAR: 23.1%). All primary (non-conditional) fields were complete; injury follow-up items were blank only when not applicable, so no mode-based imputation was required.

Table 1: Sociodemographic characteristics of participants (*n*=437)

Parameter	No.	Percentage
Gender		
Male	355	81.2
Female	82	18.8
Age (years) Mean±SD: 27.8±9.7 Range (min–max): 18–67		
18–30	347	79.4
31–45	49	11.2
≥46	41	9.4
Height (cm)		
Mean±SD	170.8±18.1	
Weight (kg)		
Mean±SD	78.3±15.9	
Residential area		
Southern region	16	3.7
Western region	182	41.6
Central region	148	33.9
Eastern region	69	15.8
Northern region	22	5.0
Educational qualification		
None	6	1.4
Primary	3	0.7
Intermediate	3	0.7
High school	123	28.1
Diploma	38	8.7
Bachelor	236	54.0
Postgraduate	28	6.4
Monthly income (SAR)		
<1,000	111	25.4
1,000–5,000	118	27.0
5,001–10,000	101	23.1
10,001–15,000	57	13.0
>15,000	50	11.4

SD: Standard deviation

Table 2 summarizes the training profile and injury-prevention knowledge. Nearly half of participants had

Table 2: Training profile and injury prevention knowledge (*n*=437)

Parameter	No.	Percentage
Training duration		
6 months–1 year	124	28.4
1–3 years	116	26.5
>3 years	197	45.1
Training under a certified trainer		
Yes	101	23.1
No	336	76.9
Average session duration		
<1 h	54	12.4
1–2 h	363	83.1
>2 h	20	4.6
Weekly gym frequency		
1–2 times	13	3.0
3–4 times	248	56.8
≥5 times	176	40.3
Received injury-prevention advice		
Yes	306	70.0
No	131	30.0
Sources of injury-prevention advice* (*n*=306)		
Certified trainer	121	39.5
Social media	215	70.3
Gym peers	148	48.4
Medical professionals	69	22.5
Online articles/videos	114	37.3
Have you experienced musculoskeletal injury related to weightlifting/bodybuilding?		
Yes	214	49.0
No	223	51.0

*Multiple-response item

trained for >3 years (45.1%), whereas 28.4% reported 6 months–1 year and 26.5% reported 1–3 years. Most trained without a certified trainer (76.9%), typically for 1–2 h per session (83.1%). Weekly frequency was high: 56.8% trained 3–4 times/week and 40.3% trained ≥5 times/week. Most respondents reported having received injury-prevention advice (70.0%). Among those who received advice (*n* = 306), social media was the most commonly cited source (70.3%), followed by gym peers (48.4%), certified trainers (39.5%), online articles/videos (37.3%), and medical professionals (22.5%) (multiple responses allowed).

Almost half of the respondents reported at least one musculoskeletal injury related to weightlifting/bodybuilding (49.0%) [Figure 1].

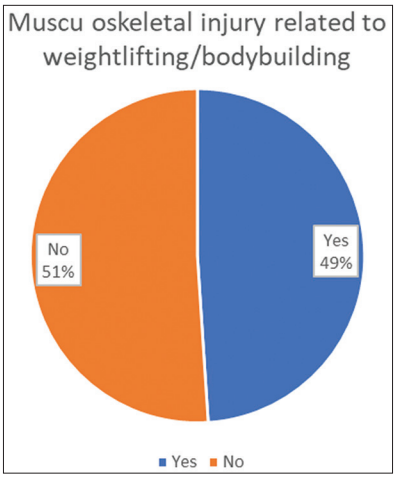

Figure 1: Prevalence of musculoskeletal injury related to weightlifting/bodybuilding (*n*=437)

Table 3 presents injury history and details among injured participants (*n* = 214). Multiple anatomical sites were commonly reported (multiple responses allowed), with the shoulder being the most affected area (54.7%), followed by the knee (27.6%) and lower back (27.1%). Slightly more than half reported that their injury was diagnosed by a medical professional (54.7%), and 62.1% sought medical consultation. The most frequently reported diagnoses were tendinosis/tendinopathy (31.3%) and muscle strain (28.5%), followed by muscle tear (14.5%). Treatment was commonly conservative: rest only (60.3%) and physiotherapy (58.9%) were most frequently selected (multiple responses allowed), whereas surgery was reported by 10.3%. Injury-related interruption in training was common, with 36.0% stopping for 1–4 weeks and 27.1% for >4 weeks. In addition, 21.0% reported stopping for <1 week, and 15.9% reported no interruption. Given the high use of rest and physiotherapy, the overall pattern suggests that many injuries were managed conservatively.

Table 4 describes injury consequences and timing (*n* = 214). Most injuries occurred after more than 1 year of training (57.5%), compared with 26.2% within the first 6 months. Recurrent injury in the same anatomical area was common (50.9%). Immediate symptoms were dominated by pain (82.7%) and limited mobility (45.8%), indicating substantial immediate functional impact. Swelling was reported by 16.4% and muscle weakness by 23.4%, which complements the high frequency of pain and mobility limitation.

Table 5 shows Chi-square associations between sociodemographic variables and injury status (Yes/No). Injury status differed significantly by age group ($P = 0.032$), residential area ($P = 0.001$), and income ($P = 0.011$). For example, injury prevalence was higher in the ≥46-year group (68.3%) than the 18–30 group (47.3%). Income differences were most apparent for the 5,001–10,000 SAR group (63.4%) versus <1,000 SAR (42.3%). Gender and educational qualification were not significantly associated

Table 3: Injury history and details among participants who reported injury (*n*=214)

Parameter	No.	Percentage
Affected anatomical area*		
Shoulders	117	54.7
Lower back	58	27.1
Knees	59	27.6
Elbows	19	8.9
Wrists	33	15.4
Neck	18	8.4
Other	22	10.3
Diagnosed by medical professional		
Yes	117	54.7
No	97	45.3
Diagnosis received*		
Anterior cruciate ligament	13	6.1
Posterior cruciate ligament	10	4.7
Meniscus tear	5	2.3
Herniated disc	8	3.7
Muscle tear	31	14.5
Muscle strain	61	28.5
Ankle sprain	12	5.6
Fracture	3	1.4
Hematoma/bruise	3	1.4
Dislocation	5	2.3
Subluxation	10	4.7
Tendinosis/tendinopathy	67	31.3
Other	53	24.8
Sought medical consultation		
Yes	133	62.1
No	81	37.9
Treatment received*		
Physiotherapy	126	58.9
Medication	51	23.8
Surgery	22	10.3
Rest only	129	60.3
Other	13	6.1
Interruption of training due to injury		
Yes, <1 week	45	21.0
Yes, 1–4 weeks	77	36.0
Yes, >4 weeks	58	27.1
No	34	15.9

*Multiple-response items

with injury status ($P > 0.05$). Regional prevalence ranged from 81.2% in the Southern region to 13.6% in the Northern region, although these strata were relatively small compared with Western and Central regions.

Table 4: Injury consequences and timing among participants who reported injury (*n*=214)

Parameter	No.	Percentage
Timing of injury relative to training start		
Within the first 6 months	56	26.2
After 6 months–1 year	35	16.4
After>1 year	123	57.5
Recurrent injuries in the same area		
Yes	109	50.9
No	105	49.1
Immediate symptoms following injury*		
Pain	177	82.7
Swelling	35	16.4
Limited mobility	98	45.8
Muscle weakness	50	23.4
Other	19	8.9

*Multiple-response item

Table 6 summarizes Chi-square associations between training profile/injury-prevention variables and injury status. Training duration was significantly associated with injury ($P = 0.026$), with a higher prevalence among those training for >3 years (55.8%) compared with those training 6 months–1 year (41.1%). Training under a certified trainer was also significant ($P = 0.040$), with higher injury prevalence among supervised trainees (58.4%) than unsupervised trainees (46.1%). Among advice sources, selecting social media was associated with injury status ($P = 0.011$). In contrast, session duration, weekly frequency, and reporting receipt of advice were not significant (all $P > 0.05$). Those selecting social media as an advice source had higher injury prevalence (55.3%) than those not selecting it (42.8%). Average session duration ($P = 0.924$) and weekly frequency ($P = 0.569$) remained non-significant.

DISCUSSION

Musculoskeletal injury is a common unwanted consequence of recreational resistance training and can affect long-term adherence to such training. The aim of the present study was to estimate the prevalence and profile of self-reported orthopedic injuries among bodybuilders in Saudi Arabia and to investigate whether there were differences between selected sociodemographic and training characteristics and injury status. Among 437 respondents, 49% had experienced at least one bodybuilding-related injury, suggesting a large burden of injury in this population.

The prevalence found here is similar to other reports found in gym settings. In a Saudi survey of Fitness Time gym members, Alrushud described an injury prevalence associated with exercise of around 57%,[10] slightly higher than the present estimate and possibly indicative of a more general range

Table 5: Chi-square test results: Sociodemographic variables versus injury status (*n*=437)

Parameters	Injury status		Total (*n*=437)	*P*-value*
	Injured	Not injured		
Gender				
Male	182	173	355	0.061
	85.0%	77.6%	81.2%	
Female	32	50	82	
	15.0%	22.4%	18.8%	
Age group				
18–30	164	183	347	0.032
	76.6%	82.1%	79.4%	
31–45	22	27	49	
	10.3%	12.1%	11.2%	
≥46	28	13	41	
	13.1%	5.8%	9.4%	
Residential area				
Southern region	13	3	16	0.001
	6.1%	1.3%	3.7%	
Western region	90	92	182	
	42.1%	41.3%	41.6%	
Central region	72	76	148	
	33.6%	34.1%	33.9%	
Eastern region	36	33	69	
	16.8%	14.8%	15.8%	
Northern region	3	19	22	
	1.4%	8.5%	5.0%	
Educational qualification				
None	6	0	6	0.117
	2.8%	0.0%	1.4%	
Primary	0	3	3	
	0.0%	1.3%	0.7%	
Intermediate	2	1	3	
	0.9%	0.4%	0.7%	
High school	63	60	123	
	29.4%	26.9%	28.1%	
Diploma	19	19	38	
	8.9%	8.5%	8.7%	
Bachelor	111	125	236	
	51.9%	56.1%	54.0%	
Postgraduate	13	15	28	
	6.1%	6.7%	6.4%	
Monthly income (SAR)				0.011
<1,000	47	64	111	
	22.0%	28.7%	25.4%	

(Contd...)

Table 5: *(Continued)*

Parameters	Injury status		Total (*n*=437)	*P*-value*
	Injured	Not injured		
1,000–5,000	52	66	118	
	24.3%	29.6%	27.0%	
5,001–10,000	64	37	101	
	29.9%	16.6%	23.1%	
10,001–15,000	24	33	57	
	11.2%	14.8%	13.0%	
>15,000	27	23	50	
	12.6%	10.3%	11.4%	

**P*-value was considered significant if ≤0.05

of activities and exposures in the gym. A prevalence study limited to female gym members in Qassim, Saudi Arabia, found a 49% prevalence of injury,[12] which is almost the same as our result but differs in terms of sex and geographic distribution. Systematic reviews in Olympic weightlifting and powerlifting highlight that there are wide differences in prevalence and incidence estimates between studies, as injury definitions and methods are heterogeneous.[13] A wider systematic review of comparisons of resistance training modalities came to a similar conclusion that between-sport comparisons are limited due to inconsistent injury definitions and exposure measurement, but that patterns of injuries varied by modality and were determined by training volume, load, and supervision.[14] Internationally, epidemiological work in Bangladesh gym trainees reported a list of low back and shoulder complaints as one of the most often affected parts,[15] supporting the external validity of our observation of the trunk and shoulder complex as recurrently stressed in recreational resistance training.

Shoulder injury was by far the most common in our cohort (54.7% of all injuries), followed by knee and low back injuries (both at 27.1%). Shoulder and spine involvement is recorded repeatedly in the context of strength sports: Examples from an early and a rather recent systematic review in the case of Olympic weightlifting and powerlifting point to the spine, shoulder, and knee as the most frequently injured parts.[13] Similar high proportions of knee and shoulder injuries have been reported by Saudi gym-based data,[10] and in another Saudi study, overuse injuries in gym centers, shoulder (25.2%), knee (20.2%), and low-back (17.7%) complaints were the leading sites.[11] The ranking of injured sites is probably an indication of the emphasis placed on training; in bodybuilding, training generally emphasizes high-volume upper-body hypertrophy work, and this may increase shoulder exposure.

Injury type in our participants was dominated by tendinopathy (31.3%) and muscle strain (28.5%), and most injuries developed gradually (70%), suggesting a cumulative overload mechanism. Tendinopathy is widely conceptualized as a load-induced disorder, which can occur at the end of a continuum where maladaptive load progression and inadequate recovery contribute to symptoms.[16] In Saudi populations of gym athletes, muscle strain is reported frequently (such as 37% in Alrushud),[10] whereas the most frequently diagnosed overuse injury in gym centers was muscle strain (35.7%).[11]

The recurrence proportion in the present study (42.8%) has practical consequences in prevention and rehabilitation. A systematic review and meta-analysis concluded that previous injury was a strong risk factor for subsequent injury, including subsequent injuries to different sites,[17] reinforcing the importance of adequate rehabilitation and graduated return to training as opposed to symptom-driven cycles of rest and re-aggravation. Consistent with this, injuries disturbed participation in our sample (46.3% stopping training; 38.3% training load reduction).

The management in our cohort was largely conservative and self-directed (rest was described by 76.4% of injured subjects, physiotherapy was less described [37.7%], and medication was different [27.7%]). Similar dependence on rest and modification has been described in the Gulf of Saudi populations of gyms.[10,11] While temporary load reduction is often appropriate in the acute phase, an exclusive focus on rest may not address modifiable contributors such as technique errors, rapid load progression, or inadequate recovery and may be insufficient for tendinopathy, where appropriately dosed re-loading is emphasized.[16] In the present study, a small proportion reported seeking physician evaluation (11%), whereas it was more commonly done to modify exercises (19.6%) or use external supports (14.7%). This pattern implies that an abundance of trainees continue to self-manage symptoms within the gym environment, which may prove beneficial for minor strains, but may also delay identification of substantial pathology or perpetuate faulty movement patterns. Given that the majority of injuries were reported to occur during free-weight lifting in this cohort, practical prevention messages need to focus on technique coaching for the major lifts, staged load progression, and

Table 6: Chi-square test results: Training profile and injury-prevention variables versus injury status (*n*=437)

Parameters	Injury status		Total (*n*=437)	*P*-value*
	Injured	Not injured		
Training duration				
6 months–1 year	51	73	124	0.026
	23.8%	32.7%	28.4%	
1–3 years	53	63	116	
	24.8%	28.3%	26.5%	
>3 years	110	87	197	
	51.4%	39.0%	45.1%	
Training under a certified trainer				
Yes	59	42	101	0.040
	27.6%	18.8%	23.1%	
No	155	181	336	
	72.4%	81.2%	76.9%	
Average session duration				
<1 h	26	28	54	0.924
	12.1%	12.6%	12.4%	
1–2 h	179	184	363	
	83.6%	82.5%	83.1%	
>2 h	9	11	20	
	4.2%	4.9%	4.6%	
Weekly gym frequency				
1–2 times	7	6	13	0.569
	3.3%	2.7%	3.0%	
3–4 times	116	132	248	
	54.2%	59.2%	56.8%	
≥5 times	91	85	176	
	42.5%	38.1%	40.3%	
Received injury-prevention advice				
Yes	157	149	306	0.165
	73.4%	66.8%	70.0%	
No	57	74	131	
	26.6%	33.2%	30.0%	
Source: Social media				
Selected	119	96	215	0.011
	55.6%	43.0%	49.2%	
Not selected	95	127	222	
	44.4%	57.0%	50.8%	

**P*-value was considered significant if ≤0.05

planned recovery in accordance with the mechanisms proposed in reviews of strength sports in the literature.[6]

Several associations found in this study provide reasonable postulations but cautious interpretation. Injury prevalence varied between age categories (highest in 36–45 years), regions of residence, income, and duration of training; age and longer exposure durations have also been associated with injury prevalence in Saudi gym members.[10] Proposed contributors in strength sports include heavy loads, large ranges of motion, inadequate rest, and faulty technique,[6] although, in keeping with systematic reviews of risk factors, emphasis is placed on limitations of evidence for specific risk factors.[13] Injury prevalence was also higher in those training under a certified trainer; this trend has been described in a sample of Saudi gym members,[10] but not in the Qassim

female sample,[12] and may be the result of reverse causality (injured trainees seek coaching) or greater loads among coached lifters. Finally, the showing of the association between the use of social media as a source of advice and injury status is interesting. A systematic review on the misinformation of physical activity on social media revealed that the misinformation covers a wide range of activity topics, and YouTube is the most researched platform in evaluating misinformation.[18] Reliance on unverified demonstrations or non-individualized programs may therefore contribute to the unsafe technique or management of loads.

This study has limitations. Its cross-sectional design prohibits the generation of causal inferences, and injuries and diagnoses were self-reported and not validated clinically, thus introducing recall bias and potential misclassification. Sampling was online and predominantly male, which may limit generalizability to female bodybuilders, as well as to other settings. Despite these limitations, the findings provide regionally relevant evidence of the commonality of bodybuilding-related injuries and their largely overuse-patterned, shoulder-dominant, and frequently meaningful training disruption-associated attributes, and should be taken as hypothesis-generating for future prospective work.

CONCLUSION

This national cross-sectional survey shows that musculoskeletal injuries are common among Saudi bodybuilders engaged in weightlifting, with nearly one in two participants reporting at least one injury. The shoulder was the most frequently affected region, followed by the knee and lower back, and the predominant diagnoses were tendinopathy and muscle strain. Injuries often occurred after prolonged training exposure and were frequently recurrent, leading to interruption or reduction of training. Injury status was significantly associated with age, residential area, income, longer training duration, training under a certified trainer, and using social media as a source for injury-prevention advice. These findings support the need for targeted prevention strategies emphasizing evidence-based education, safe load progression, and technique supervision to reduce injury burden and recurrence.

ACKNOWLEDGMENTS

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ETHICAL APPROVAL

The study was fully explained to all participants, and it was emphasized that participation was voluntary. Written informed consent was obtained from each participant before enrollment. All collected information was securely stored and used exclusively for research purposes.

INFORMED CONSENT

Written informed consent was obtained from all study participants.

DATA AND MATERIALS AVAILABILITY

All data generated or analyzed during this study are included in this published article.

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