

Musculoskeletal Pain in Unsupervised Gym-Goers: Prevalence and Anatomical Distribution

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Abstract: Regular exercise provides important physical and psychological health benefits; however, inappropriate exercise technique, excessive loading, overtraining, and inadequate supervision may contribute to musculoskeletal symptoms. This study aimed to determine the prevalence and anatomical distribution of musculoskeletal pain among gym-goers who exercised without personal trainer supervision. An observational study was conducted among 100 gym-going individuals aged 18–30 years. Participants had exercised for at least 6 months and regularly exercised 4–5 days per week for 45 minutes or more. Individuals with neurological conditions, recent musculoskeletal injuries, or inflammatory conditions were excluded. Musculoskeletal pain was assessed using the Nordic Musculoskeletal Questionnaire. Data were analyzed using descriptive statistics and expressed as frequencies and percentages. Of the 100 participants, 92% reported musculoskeletal pain in at least one body region. The most frequently reported sites were the lower back (36%), shoulder (24%), upper back (22%), and neck (21%), followed by the knee (13%), wrist/hand (12%), ankle/foot (7%), and elbow (6%). The findings indicate a high prevalence of self-reported musculoskeletal pain among gym-goers exercising without trainer supervision and highlight the importance of appropriate exercise technique, progressive loading, and injury-prevention education.

Keywords: Musculoskeletal pain; Gym-goers; Exercise; Trainer supervision; Nordic Musculoskeletal Questionnaire

1. Introduction

Participation in gym-based exercise has increased considerably as individuals seek to improve physical fitness, strength, endurance, and general health. Exercise provides several physical and psychological benefits and is an important component of a healthy lifestyle.^{1–4} However, inappropriate exercise practices may expose individuals to musculoskeletal symptoms and injuries, particularly when exercises are performed with excessive loads, improper technique, inadequate recovery, or insufficient knowledge of exercise progression.

Weight training and resistance exercise are commonly performed in fitness centres. Although resistance exercise can provide substantial health and fitness benefits, incorrect exercise technique and inappropriate loading may increase mechanical stress on the musculoskeletal system. Previous research has reported musculoskeletal injuries associated with weight training and has emphasized the importance of appropriate instruction and safe use of exercise equipment.^{5,6}

Supervision by a trained fitness professional may assist individuals in learning appropriate exercise techniques, selecting suitable loads, progressing exercises safely, and identifying potentially harmful movement patterns. Fitness trainers may also provide guidance regarding warm-up, cool-down, recovery, and exercise modification. Research investigating fitness-centre populations has demonstrated an association between trainer experience and the occurrence of musculoskeletal pain among trainees.⁷

Musculoskeletal symptoms may occur at different anatomical regions depending on the type of exercise, loading characteristics, technique, and individual factors. Recent epidemiological evidence indicates that injuries during gym-based activities frequently occur during strength training and

individual cardiovascular exercise, with the shoulder and lower extremities among commonly affected regions.⁸

The Nordic Musculoskeletal Questionnaire (NMQ) is a standardized questionnaire used to assess self-reported musculoskeletal symptoms across different anatomical regions.⁹ The questionnaire provides a practical method for identifying the presence and distribution of musculoskeletal symptoms in population-based studies.

Although previous studies have examined fitness-related injuries and the relationship between trainer characteristics and musculoskeletal pain, there remains a need to describe the prevalence and distribution of musculoskeletal pain among young recreational gym-goers who exercise without personal trainer supervision.

2. Literature Survey

Ahmed et al. conducted a cross-sectional study investigating the relationship between fitness trainers' educational qualifications and experience and musculoskeletal pain among their trainees. The study included 1,177 trainees from 74 fitness centres and used the Nordic Musculoskeletal Questionnaire to assess pain. Lower trainer experience was associated with increased odds of musculoskeletal pain among trainees, although trainer educational qualification was not significantly associated with pain after adjustment for relevant factors.⁷

Jones et al. investigated trends in weight-training injuries over a 20-year period using emergency department data. The authors reported injuries associated with weight training and highlighted inappropriate use or misuse of weight-training equipment as an important concern, emphasizing the need for appropriate instruction in equipment use.⁵ Gray and Finch

examined fitness activity-related injuries presenting to hospital and emergency departments. Sprains, strains, and dislocations represented common injury types, and the authors emphasized the importance of targeted injury-prevention strategies according to the type of fitness activity.¹⁰

Keogh and Winwood reviewed the epidemiology of injuries across weight-training sports and reported that although weight-training sports generally demonstrate relatively low injury rates compared with several team sports, improvements were required in prospective injury surveillance, diagnosis, and exposure assessment.⁶

Kemler et al. investigated fitness-related injuries in recreational fitness participants in the Netherlands. Strength training and individual cardiovascular exercise accounted for many reported injuries, while the shoulder, leg, and knee were commonly affected. Overuse or overload, sprains, and incorrect posture or movement were frequently reported causes.⁸ The available literature therefore suggests that inappropriate loading, technique, overuse, and insufficient supervision may contribute to musculoskeletal problems among individuals participating in fitness activities. However, limited information is available regarding the prevalence and anatomical distribution of musculoskeletal pain specifically among young gym-goers who exercise without trainer supervision.

3. Problem Definition

Gym-goers may experience musculoskeletal symptoms during regular exercise, particularly in the context of resistance and other physically demanding activities. Although previous research has described fitness-related injuries and factors such as excessive loading, overuse, and inappropriate movement patterns, limited information is available regarding the prevalence and anatomical distribution of self-reported musculoskeletal pain among young gym-goers who exercise without personal trainer supervision. Therefore, the present study was undertaken to determine the prevalence and anatomical distribution of musculoskeletal pain in this population.

4. Methodology/ Approach

4.1 Study Design

An observational study design was adopted to determine the prevalence and anatomical distribution of self-reported musculoskeletal pain among gym-goers who exercised without supervision from a personal trainer.

4.2 Study Setting and Population

The study was conducted in a community-based gym-going population. The study population comprised individuals who regularly participated in gym-based exercise without supervision from a personal trainer.

4.3 Sample Size and Sampling Technique

A total of 100 participants were recruited using a convenience sampling technique. Participants meeting the predefined eligibility criteria and willing to participate in the study were included.

4.4 Eligibility Criteria

Participants were eligible for inclusion if they fulfilled all of the following criteria:

- Male or female participants aged 18–30 years;
- Regular participation in gym-based exercise for a minimum of 6 months;
- Exercise frequency of 4–5 days per week; and
- Exercise duration of 45 minutes or more per session.

Participants were excluded if they had:

- A known neurological condition;
- A recent musculoskeletal injury; or
- An inflammatory condition.

These criteria were applied to obtain a relatively homogeneous sample of young, regularly exercising gym-goers and to minimize the influence of pre-existing conditions that could independently contribute to musculoskeletal symptoms.

4.5 Outcome Measure

The Nordic Musculoskeletal Questionnaire (NMQ) was used as the primary outcome measure for assessing self-reported musculoskeletal symptoms.

The NMQ assesses musculoskeletal symptoms across specific anatomical regions, including the neck, shoulders, upper back, lower back, hips/thighs, knees, ankles/feet, elbows, and wrists/hands. The questionnaire was selected because it provides a standardized approach for documenting the presence and anatomical distribution of musculoskeletal symptoms across multiple body regions.⁹

The primary outcome of interest was the presence of musculoskeletal pain in one or more anatomical regions. The anatomical site(s) of reported pain were subsequently recorded to determine the distribution of symptoms within the study population.

4.6 Data Collection Procedure

Prior to commencement of data collection, approval was obtained from the Institutional Research Board (IRB). Participants were screened according to the predefined inclusion and exclusion criteria and were informed about the purpose and procedure of the study. Written informed consent was obtained from all participants before data collection.

Relevant demographic and exercise-related information was recorded, including age, sex, height, weight, presence of musculoskeletal pain, and exercise characteristics. Participants were also assessed with respect to whether they performed their gym-based workouts without supervision from a personal trainer.

Eligible participants were then administered the Nordic Musculoskeletal Questionnaire. Participants reported the presence of musculoskeletal pain across the specified anatomical regions. The completed questionnaires were collected, reviewed for completeness, and the obtained data were subsequently entered into Microsoft Excel for analysis.

4.7 Data Management and Statistical Analysis

The collected data were entered and organized using Microsoft Excel. Descriptive statistical analysis was performed to summarize the characteristics of the study population and the prevalence and anatomical distribution of self-reported musculoskeletal pain.

Categorical variables were summarized using frequencies and percentages. The prevalence of musculoskeletal pain was calculated as the proportion of participants reporting pain in at least one anatomical region. Frequencies and percentages were also calculated for individual anatomical regions to describe the distribution of reported musculoskeletal pain.

Because participants could report pain in more than one anatomical region, the regional frequencies were not mutually exclusive and therefore their percentages were not expected to total 100%.

5. Results and Discussion

5.1 Prevalence of Musculoskeletal Pain

Among the 100 participants included in the study, 92 participants (92%) reported musculoskeletal pain in at least one body region, while 8 participants (8%) did not report musculoskeletal pain.

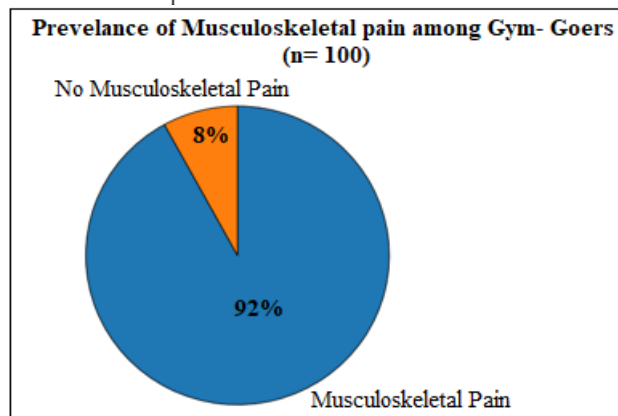


Figure 1: Prevalence of musculoskeletal pain among participants

The findings demonstrate a high prevalence of self-reported musculoskeletal pain among gym-goers exercising without personal trainer supervision. As the study assessed self-reported symptoms using the Nordic Musculoskeletal Questionnaire rather than clinically diagnosed musculoskeletal disorders, the findings should be interpreted as the prevalence of reported musculoskeletal pain and not as the prevalence of clinically diagnosed gym-related injuries.

5.2 Gender Distribution- Of the 100 participants, 69% were male and 31% were female. Thus, males constituted the larger proportion of the study sample.

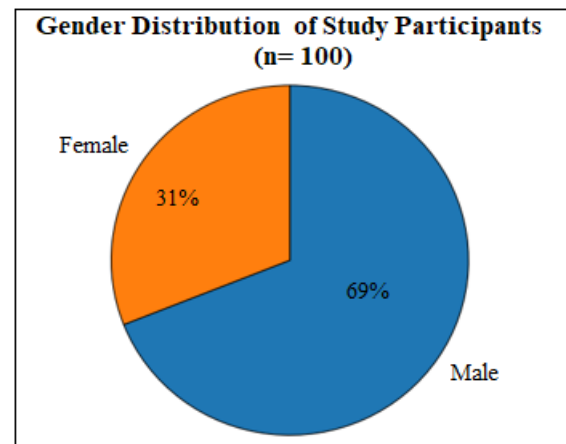


Figure 2: Gender distribution of study participants (n = 100).

The unequal gender distribution should be considered when interpreting the findings, as the smaller proportion of female participants limits meaningful comparison of musculoskeletal pain prevalence between males and females.

5.3 Anatomical Distribution of Musculoskeletal Pain

The distribution of reported pain across anatomical regions is presented in Table 1.

Table 1: Anatomical distribution of self-reported musculoskeletal pain among study participants (n = 100)

Anatomical region	Number of participants reporting pain	Percentage of participants
Lower back	36	36%
Shoulder	24	24%
Upper back	22	22%
Neck	21	21%
Knee	13	13%
Wrist/hand	12	12%
Ankle/foot	7	7%
Elbow	6	6%
Hip/thigh	4	4%

Note: Participants could report pain in more than one anatomical region; therefore, percentages do not total 100%.

The lower back was the most frequently reported site of pain, affecting 36% of participants, followed by the shoulder (24%), upper back (22%), and neck (21%). Pain was also reported in the knee (13%), wrist/hand (12%), ankle/foot (7%), elbow (6%), and hip/thigh (4%).

5.4 Discussion of Overall Findings

The present study found that 92% of participants reported musculoskeletal pain in at least one anatomical region. This indicates a high prevalence of self-reported musculoskeletal symptoms within the studied population of gym-goers who exercised without personal trainer supervision. However, this finding should be interpreted as a description of the study

population rather than evidence that exercising without supervision caused musculoskeletal pain.

The high prevalence observed may be related to several factors associated with gym-based exercise, including training load, exercise technique, repetitive movements, and inadequate recovery. Previous research has identified overuse or overload, sprains, and incorrect posture or movement among commonly reported factors associated with fitness-related injuries.⁸ These findings provide a possible context for the musculoskeletal symptoms observed in the present study; however, the specific causes of pain among the participants were not assessed.

Ahmed et al. reported an association between fitness trainer experience and the risk of musculoskeletal pain among trainees.⁷ This finding suggests that the experience and quality of professional guidance may be relevant to musculoskeletal health in fitness settings. However, the present study did not assess trainer characteristics and did not include a comparison group of gym-goers exercising under professional supervision. Therefore, the findings cannot establish whether the absence of trainer supervision was independently associated with the reported pain.

The lower back was the most frequently reported anatomical site, with 36% of participants reporting pain, followed by the shoulder (24%), upper back (22%), and neck (21%). The predominance of lower-back symptoms may reflect the mechanical demands associated with resistance-based activities involving lifting, bending, squatting, or trunk stabilization. Nevertheless, because specific exercises, training loads, exercise technique, and individual training practices were not systematically evaluated, the underlying reasons for the reported lower-back symptoms cannot be determined from the present data.

Shoulder pain was the second most frequently reported symptom. The shoulder is exposed to substantial movement and loading demands during resistance and overhead exercises. Repetitive loading or inappropriate exercise technique may potentially contribute to shoulder symptoms. Previous epidemiological evidence has also identified the shoulder as an important region affected during strength-training activities.⁸ However, the present study did not collect sufficient information to determine whether any particular exercise was responsible for the reported symptoms.

The distribution of participants by sex showed that 69% were male and 31% were female. This unequal representation limits meaningful comparison of musculoskeletal pain between males and females. Therefore, the present findings should not be interpreted as demonstrating a sex-related difference in pain prevalence.

Overall, the findings highlight a high burden of self-reported musculoskeletal pain within this sample of young gym-goers exercising without personal trainer supervision. The results support the importance of promoting appropriate exercise technique, progressive training loads, adequate recovery, and awareness of musculoskeletal symptoms. However, the study design does not permit a causal inference regarding the relationship between trainer supervision and musculoskeletal

pain. Future comparative or prospective studies involving supervised and unsupervised gym-goers, together with assessment of exercise type, training intensity, technique, and duration, are required to determine factors associated with the development of musculoskeletal pain in this population.

6. Conclusion

The present study found a high prevalence of self-reported musculoskeletal pain among gym-goers exercising without personal trainer supervision. Ninety-two percent of the participants reported pain in at least one anatomical region.

The lower back was the most commonly reported site, followed by the shoulder, upper back, and neck. These findings emphasize the importance of appropriate exercise technique, gradual progression of training loads, adequate recovery, and injury-prevention education among recreational gym-goers.

Although the findings suggest a potential need for professional guidance in gym settings, the observational design does not allow a causal relationship between lack of supervision and musculoskeletal pain to be established.

7. Future Scope

Future research should include comparative studies of gym-goers exercising with and without personal trainer supervision to further examine the relationship between supervision and musculoskeletal pain. Studies should also investigate the association between specific types of exercise and pain at individual anatomical regions, while considering training intensity, duration, frequency, and exercise technique as potential contributing factors. Larger and more gender-balanced samples should be recruited to improve the generalizability of findings. Prospective study designs may further help determine the development of musculoskeletal symptoms over time. In addition, future interventional studies could evaluate whether structured supervised exercise and injury-prevention education are effective in reducing musculoskeletal pain among recreational gym-goers.

8. Limitations

The study has several limitations. First, the sample size was limited to 100 participants and convenience sampling was used, which may restrict generalizability. Second, females were underrepresented in the study population. Third, the study relied on self-reported symptoms using the Nordic Musculoskeletal Questionnaire and did not include clinical examination, imaging, or objective assessment of musculoskeletal impairments. Finally, information regarding specific exercises, training loads, exercise technique, previous training experience, and duration of individual exercises was not systematically analyzed.

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