Exercise-related injuries among female gym members in Qassim 2019
Yasser Alwabli1, Khadijah Al Ruwaili2*, Maram Alghadoni2, Lujain Alsaleh2

ABSTRACT

Background: Physical exercise is one of the essential activities people can do to improve their health and is a necessary asset for healthy aging. However, over-exercising may lead to an increase in the range of acute and overuse musculoskeletal injuries. The aim of this study was to estimate the extent of exercise-related injuries and evaluate the common types of those injuries among female gym members in the Qassim region.

Methodology: In this prevalence study, we targeted women attending gym centers in the Qasism region. A structured questionnaire was delivered online and 247 respondents completed the questionnaire. The main outcome measured were self-reported injuries, their location, and type.

Results: Of the respondents, 49% of them responded yes, they have injuries and, on the other hand, 51% had no injuries. There was no difference in the frequency of injuries between members who were trained by a trainer and those who are not (p-value = 0.788). Injuries varied according to body mass index (BMI). Injuries by anatomic location were counted as: injuries of the ankle (20.9%), the second most common location was the knee (19.0%), and the third most common location was the thigh (15.7%). The most common injury by body part was the injury of the muscles (55.7%) and most of these injuries were muscle strains (52.2%). Other less common injuries included ankle sprains and traumas that led to different bruises.

Conclusion: Physical activity is an important component in improving and maintaining health; however, injury is also an accompanying risk, and since the physical exercise trend is increasing among females in Saudi Arabia, we need more effective injury prevention methods.

Keywords: Female gym members, exercise-related injuries, sport injury, sport club.

Introduction

Physical exercise is one of the most essential activities people can do to improve their overall health, and exercise is necessary for healthy aging process of humans that aids in reducing risk factors of chronic diseases, and possibly prevent early death. Moreover, it has immediate and long-term health benefits. At least 30 minutes of moderate exercise, most days of the week may provide the opportunity to enjoy these benefits. Consequently, active people have less risk for serious health problems, such as heart disease, type two diabetes, obesity, and cancer [1].

However, over-exercising may lead to an increase in the range of acute and overuse musculoskeletal injuries. Moreover, some specific types of musculoskeletal injuries, such as ligament tears, meniscus tears, ankle sprains, or other injuries affecting other body parts have been noted in higher rates among women taking exercise [2].

Our aim of this study was to estimate the extent of exercise-related injuries and evaluate the common types of those injuries among female gym members in Qassim.

Recently, physical exercise trend has increased in Saudi Arabia, so there is a need to know the most prevalent exercise-related injuries and, also to increase the awareness about them to ultimately prevent the injuries and help exercising women to sustain their exercise plans over extending period [3,4].

In recent years, female sport participation has considerably increased at all the levels. Ranging from regular exercise practiced by the general population, to elite athletes participating in competitive sports. Nevertheless, more female participation in sports puts them at an increased
risk of exercise-related injuries. Also, a greater rise in the volume, intensity, or competitiveness of sports activities has raised the risk of exercise-related injuries [5].

An earlier cross-sectional study by Ristolainen et al. [3] focused on acute and overuse injuries among sport gym members, and found that both acute and overuse injuries are more frequent among gym members with 44.0% acute injuries and 35% overuse injury in gym members compared to 19.8% acute injury and 17.4% overuse injury in non-members.

Exercise-related injury results from joining sports gyms have been studied in adolescents [6,7]. There are several studies established that female athletes are at a high danger of having knee injuries, especially anterior cruciate ligament injury (ACL) [8], the reason for this increase is believed to be that hamstring muscle flexibility might be the reason for a higher risk of ACL tears among female athletes [9]. Furthermore, a study discovered that patellofemoral pain syndrome, stress fractures, or lateral epicondylitis are more common among female athletes than other groups in the study [10].

The prevalence and hazard of several varieties of unintentional injuries studied before in Finnish adolescents [11]. However, studies about the differentiation between injuries result from sport gym members and non-member are limited [12].

Subjects and Methods

Our study aimed to estimate the extent of exercise-related injuries among female gym members in Qassim. The study took place in multiple women gym centers in different cities in the Qassim region. Female participants were selected through simple random sampling. We distributed the survey online randomly, and the participants fill the survey without any influence.

The data were collected by an online survey from women attending gym centers in the Qassim region from September to October 2019 and all the age groups were included in the study. The respondents were 246, and therefore, the sample size was 246. The survey used closed-ended questions designed to call for responses.

The extent of exercise-related injuries among female gym members was assessed using crosstabs and chi-squared tests when appropriate. Linear regression was applied to study the associations between injuries and the training with trainers or not, and the duration of training. Odds ratios (ORs) and their 95% CIs (95% Confidence Intervals) were calculated for the occurrence of injuries, anatomic location, type of injuries, age, and body mass index (BMI). The statistically significant threshold was accepted at $p \leq 0.05$.

IBM SPSS Statistics was used to carry out all analyses.

**Results**

The study included to 247 female's gym members. Of the respondents, 49% responded yes, they have injuries and, on the other hand, 51% had no injuries (Figure 1). There was no difference in the frequency of injuries between members who were trained by a trainer and those who are not ($p$ value $= 0.788$). Injuries according to the respondents’ BMIs were as follows: BMI 18.5–24.9, 23.1% had injuries (57 of 134) and 31.2% had no injuries (77 of 100); BMI >25, 23.5% had injuries (58 of 100) and 17.0% had no injuries (42 of 100), and those with BMI <18.5 showed that only 2.4% had exercise-related injuries (6 of 13) and 2.8% had no injuries (7 of 13). (Table 1).

Our study demonstrated that women going to gym mostly develop exercise-related injuries (ERIs) in their twenties. The lowest rates of ERIs are observed in the late teens and above 35 years of age. As seen in Table 2, the age group 20–29 years accounts for more than 30% of the studied population developing ERIs. Interestingly, the rate of ERIs decreased in the thirties and forties of the participants, especially after the 35-year-old age group. However, younger participants in their teens showed the lowest rate of injuries (3.6%).

According to the anatomical location, our study showed that most common part had injuries in female gym members is ankle 20.9%. The second common part is knee injuries which accounts for 19% then thigh injuries which was reported 15.7%. As seen in Figure 2, these three locations showed high rate when we compare it with the other locations.

Our result showed the most body part had injuries was the muscle 55.7%, and the second most part was the joint 20% (Figure 3). According to the injury type, the most common was muscle strain 56.0%, then bruises come after 15.5%, and ankle sprains were less common 14.7% (Figure 4).

### Table 1. Frequency and percentages of injuries according to the BMI among sports gym members.

<table>
<thead>
<tr>
<th>Injury</th>
<th>BMI 18.5–24.9</th>
<th>BMI &gt;25</th>
<th>BMI &lt;18.5</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Count</td>
<td>Count</td>
<td>Count</td>
<td>Count</td>
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<tr>
<td>Yes</td>
<td>57</td>
<td>58</td>
<td>6</td>
<td>121</td>
</tr>
<tr>
<td></td>
<td>% of Total</td>
<td>23.1%</td>
<td>23.5%</td>
<td>2.4%</td>
</tr>
<tr>
<td>No</td>
<td>77</td>
<td>42</td>
<td>7</td>
<td>126</td>
</tr>
<tr>
<td></td>
<td>% of Total</td>
<td>31.2%</td>
<td>17.0%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Total</td>
<td>134</td>
<td>100</td>
<td>13</td>
<td>247</td>
</tr>
<tr>
<td></td>
<td>% of Total</td>
<td>54.3%</td>
<td>40.5%</td>
<td>5.3%</td>
</tr>
</tbody>
</table>
Exercise-related injuries among female gym members

### Table 2. Frequency and percentages of injuries according to the age group among sports gym members.

<table>
<thead>
<tr>
<th></th>
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</thead>
<tbody>
<tr>
<td><strong>injury</strong></td>
<td><strong>Count</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>9</td>
<td>56</td>
<td>19</td>
<td>13</td>
<td>12</td>
<td>12</td>
</tr>
<tr>
<td>% of Total</td>
<td>3.6%</td>
<td>22.7%</td>
<td>7.7%</td>
<td>5.3%</td>
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<tr>
<td>No</td>
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<td>56</td>
<td>24</td>
<td>11</td>
<td>14</td>
<td>10</td>
</tr>
<tr>
<td>% of Total</td>
<td>4.5%</td>
<td>22.7%</td>
<td>9.7%</td>
<td>4.5%</td>
<td>5.7%</td>
<td>4.0%</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>112</td>
<td>43</td>
<td>24</td>
<td>26</td>
<td>22</td>
</tr>
<tr>
<td>% of Total</td>
<td>8.1%</td>
<td>45.3%</td>
<td>17.4%</td>
<td>9.7%</td>
<td>10.5%</td>
<td>8.9%</td>
</tr>
</tbody>
</table>

**Figure 1.** Percentage of females' injury within the sample.

**Figure 2.** Injuries percentages in different anatomical locations among sports gym members.

### Discussion

Forty-nine percent of female gym members revealed that they had experienced ERIs. The frequency of ERIs between female gym members trained by a coach and the one without showed $p$ value = 0.788, which means that there is no significant difference between them and no differences in frequency of injury also.

The most common injuries between age groups were found in twenties. According to body parts, our result showed injuries to the ankle were more prevalent...
numbers than other parts, as in Finnish adolescents’ research found that the most common locations were ankle and foot [3], and also, a prior study showed that females are prone to have ankle sprain more than men, especially during sports and lateral ankle sprain were higher than medial ones [14]. Another common injury part found in our study after ankle was knee injuries. As stated by the study of Finnish adolescents, knee injuries were the second most common acute injuries among them [3], and adding to that, other earlier study stated that knee injuries commonly happen with adolescents [15].

The commonness type of injuries was mostly muscle strain which has been recorded in all the age groups. In agreement with Finnish adolescent study, as they reported that muscle injury also was the most common type of overuse injury in both groups [3]. Furthermore, our results demonstrated that BMI was linked to the frequency of injuries, indicated that an
increase in BMI leads to an increase in injury rate. In line with a study done to correlate BMI with the frequency of injury, result that a higher risk of ERIs in obese adolescents compared to healthy ones [16]. On the other hand, a study on Canadian adolescents found negative results shows that no notable relationship between overweight adolescents and ERI [17].

In addition, several studies reported that, the more sport participation the more injury related to such sport in adults and adolescents [18]. Moreover, in Finnish adolescent study stated, an increased number of injuries with increased playing hours [3]. However, in contrast, our study showed that the relationship between the timing of injury and the period of training was not remarkable. In order to decrease or prevent ERI, several studies have shown that physical activity programmers with physical education have been effective to prevent ERIs [19]. Another important thing as mentioned earlier that, ERIs mostly found in female in their twenties so, an awareness campaign should target this age group specifically more than other age groups to educate them about the increasing potential of ERIs and help exercising women at this age group to avoid ERIs.

One limitation of our study is the type of study of the cross-sectional study. Another one is about the method of data collection which was by an online survey that caused some difficulties to us, in which we cannot communicate with them in person to confirm some information and to get more details about the injury.

Conclusion

Physical activity is an important component to improve our health and it can reduce risk of major illnesses, such as heart disease, stroke, and type 2 diabetes. Also, it can help to get rid of sedentary lifestyle which is common among female community in our region. One of the concerns about increasing physical activity is the risk of injury associated with exercise. Our study shows the extent of exercise-related injuries, common types of those injuries among female gym members in the Qassim region. This may help to reduce these injuries.

List of Abbreviations

BMI body mass index
ERIs exercise-related injuries

Conflict of interests

The authors declare that there is no conflict of interest regarding the publication of this article.

Funding

None.

Consent for publication

Written consent was obtained from the research participants.

Ethical approval

Ethics approval was granted by Subcommittee of Health Research Ethics, Deanship of Scientific Research, Qassim University, via ref number 19/01/01 dated: 11 September, 2019.

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