Effect of a Volleyball Course on Health-Related Fitness Components of University Students

Mohammed Hamdan Hashem Mohammed

Abstract

Physical educators need to evaluate the physical education (PE) curriculum they provide to their students. One way is through regular health-related fitness assessments. Physical education programs have improved fitness levels of schoolchildren, but such data is rare for university students. The aim of this study was to determine the effect of a volleyball course on the health-related fitness of male university students. The participants were non-PE majors from King Fahd University of Petroleum & Minerals. They registered for a volleyball course which was done twice a week for eight weeks (31 October–29 December 2016, 50 minutes per session). The parameters assessed were as follows: 1) body composition through body mass index (BMI), 2) muscular endurance through the 60s curl-up test, 3) flexibility through the sit and reach test, 4) leg explosive strength through standing long jump, and 5) cardiovascular endurance through a 1.6 km run. Pre and post measurements were taken and the data were analyzed using descriptive statistics and paired t-test with SPSS 16. P-values for statistical significance was set at<0.05 while a Cohen-d>0.2 was considered of practical significance. Data from 145 students were analyzed (mean (SD) age=20.8 (0.64) years). There were improvements from pre to post in all variables except body mass and BMI. The data shows evidence that the volleyball course improved the health-related fitness variables of the students. This shows a course designed for non-PE majors may improve their fitness levels if well designed.

Key words: volleyball, university students, health-related fitness, physical education

Introduction

Physical educators need to evaluate the physical education (PE) curriculum they provide to their students. This is important as PE can contribute in giving the required amount of physical activity needed by students. This, in turn, can reduce the prevalence of physical inactivity existing among students, thus contributing in countering the obesity growth reported by the World Health Organization (2016). One way to evaluate a PE curriculum is through health-related fitness assessments. PE programs have improved fitness levels of schoolchildren (Jarani et al., 2016; Kriemler et al., 2011; Siegrist, Lammel, Haller, Christle, & Halle, 2013). But such studies are rare for university students. Moreover, there are no studies that determine the effect of volleyball training on non-athletic university students. This is of interest as volleyball is a competitive sport that relies mainly on explosive strength and endurance to perform techniques such as blocking and smashing (Marques, van den Tillaar, Gabbett, Reis, & González-Badillo, 2009). Thus, the aim of this study was to determine the effect of a volleyball course on the health-related fitness of male university students.

Method

Participants

The participants were students from King Fahd University of Petroleum & Minerals (KFUPM) who registered for the volleyball course provided by the university. The participants were non-PE majors.

Ethics

The study conformed to the Declaration of Helsinki. This study was approved in advance by the Ethical Committee of the
Physical Education Department of KFUPM and KFUPM. Each participant voluntarily provided written informed consent before participating. The privacy of their results was guaranteed.

Course activities

The volleyball course was done twice a week for eight weeks (31 October-29 December 2016, 50 minutes per class). Each class began with a 10 minutes warm-up. After the warm-up, the students were asked to jump in the same position and to do some sit ups and pushups.

After these exercises, the students were taught fundamental volleyball rules and skills. The skills taught included overhead pass, dig, overhand serve, underhand serve, block, and smash. Basic footwork was taught to the students in order to move around the court and to play the ball correctly using the skills they were taught. All of these lessons were practically demonstrated to the students.

Matches among the students were played in five classes and a practical test was given to them after the matches. The aim of the matches and the practical test were to test their mastery of the skills. The practical test required students to perform correctly the underhand and overhead serves, and the overhead pass. The matches among the students were played in five classes and a practical test was done in the last two classes.

Data analysis

Data were analyzed using descriptive statistics and paired t-test with SPSS 16. P-values for statistical significance was set at <0.05 while a Cohen-d>0.2 was considered of practical significance.

Results

There were 145 students with complete data after the completion of the course. The results are shown in Table 1. There were statistical improvements in all parameters before and after the course. But the improvements in body mass and BMI were not of practical significance.

Table 1. Pre and post health-related assessment (N=145)

<table>
<thead>
<tr>
<th>Test</th>
<th>Pre</th>
<th>Post</th>
<th>p-value</th>
<th>95% Confidence Interval</th>
<th>Percent Improvement</th>
<th>Cohen d</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>20.8 (0.64)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Height</td>
<td>173.2 (6.24)</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
<td>–</td>
</tr>
<tr>
<td>Body mass (kg)</td>
<td>76.1 (17.3)</td>
<td>75.5 (16.7)</td>
<td>0.039*</td>
<td>[-1.16, -0.03]</td>
<td>0.780</td>
<td>0.173</td>
</tr>
<tr>
<td>BMI (kg/m²)</td>
<td>25.35 (5.52)</td>
<td>25.15 (5.27)</td>
<td>0.041*</td>
<td>[-0.40, -0.01]</td>
<td>0.797</td>
<td>0.171</td>
</tr>
<tr>
<td>60s Curl ups (repetitions)</td>
<td>35 (8)</td>
<td>41 (10)</td>
<td>0*</td>
<td>[5, 7]</td>
<td>16.5</td>
<td>0.931</td>
</tr>
<tr>
<td>Sit &amp; reach (cm)</td>
<td>28 (7)</td>
<td>31 (7)</td>
<td>0*</td>
<td>[2, 4]</td>
<td>10.6</td>
<td>0.744</td>
</tr>
<tr>
<td>Standing Long Jump (cm)</td>
<td>178 (27)</td>
<td>190 (28)</td>
<td>0*</td>
<td>[9.5, 14.6]</td>
<td>6.76</td>
<td>0.777</td>
</tr>
<tr>
<td>1.6 km run (s)</td>
<td>10.99 (2.55)</td>
<td>9.88 (2.14)</td>
<td>0*</td>
<td>[-1.33, -0.89]</td>
<td>10.1</td>
<td>0.836</td>
</tr>
</tbody>
</table>

Note. Values in Mean (standard deviation); *p<0.05, †p<0.001

Discussion

The aim of the study was to determine the effect of a volleyball PE course on the health-related fitness of male university students who were non-PE majors. All the parameters except body composition improved from pre to post. The improvements in 60s curl-up test, sit and reach, standing long jump, and 1.6 km run were statistical improvements in all parameters before and after the course. Th e absence of significant improvements in body mass and BMI after the program was possibly due to the short duration and intensity of the course. The intensity was low to moderate as the students needed to go for the other classes they had during the day without being tired.

A limitation of this study is that there was no control group. Moreover, the study was conducted on male university students. It will be important to know the effect of such a program on female university students.

Health-related fitness assessment

The following health-related fitness parameters were assessed before and after the course: 1) body composition through body mass and body mass index (BMI), 2) muscular endurance through the 60s curl-up test, 3) flexibility through the sit and reach test, 4) leg explosive strength through standing long jump, and 5) cardiovascular endurance through a 1.6 km run. The students were asked to give their best effort when performing the fitness tests and they were assured that the results of the tests will not affect their final grade.

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Despite the limitations of the study, there is evidence that volleyball designed for physical education can improve the health-related fitness of university students.

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Conflict of Interest
The authors declare there are no conflict of interest.

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References


