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Research Article

Characteristics of Injuries among High School Basketball Players and Current Issues in University Student-led Volunteer Conditioning and Care Activities

Yoshimori Ito[1], Yoshitake Hirano[1]*, Midori Motohashi[1], Yusuke Morita[1], Hitomi Tajima[2], Takumi Watanabe[1], Haruya Suzuki[1], Yuito Yoshii[1], Yuta Kuroi[1], Giichirou Nakaya[3] and Hiroaki Shindo[4]

[1]Department of Rehabilitation, Physical Therapy Course, Nihon Institute of Medical Science, Japan

[2]Department of Rehabilitation, Occupational Therapy Course, Nihon Institute of Medical Science, Japan

[3]Department of Clinical Laboratory Science, Nihon Institute of Medical Science, Japan

[4]Department of Radiological Technology, Nihon Institute of Medical Science, Japan

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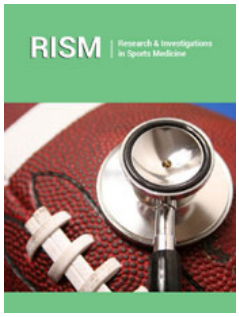

***Corresponding author:** Yoshitake Hirano, Department of Rehabilitation, Physical Therapy Course, Nihon Institute of Medical Science, Japan

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Abstract

This study examines a case of college students who participated in volunteer conditioning and care activities for high school basketball players. The subjects comprised 43 players who participated in a high school basketball tournament and received conditioning and care. The survey items were subjects' attributes, areas of discomfort, degree of pain and fatigue before and after conditioning care, and level of satisfaction with these activities. The results revealed that athletes mainly complained about discomfort in the posterior lower leg, lumbar region, anterior thigh, and posterior thigh, in that order. In addition, the degree of fatigue and pain experienced in problem areas was significantly lower after conditioning and care. The satisfaction of athletes who used conditioning and care was also higher. The results suggest that high school basketball players were delighted with the student-led conditioning and care volunteer program, and the program may help reduce fatigue and pain in problem areas.

Introduction

Many students who aspire to become physiotherapists choose a career path based on their own experiences of sports injuries. Students at Nihon Institute of Medical Science are no exception. Since entering the university with a strong interest in conditioning and care of sports injuries, students who have been accumulating knowledge through lectures and practical training demonstrated their desire for further study by launching the student-led "Sports Medical Care Club" (SMCC) in 2018. In addition, in 2017, the Saitama High School Athletic Federation asked this university to cooperate with volunteers engaged in conditioning and care of athletes participating in track and field events. When the SMCC was established, there was little information on what students should learn and how to proceed with activities. Initial activities began with faculty members disseminating information about sports injuries, bandaging methods, relaxation methods (including sports massage), and taping methods. However, as activities increased at SMCC, students began to take more initiative and learn from each other about conditioning and care methods for sports injuries and disorders. Thus far, we have conducted volunteer conditioning and care activities for high school track and field athletes in Saitama Prefecture and summarized trends in the competitive characteristics and areas of complaints of athletes who used the program [1,2]. On the basis of these results, we created a questionnaire survey to enable our students to safely and quickly provide

conditioning care for high school track and field athletes [1]. We created three manuals covering eight different stretching methods focusing on the lower extremities, two taping methods, and instruction on ice massage methods as self-care [2]. We did not research other sports. Therefore, this study aims to understand the characteristics of disability in high school basketball players and examine the effects that conditioning care had on these players.

Methods

Participants

The participants were players from five teams who participated in a 2022 men's basketball event hosted by the university (April 9 and 10) and who used the SMCC booth at the university. The participants in this study were confirmed to be free of acute symptoms and there were no fractures, numbness, or other neurological symptoms in the area of discomfort. Furthermore, if the participants or SMCC students were unable to determine whether the athlete was eligible for conditioning support, they were instructed to ask a member of the SMCC faculty (licensed physical therapists, occupational therapists, judo therapists, acupuncturists, and strength and conditioning specialists) for instructions. Before the event, the university students studied the areas of discomfort that high school basketball players might experience and measures to treat them and practiced practical skills once a week (90 minutes per session). Seven fourth-year students, nine third-year students, two second-year students, and six graduates from the Department of Physical Therapy participated in volunteer activities during this tournament.

Method

The method used to understand the characteristics of the players covered six items: sex, age, position (multiple responses allowed), the body part causing discomfort (multiple responses allowed), the degree of fatigue, and the area and degree of pain. The Visual Analogue Scale (VAS) was used to evaluate the degree of fatigue. The Numerical Rating Scale (NRS) was used as an index to assess the degree of pain. Next, to confirm the content of SMCC volunteer activities, a 5-point scale consisting of 3 items was used to examine the content of the treatment and the athletes' impression of and satisfaction with the students who performed conditioning and care.

A questionnaire survey was administered to the subjects beforehand to confirm that they had no acute symptoms or fractures. In addition, subjects underwent stretching, relaxation, taping, and so on for 20 minutes at a time to alleviate fatigue and pain, primarily in the areas of complaint (Figure 1).

Figure 1: Conditioning and care of a high school basketball player.

The analysis examined both the degree of fatigue before and after the intervention using a paired t-test and the degree of pain before and after the intervention using Wilcoxon's signed rank-sum test. Other survey items were simply tabulated. SPSS 26 for Windows was used for statistical processing, and the statistical significance level was set at 5%. The study was conducted after obtaining approval from the Research and Ethics Committee of the Nihon Institute of Medical Science (approval number: 2021025). The study's main purpose was fully explained to the subjects, and their written consent was obtained.

Results

A total of 43 subjects received conditioning and care. Of them, 33 were one-time users, 9 were two-time users, and 1 was a three-time user. The average age was 16.3±0.4 years. Regarding gender, 33 subjects were male. The positions of the players who received care (multiple responses were allowed) included 10 point guards, 12 shooting guards, 11 small forwards, 5 power forwards, and 8 centers.

Forty-two of the 43 subjects responded to the questionnaire. Most athletes complained mainly about the following areas of discomfort (multiple reactions were allowed): posterior lower leg, 16; lumbar region, 16; anterior thigh, 15; posterior thigh, 13; and ankle joint, 6 (Figure 2). The results of the comparison of fatigue level and pain before and after the intervention are shown in Table 1. After the intervention, fatigue and pain levels were significantly lower than before.

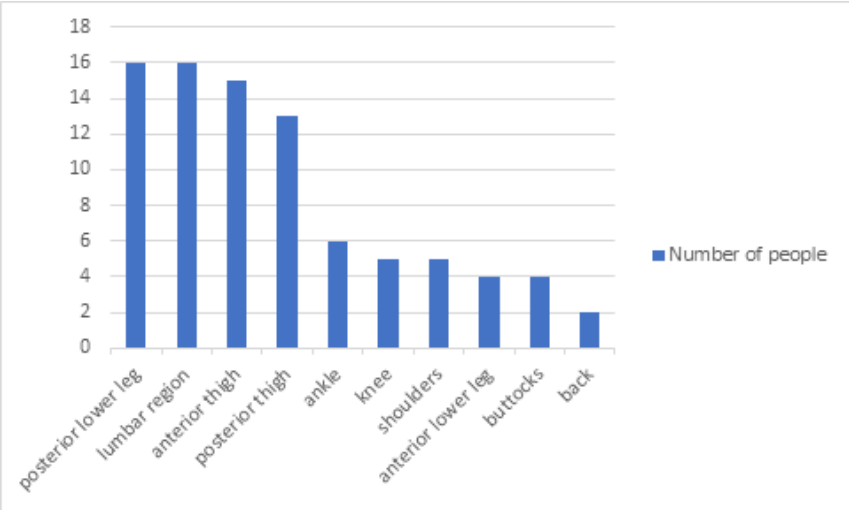

Figure 2: Main areas of discomfort among subjects.

Table 1: Comparison of fatigue and pain before and after intervention.

Evaluation Item	Pre-intervention (n=42)	Post-intervention (n=42)	p-value
Fatigue (VAS: mm) *	56.5±26.7	19.3±13.1	0.011
Pain (NRS) *	4 (0-8)	2 (0-6)	0.001

Wilcoxon signed rank-sum test, * = p< 0.05

VAS: Visual Analogue Scale; NRS: Numerical Rating Scale; mean and standard deviation, median, minimum, and maximum (median (min-max)) of subjects' evaluation items.

The next section presents the results of the SMCC volunteering survey. Responses were received from 42 of the 43 subjects who received conditioning and care. The breakdown of responses regarding subjects' impressions of the students who provided conditioning and care was as follows: "very good," 40; and "good," 2. Regarding the conditioning and care content, 39 subjects evaluated it "very good" and 3 rated it "good." Regarding their satisfaction with the conditioning and care intervention, 36 subjects were "very satisfied," 5 were "satisfied," and 1 was "neutral."

Discussion

Douglas et al. [3] investigation of injury and incidence rates among high school basketball players reported that the most common injuries were, in order of frequency, to the ankle, knee, hip, and thigh. Additionally, Amanda et al. [4] reported that the most common injuries among high school basketball players were to the ankle joint, knee joint, head/face area, and wrist/fingers. In a Japanese study of sports injuries and disabilities in high school club activities, Jinnai et al. [5] reported that basketball players' most common sports injuries and disability sites were the ankle joints, knee joints, and hips. In the present study, the most frequently reported sites of fatigue and pain by the subjects were the posterior lower leg, lumbar region, anterior thigh, and posterior thigh. The reason that injuries were concentrated in the lower limbs and that fatigue and pain were located in the same areas as in previous studies is thought to be the frequent repetition of the dash, stop, turn, and jump movements necessary for basketball.

Hirano et al. [6] reported that high school track and field athletes experienced an improvement in fatigue and pain after 20 minutes of relaxing and stretching the site of discomfort. In the present study, the same form of conditioning and care for high school basketball players' injuries was an aid in reducing fatigue and pain before and after the intervention. The questionnaire regarding the subjects' physical fatigue and areas of physical discomfort provided an understanding of the subjects' overall condition and the problems they were experiencing. In addition, building on previous research, it was thought that a standard level of conditioning and care could be provided by preparing a conditioning and care manual for parts of the body causing discomfort during sports.

Conclusion

The survey results on the subjects' impression, content, and satisfaction with the students who were in charge of conditioning and care were generally favorable on each item. One of the

reasons for this was that, as preparation, the students took the initiative to use the conditioning and care manual to learn the methods to condition and care for sports injuries and disorders by practicing them weekly in their club. This likely resulted in favorable responses from the subjects on the impression, content, and satisfaction items. Working directly in this way with athletes experiencing sports injuries or complaining of problems during competition is a good opportunity to learn communication skills, the characteristics and areas of injuries arising during basketball games, and the physical therapy skills (strength and conditioning methods) required to address such injuries. Therefore, we believe that these extracurricular activities, in addition to studies during pre-graduate education, will aid in developing human resources with the mind and skills of medical professionals who can be readily active in the clinical field immediately after graduation.

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