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Physical Fitness Level of First Year Exercise Science Students

Research Brief

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Abstract

Introduction: Most college students do not meet the recommended amount of physical activity per week. However, in the health sciences there is an expectation that students should serve as role models for physical activity and fitness. With the growing decline in fitness among young adults, it is likely that future healthcare professionals will be less fit and more likely to sustain job-related injuries.

Methods: Exercise science students (n = 275) completed fitness testing during an introductory course (18.64 ± 1.01 years; female n = 175). Tests included the Cooper 12-min run, wall sit-and-reach, 1-min sit-up, and YMCA bench press tests. Two common "fit for hire" lifts, the floor-to-waist and the overhead lifts, were also included. To meet standards, students needed to meet the 50th percentile range based on normative data for age and sex. Student data were compared to the identified norms using one-sample t-tests with an alpha of $p < 0.05$ *a priori*.

Results: Only 9 of 275 (3%) students met all standards. The majority of male and female participants did not meet standards for the YMCA Bench Press test. The majority of males did not achieve standards for the 1-min sit-up test.

Conclusions: All students met standards for ≥ 1 test; however, only 3% met all standards. Therefore, academic majors in the health sciences should emphasize that their students meet recommendations for physical activity and fitness standards.

Key Words: Physical ability test, physical activity, fit-for-hire standards

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Introduction

Recent data from the American College Health Association - National College Health Assessment II determined that approximately 59% of college students self-reported not meeting current physical activity (PA) guidelines.[1] In addition, researchers have also reported declines in PA within health-related fields of study such as exercise science, kinesiology, nursing, pre-physical therapy, pre-occupational therapy, and pre-medicine.[2–5] With the relationship among physical activity, fitness, and obesity, if the PA and fitness levels of pre-health and exercise science students continue to decline, future young allied health professionals may fail to meet "fit for hire" standards that ensure they can perform job tasks safely with a lower risk for job-related injuries.[6] Therefore, pre-health and exercise science students should not only possess content knowledge related to PA and fitness, but should practice what they teach,[7] making the case that physical fitness

assessments should be included as an exit requirement for graduation.[7,8] The purpose of this study is to investigate whether first year exercise science undergraduate students meet a standard fitness level of average (50th percentile) on a battery of health-related fitness tests.

Methods

Participants

Students (n = 275) who were enrolled in an introductory exercise science course at a small private Midwest university completed a custom physical ability test (PAT) as part of the program's assessment plan to evaluate the fitness level of students entering the program. All students were declared exercise science majors. The Institutional Review Board approved the study, and the release of coded data.

Protocol

This PAT was developed using standardized health-related fitness test protocols, including the Cooper 12-min run, 1-min sit-up test, and YMCA bench press test to assess aerobic and musculoskeletal endurance. A modified sit-and-reach test (a wall sit-and-reach) was developed to evaluate hamstring flexibility. Based on established physical requirements for nursing programs as well as other healthcare workers, the researchers also selected two field specific tests, a floor-to-waist lift using 80 lbs and an overhead lift tests using 35 lbs. Standardized equipment for the tests included a stopwatch, cones, pennies, mats, weight bench, metronome, and barbells with weight plates and collars.

Prior to the sixth week of the semester, the students, as part of their course, completed scheduled testing sessions outside of normal class times. The instructor provided pre-test instructions, both verbally and in writing, on the last class session prior to testing. An email was also sent to the students reminding them of their appointment time and pre-test instructions. The instructions included recommendations on sleep, food and drink consumption, dress, and medications prior to testing. Students completed the Physical Activity Readiness Questionnaire for Everyone (PAR-Q+)[9] and brought the completed form to the testing appointment for review and approval to perform testing.

Students were encouraged to warm-up and stretch for at least 5 minutes prior to testing. Students completed testing in assigned groups of 12 and rotated through the stations (Table 1). At all stations, except the Cooper 12-min run, instructors demonstrated proper test procedures (Figure 1). For the wall sit-and-reach, 1-min sit-up, and the YMCA bench press tests, the instructors encouraged students to perform 1-2 practice trials. The instructors and trained graduate assistants recorded student data on each student's data recording sheet, which was then submitted to the online learning platform for the course.

Table 1. Testing order and location.

Order of testing	Location
Cooper 12-min run	Track
1-min Sit-Up	Track
Wall Sit-and-Reach	Track
Lift Floor-to-Waist	Weight room
Overhead Lift	Weight room
YMCA Bench Press	Weight room

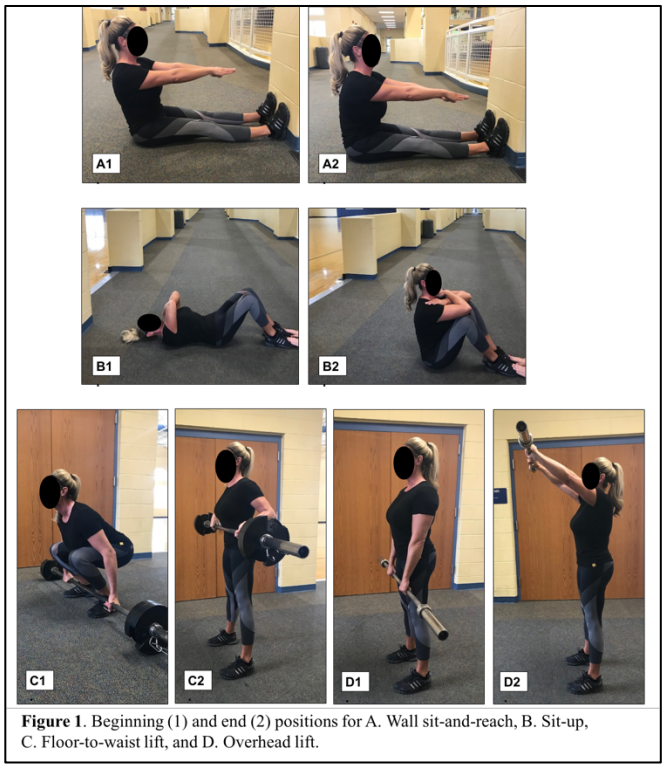

Figure 1. Beginning (1) and end (2) positions for A. Wall sit-and-reach, B. Sit-up, C. Floor-to-waist lift, and D. Overhead lift.

Statistical Analysis

The researchers selected the 50th percentile range based on normative data for age and sex as the cut-off point for met or did not meet standards. Researches computed frequencies for the number of participants who met the physical ability test norms. The researchers compared student data to the criterion using one-sample t-tests with an accepted alpha level of $p < 0.05$ *a priori*.

Results

Of the 275 students (18.64 ± 1.01y; female n = 175, 18.63 ± 0.8y; male n = 100, 18.66 ± 0.10y), very few students (female = 3, male = 6) met every standard. However, all students met at least one standard, and as Table 2 indicates, most students met standards for the Cooper 12-min run, the wall sit-and-reach test, and the floor-to-waist and overhead lifts. Overall, participants performed greater than the set criteria for age and sex; however, the majority of male participants did not meet standards for the 1-min sit-up and YMCA bench press tests. Similarly, most females did not meet standards for the YMCA bench press test.

Table 2. Frequency with percentages of males and females who met standards for physical ability tests, and means with standard deviations and criteria for each test.

Test	Males n (%)	Mean (SD)	Criteria	Females n (%)	Criteria	Mean (SD)
Cooper 12-min run	55 (55%)	2549.70 m (52.03)	2500 meters	96* (55%)	1800 meters	2121.24 (39.73)
1-min Sit-Up	32**(32%)	37.75 reps (0.77)	35 repetitions	158* (90%)	29 repetitions	33.33 reps (0.59)
Wall Sit-and-Reach	68 (68%)	n/a	Touch the wall	158 (90%)	Touch the wall	n/a
Lift Floor-to-Waist	97 (97%)	n/a	80lb lift with barbell	169 (97%)	80lb lift with barbell	n/a
Overhead Lift	97 (97%)	n/a	35lb barbell to 45° above head	169 (97%)	35lb barbell to 45° above head	n/a
YMCA Bench Press	33**(33%)	29.47 reps (1.19)	26 repetitions	85** (49%)	21 repetitions	29.53 reps (0.98)

* significantly greater than criterion ($p \leq 0.003$)
** significantly lower than criterion ($p \leq 0.003$)

Discussion

The results of this study indicate the majority of exercise science students met standards for field-related tasks (floor-to-waist and overhead lifts), aerobic fitness (Cooper 12-min run), and hip flexibility (wall sit-and-reach). However, the majority of male students were unable to meet standards for core endurance (1-min sit-up), and both sexes were unable to meet standards for upper body endurance (YMCA bench press).

While first year college students generally report a decline in PA during the first few months,[10] our results suggest that the first year exercise science students in our program did not experience decline in PA within the first two months sufficient to be categorized below the 50th percentile. Academic majors that focus on PA and fitness in their coursework should emphasize that their students meet recommended PA guidelines and at least an average health-related physical fitness level, in order to document "fit for hire" standards[6] and reduce the risk of job-related injury.

The results of this study are limited to the performance motivation of the students. While not graded on level of fitness, students were required to complete testing and were graded on the ability to interpret their results on a separate assignment. Multiple instructors and graduate assistants were included during fitness testing; however, all testers were familiar with and followed standardized testing protocols. Further research is needed to determine if PA and fitness levels decline throughout the undergraduate years, as well as the extent of physical fitness needed among exercise science graduates to reduce their overall risk of low-back and other job-related injuries in the workplace.

Media-Friendly Summary

Most college students do not meet the recommended amount of physical activity per week. However, students pursuing a health-related profession should be able to meet job-related physical abilities and physical activity recommendations. At one small university, exercise science students completed fitness testing as part of their introductory course. To meet standards, students needed to achieve a rating of average (50th percentile range) based on age and sex. Most students met standards for aerobic fitness, hip flexibility, and field-related functional fitness

(floor-to-waist and overhead lifts). Both sexes were unable to meet standards for upper body endurance. In addition, male students were unable to meet standards for core endurance. With the growing decline in fitness among Americans, it is likely that future healthcare professionals will be less fit and more susceptible to job-related injury. One recommendation is to include fitness assessments as an exit requirement for graduation in health science majors.

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