Are Physical Education Majors Models for Fitness?

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The National Association of Sport and Physical Education (NASPE) (2002) has taken a firm stance on the importance of adequate fitness levels of physical education teachers stating that they have the responsibility to model an active lifestyle and to promote fitness behaviors. Since the NASPE declaration, national initiatives like Let's Move (Obama, 2011) and the U.S. Department of Agriculture's (USDA) Nutrition Standards for School Meals (2012) have further elevated the need for physical education teachers to serve as fitness leaders. In response to this national attention, this study compared fitness levels of Physical Education Teacher Education (PETE) majors to non-PETE majors using six physical fitness tests. The results yielded that PETE majors, with the exception of the one-mile run, are not significantly more fit. Therefore, the timeliness of these results should serve to further raise the awareness of physical education teacher preparation institutions.

With national media attention being raised through the Let's Move initiative developed by First Lady Michelle Obama (2011), the fight against childhood obesity is gaining momentum. Individual school districts are implementing policies removing sugary drinks and high calorie snacks from vending and replacing them with healthy alternatives. School lunch programs, as mandated by the USDA's Nutrition Standards for School Meals (2012), are being reorganized to include healthy alternatives like expansive salad bars, fresh fruits, whole grain, and even policies limiting the number of bake sales are taking hold (Hartocollis, 2011). So what role are our physical education teachers playing in this fitness challenge?

The National Association of Sport and Physical Education (NASPE) (2002) has taken a strong stance on their belief of fitness levels of physical education teachers. They have stated that physical education teachers have the responsibility to model an active lifestyle and to promote fitness behaviors. It is important that physical education professionals "walk the walk" instead of simply "talking the talk". Therefore, it is imperative that physical education teacher preparation programs also take a stance and reaffirm its commitment to fitness. Melville and Maddalozzo (1988) suggest that physical education teacher education major (PETE) program faculty have the responsibility to address fitness issues with their students, even suggesting that holding students to fitness standards would not be out of line.

With this reaffirmation to fitness standards, it is not unreasonable to revisit and investigate the fitness levels of pre-service physical education teachers. NASPE (2002) supports the belief that physical education teachers that live a life that promotes physical fitness have a positive influence on the youth they serve. The more physically fit the students' physical education teacher the more positive their feelings towards physical education (Cardinal, 2001). Melville (1999) contends that physical education teachers who allow their fitness level to decrease seriously impair their teaching effectiveness. Students will view a physical education teacher's message as insincere and lacking credibility. Therefore it is imperative that physical education teachers model a healthy-lifestyle and serve as role models. Physical education teachers cannot be selective as to when they are going to be role models (Dean, Adams, & Comeau, 2005).

Physical education teachers modeling a lifestyle that promotes fitness and physical activity are able to reinforce student learning about fitness concepts and will influence their students to adopt similar lifestyles (NASPE, 2002). La Vine and Ray (2006) studied fitness behaviors of PETE majors using pedometers to help determine how many steps PETE majors walked in one day. They measured how many steps their PETE majors took in the fall semester without any instruction other than how to use the pedometers. They found that the participating PETE majors averaged 8,972 steps daily which is 10% under the recommended 10,000 daily steps (Hatano, 1993). After the PETE majors were encouraged to reflect upon how many steps they averaged in the fall semester the researchers measured the average daily steps of the PETE majors again in the spring semester. The average number of steps taken by PETE majors increased to 15,695 steps per day (La Vine & Ray, 2006). PETE majors that are invested in physical fitness are more likely to be convincing role models and will have a greater impact on their students' commitment to fitness (Sparling, 2003).

NASPE (2002) emphasized three key points when dealing with the issue of fitness levels and physical education teachers: (a) the behaviors of physical education teachers influence the learning of their students; (b) participating in physical activity increases the health and wellness of physical education teachers and is an essential behavior; and (c) there is an expectation that physical education teachers meet and maintain accepted levels of fitness. This underlines the importance that PETE majors need to understand the impact they will have as teachers.

Methodology

The purpose of this study was to determine and compare the fitness level of the PETE majors and non-PETE majors at a small southeastern 4-year university. The study employed a convenience sample design to discover the fitness level of PETE majors taking a physical education course and compare their level of fitness with non-PETE majors enrolled in a health and wellness course. In order to evaluate the fitness level of both groups participating the researchers administered fitness tests that included: 1) a one-mile run, 2) skinfold measurements, 3) curl-ups, 4) pushups, 5) sit and reach, and 6) a handgrip dynamometer measurement.

Subjects

The study consisted of 43 participants, 20 PETE majors and 23 non-PETE majors, enrolled in a small southeastern four-year university and ranging in age from 18-58 years. Of the 20 PETE majors, 10 were male and 10 were female. Of the 23 non-PETE majors, eight were male and 15 were female. The participant pool was pulled from two undergraduate courses; one course required for PETE majors (Teaching Physical Education) and the other course required for all other education majors (Lifelong Health and Wellness) but open to all non-PETE majors as an elective choice making this a convenience sample. Both undergraduate courses are taught

by PETE program faculty. Non-PETE majors included the following majors: 1) exercise science, 2) business, 3) early childhood education, 4) accounting, 5) independent studies, 6) psychology, 7) nursing, 8) middle school education (social studies and math), 9) undeclared majors, 10) fitness/recreation, and 11) elementary education.

Procedures

The fitness tests were administered over a two day period. The first day of testing, the researchers collected height and weight measurement data and the one-mile run results on all subjects. The second day of testing, the researchers took skinfold measurements of subjects and administered the rest of the fitness evaluations: sit and reach, handgrip dynamometer, curl-up, and pushup tests.

One-Mile Run

Subjects in this study ran the one-mile run on an indoor track. The subjects were arbitrarily split into two groups so there was plenty of space on the track to run and pass as needed. Each group of subjects was started together. The one-mile run was calculated in minutes. As a subject crossed the one-mile finish, individual times were announced by the researcher and recorded.

Skinfold

Subjects were administered a standardized 3-site skinfold test using a Lange skinfold caliper. On male subjects, the measurements were taken on the chest, abdomen, and thigh. On female subjects, the measurements were taken on the triceps, the suprailiac site, and thigh. Skinfolds were measured by a trained exercise physiologist with 15 years experience taking skinfold measurements. Skinfold measurements were in millimeters and converted to body density using a gender-specific skinfold equation (Jackson 1985):

Males: Body Density = 1.10938-0.0008267(sum of three skinfolds) + .0000016(sum of three skinfolds)2 – 0.0002574(age)

Females: Body Density = 1.099421 – 0.0009929(sum of three skinfolds) + 0.00000023((sum of three skinfolds)2 – 0.0001392

Results were converted to percent fat using a two component prediction equation (Siri, 1956):
% fat = (495/Body Density) – 450

Pushups

Pushups were measured by the total count number that a subject could complete. Male subjects performed this test with straight legs and assumed the pushup position on their hands and toes. The female subjects performed this test with bent knees and assumed the pushup position on their hands and knees. Pushups were performed with a straight back, bending at the elbows. The subject lowered their body until their chin touched the mat. All pushups were performed at a steady rate until the subject could no longer perform any more pushups or their form was incorrect. Researchers recorded the total pushups completed consecutively and correctly.

Curl-Up

Curl-ups were measured by the total number that a subject could complete with a maximum count of 25. There was no difference in form for male or female subjects. The subjects were asked to lie down on a mat with a cardboard strip that was 10 cm wide placed at the tip of their fingers as they lie flat on the ground with their knees bent in the air so that their feet were flat on the ground. A metronome was used at 50 beats per minute. When the metronome clicked, the subject curled up so that his/her finger tips went from one edge of the 10 cm strip to the other. Subjects were stopped when they did not keep up with the metronome, no longer followed form protocols, reached the point of exhaustion, or performed the maximum 25 curl-ups.

Sit and Reach

The sit and reach test was measured in centimeters. Subjects performed the sit and reach fitness test using a standard sit and reach box. The subjects removed their shoes and placed one leg straight out in front of them with the sole of their foot against the sit and reach box while their leg laid flat against the ground. The other leg was folded in so that the sole of the foot was against the outstretched inner leg. Participants moved with a slow and steady movement in order to move the marker on the top of the sit and reach box as far as they could without lifting their leg off the ground. Participants repeated the process three times and the highest score was recorded in centimeters.

Handgrip

The handgrip test was measured in pounds. Subjects were asked to squeeze the handgrip dynamometer with as much force as possible careful to only squeeze once for each measurement. Subjects in this study used their dominant hand to perform the handgrip dynamometer test. Each subject had three attempts with a pause of about 10-20 seconds between each attempt. The subjects' highest score of the three attempts was then recorded in pounds.

Statistical Analysis/Results

Analyses were done on the data collected from the two groups. Comparisons were made between each group using standard means and a one-way ANOVA utilized to determine if there were significant differences between PETE majors and non-PETE majors in each of these areas of fitness. Data was not disaggregated by gender due to the small number of subjects in this study.

One-Mile Run

The One-Mile Run was reported in minutes/seconds. The PETE participants had a mean time of 8.92 m/s and the non-PETE participants had a mean time of 10.86 m/s. A one-way ANOVA of the data, resulted in significant F-value, $F (1, 41) = F=10.083$, $p<.05$. Therefore, it may be concluded that the pair of means is significantly different.

Using a liberal Fisher PLSD post hoc analysis of all pair-wise comparisons of the means, the one-mile run means were significantly ($p<.05$) different. This suggests that the PETE majors have a significantly faster Mile-minute time than do the non-PETE majors' category. This could be because the field of physical education tends to attract individuals with more athletic experiences involving running.

Skinfold

The mean skinfold data reported in millimeters for the PETE majors was 0.2207mm and 0.2599mm for the non-PETE majors. A one-way ANOVA of the data resulted in a non-significant F-value, $F (1, 41) = F = 2.879$, $p>.05$. This suggests that the means differ only by chance and may be assumed equal.

Pushups

PETE participants had a mean count of 33 pushups and the non-PETE participants had a mean count of 26 pushups. A one-way ANOVA of the data, resulted in a non-significant F-value, $F (1, 41) = F = 2.743$, $p>.05$. This suggests that the means differ only by chance and may be assumed to be equal.

Curl-ups

Both groups of study participants had a mean count of 22 curl-ups. A one-way ANOVA of the data, resulted in a non-significant F-value, $F (1, 41) = F = .059$, $p>.05$. This suggests that the means differ only by chance and may be assumed equal.

Sit and Reach

Recorded in centimeters, the PETE majors had mean of 13.18cm while the non-PETE majors had a mean of 12.97cm. A one-way ANOVA of the data, resulted in a non-significant F-value, F

(1, 41) = F = .056, p>.05. This suggests that the means differ only by chance and may be assumed equal.

Handgrip

In the final fitness test, the results yielded only a one-pound mean difference between the two study groups. PETE majors with a mean of 39lbs. and the non-PETE majors with a mean of 38lbs. A one-way ANOVA of the data, resulted in a non-significant F-value, F (1, 41) = F = .106, p>.05. This suggests that the means differ only by chance and may be assumed equal.

Conclusions

The fitness tests used to compare PETE majors and non-PETE majors were chosen because of their validity and reliability. The results of this study reveal that there was only significant difference in the one-mile run between PETE majors and non-PETE majors with PETE majors significantly performing better than the non-PETE majors. However, the mean data, though not statistically significant, suggests that PETE majors also performed slightly better in the skinfold, pushup, sit and reach, and handgrip tests. NASPE's (2002) position statement titled Physical Activity and Fitness Recommendation for Physical Activity Professionals begins with the statement, "Participation in regular physical activity at a level sufficient to promote health-related physical fitness is an essential behavior for professionals in all fields of physical activity at all levels," (p. 1). If one wishes to be a leader in the field of physical education, it is important to live a lifestyle that is embedded with exercise and healthy decisions. Students, parents, and administrators expect physical education teachers to be role models for physical fitness (NASPE, 2002).

Petersen, Byrne, and Cruz (2003) conducted a study in which they administered the Fitnessgram test and the FitSmart test to a group of PETE majors that were completing their degree at a medium-sized upstate New York college. Petersen et al. (2003) concluded that the PETE majors they tested did well on the Fitnessgram tests and most students (82%) passed all the tests easily. One of the important things to understand about Petersen et al.'s (2003) research is that all of the PETE majors included in the study were receiving their degree from an institution that required all of their PETE majors to pass the Fitnessgram in order to pass a pre-requisite course required before they could student teach. In other words, all PETE subjects had to pass the Fitnessgram before they could graduate. The subjects participating in the current study are not required to pass any type of fitness test in order to graduate from the institution in which they are enrolled in to receive their degree. This leads us to an interesting point that Petersen et al. (2003) raises in their research in which they are questioning whether PETE institutions have a responsibility to require PETE majors to pass a fitness test or not.

How do physical education teachers become role models for physical fitness? One recommendation would be following the Physical Activity Pyramid (Corbin & Lindsey, 2005). This pyramid recommends participating in: 1) lifestyle physical activities every day, 2) aerobic activities 3-6 days a week for at least 20 continuous minutes, 3) active sports and/or recreational activities 3-6 days a week, 4) muscle fitness activities 2-3 days a week, 5) flexibility activities 3-7 days a week, and 6) limited amounts of sedentary living. NASPE (2002) contends that physical education teachers who participate in regular physical fitness activities and apply sound physiological training principles will indeed reinforce learning and will be stronger role models in order to help their students adopt a healthy lifestyle.

The current study suggests that the participating PETE majors in this study are no more role models for physical fitness than the non-PETE majors except for the one-mile run. While PETE majors only scored better on the

one-mile run it is important to remember that cardio vascular endurance is one of the most important aspects of fitness especially given the fact that cardiovascular disease is one of our nation's leading killers. Himberg (2011) addresses the issue of physical education professionals that are too focused on one aspect of physical fitness and fail to address the other aspects of physical fitness. Since PETE majors in this study only scored significantly better than non-PETE majors on the one-mile run, the results from this study seem to concur with Himberg (2011).

This study was limited by its small sample size and needs to be revisited. Perhaps a longitudinal study would reveal significant differences between the groups. There has been very little research conducted on this subject. Therefore, the findings of the study should have an impact on PETE programs across the nation. As Melville and Hammermeister (2006) state, "it is apparent that our future physical education teachers will need to be leaders in school and community efforts to foster regular activity, good nutrition, and positive health practices," (69).

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