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PEDAGOGY

# Are You Better Than a 12-Year-Old Student? A Pilot Study to Explore Physical Literacy in Preservice Physical Education Teachers

*Chih-Chia (JJ) Chen, Megan E. Holmes, Katie Wood, Yonjoong Ryuh, Pamela Hodges Kulinna*

## Abstract

*Physical educators play a key role in role modeling to students within the school context. Therefore, there is a need to understand whether current physical education teacher education (PETE) provides sufficient knowledge and practice to prepare preservice educators to be successful. Thirty PETE preservice teachers (23 males, 7 females, aged 19–26) participated in this study. Participants performed tests in physical fitness and motor performance and completed an online questionnaire about cognitive factors (e.g., knowledge and understanding). In addition, a 7-day walking step total was recorded as daily activity in accordance with the Canadian Assessment of Physical Literacy*

Chih-Chia (JJ) Chen is an assistant professor, Department of Kinesiology, Mississippi State University. Megan E. Holmes is an associate professor, Department of Kinesiology, Mississippi State University. Katie Wood is a graduate student, Department of Kinesiology, Auburn University. Yonjoong Ryuh is a graduate student, Department of Kinesiology, Mississippi State. Pamela Hodges Kulinna is a professor, Mary Lou Fulton Teachers College, Arizona State University. Please send author correspondence to cc2196@msstate.edu

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*testing battery. Each participant's performance was compared with the achievement level of a 12-year-old child. Participants had significantly better performance in muscular strength (measured as handgrip test) and flexibility (measured as sit-and-reach test) than a 12-year-old. However, participants had significantly poorer performance in aerobic fitness (measured as PACER), motor performance (measured as obstacle course test), and muscular endurance (measured as plank test) than a 12-year-old. In addition, participants had significantly lower knowledge and understanding of health and physical activity than a 12-year-old. A positive relationship between physical competence (i.e., overall performance in physical fitness and motor performance) and cognitive factor was shown among participants. Growth and maturation may explain participants' better performance in muscular strength and flexibility. Excessive weight status and low level of knowledge may have contributed to their poor performance in the physical competence domain. The positive relationship may indicate that cognitive factors are a strong predictor of the performance of physical fitness and motor performance. Therefore, for physical educators to promote a healthy lifestyle in education settings, the current PETE curriculum needs to be reviewed and relevant information delivered to promote physical literacy in PETE preservice teachers.*

Traditionally, school physical education has been thought of as the setting where students are taught to play sports and where potential elite athletes can be found (Rink, Hall, & Williams, 2010). However, a great number of studies have demonstrated that physical activities in the early years are beneficial for different levels of health and well-being in later life, such as cardiovascular and musculoskeletal systems, social functioning, and mental health (Acosta et al., 2015; Dohle & Wansink, 2013; Savina, Garrity, Kenny, & Doerr, 2016; Zahl, Steinsbekk, & Wichstrøm, 2017). Thus, in addition to physical health and functioning, more and more studies suggest physical education should promote motivation, confidence, physical competence, knowledge, and understanding in the pursuit of a physical and meaningful lifestyle (Kirk, 2013). The Society of Health and Physical Educators (2014) included this concept of multiple levels of health and well-being and adopted the term *physically literate person* in its latest national physical education K–12 content standards. Specifically, the physically literate persons should (1) learn the skills necessary to participate in physical activities, (2) know the implications and the benefits of involvement in physical activities, (3) participate regularly in physical activity, (4) be physically fit, and (5) value physical activity and its contributions to a healthy lifestyle (Society of Health and Physical Educators, 2014). Hence, the purpose of physical education seems to pertain to not only a state of being physical but also states of being sociable, knowledgeable, and psychological that are interacted within various environment.

Research has proposed several pedagogical strategies that can alter students' physical literacy. Teachers and coaches have been cited as role models more frequently than family members among schoolchildren (Gilmer, Speck, Bradley, Harrell, & Belyea 1996). For example, Whent, Martinez, Gomez-Camacho, and de la Torre (2016) found that classroom teachers' weekly minutes in physical activity was a significant predictor of students' physical activity time in school. Hence, it is important for classroom teachers to be active and for physical educators to be fit role models for their messages to be effective. In particular, the role modeling of physical educators has been recommended as an important factor (Cardinal, 2001). Several studies have demonstrated the potential effect of physical activity and physical fitness of educators on teaching effectiveness and student learning outcomes. First, Melville and Maddalozzo (1998) indicated that elementary school students who scored low on the physical fitness knowledge examination displayed less intent to exercise and rated the physical educator less appropriate as a role model when they perceived the physical educator as "overweight." Further, Dean, Adams, and Comeau (2005) noted that physical educator's appearance of body fatness was related to high school students' performance on a cognitive-based health-related fitness test. Therefore, it is imperative that physical educators understand their effect on students. Whether they are making a conscious effort or not, physical educators are modeling a lifestyle that promotes fitness and physical activity to reinforce the concept of physical literacy among students.

Because physical literacy is listed in the national physical education standards and has become the ultimate goal of physical education, it is important to know if the general public understands the concept and appreciates the importance of physical literacy. Surprisingly, a Canadian survey indicated that only 17% of Canadians were aware of physical literacy (Decima Research, 2008). This poor awareness may be due to the lack of a well-defined and measurable concept that can better position physical literacy effectively in changing public perceptions. Tremblay and Lloyd (2010) considered physical literacy to have four interrelated core domains: (a) physical fitness (cardiorespiratory, muscular strength, and flexibility), (b) motor performance (fundamental motor skill proficiency), (c) physical activity behaviors (directly measured daily activity), and (d) cognitive factors (attitudes, knowledge, and feelings). To promote this new concept to the public, it is important that physical educators are role models of physically literate persons. However, it seems that preservice teacher education programs currently do not emphasize the four interrelated core domains as suggested by Tremblay and Lloyd (2010). For example, Kamla, Snyder, Tanner, and Wash (2012) found that preservice physical educators were not significantly fit compared to non–physical education majors based on several fitness assessments with the exception of the 1-mile run. Further, Petersen, Byrne, and Cruz (2003) surveyed health-related physical fitness knowledge of preservice physical educators who had completed all coursework and student teaching. The mean score for these teachers was 75.18%, which was not better than the mean score of high school students. Both studies demonstrate that preservice physical educators may not be good role models as physically literate persons because of their low physical activity and physical fitness levels and poor knowledge. Chen, Liu, and Schaben (2017) suggested that level of knowledge was a strong predictor of time spent in physical activity. Yet, to our knowledge, no study has systematically examined the physical literacy status among physical educators. This study also adds to the limited literature on physical activity habits and health-related fitness knowledge of preservice physical education teachers.

Based on the concept of Tremblay and Lloyd (2010), this study applied subjective ratings (i.e., knowledge and understanding of physical activity questionnaire) and objective measures (i.e., physical fitness, motor performance, and daily physical activity levels) to examine physical literacy in preservice physical education teachers. The primary purpose of this study was to measure four core domains of physical literacy: physical fitness, motor performance, daily physical activity levels, and cognitive factors (i.e., knowledge and understanding of physical activity). The Canadian Assessment of

Physical Literacy (CAPL) was adopted in this study because it is the first national protocol to evaluate physical literacy (Longmuir et al., 2015). The second edition launched in October 2017. Thus, the adopted assessments during the data collection period were from the first edition. In addition, CAPL was designed for Canadian children aged 8 to 12 years. We hypothesized that in regard to being a role model, the preservice physical education teachers would have better performance in all four core domains of physical literacy compared to a 12-year-old child based on the CAPL. Consistent with Chen et al. (2017), we also hypothesized knowledge and understanding of physical activity was one factor that contributes to physical fitness and motor performance in preservice physical education teachers. A positive association might be evident in this study.

# Method

## Participants

Thirty-seven preservice physical educators (29 males, 8 females, aged 19–26), including sophomores through seniors at a southeastern 4-year university, were recruited for this study. Before testing, interested participants completed the informed consent form. Then the Physical Activity Readiness Questionnaire (PAR-Q) was used to determine the safety of exercising for participants. It is a self-screening tool that asks several questions regarding heart trouble, chest pain, high blood pressure, dizzy spells, joint problems, and other problems that may be exacerbated by aerobic exercise. If participants answered yes to one or more questions, they were not included in the study. After taking the PAR-Q, seven participants were excluded because of their orthopedic problems or mobility limitations. Thirty participants signed the consent forms and performed the physical literacy assessments. All protocols were approved by the university human subjects institutional review board.

## Measurement

Three components of the CAPL were applied: physical competence, daily behavior, and knowledge and understanding. Moreover, the CAPL combines physical fitness and motor performance in the physical competence domain. Therefore, to determine physical literacy in preservice physical educators, this study measured four core domains of physical literacy—physical fitness, motor performance, daily physical activity level, and cognitive factors—as recommended by Tremblay and Lloyd (2010).

**Physical fitness.** Physical fitness refers to physical ability to engage in physical activities. Assessment of physical fitness consists of several components that measure body composition, aerobic capacity, musculoskeletal fitness, and flexibility.

***Body composition.*** Body composition was assessed through measurements of body mass index (BMI) and waist circumference (WC). BMI was computed as weight divided by the square of height ($kg/m^2$). According to the Centers for Disease Control and Prevention (CDC, 2009), BMI between 18.9 and 24.5 is considered normal status for adults. WC measurements were taken at the top of the iliac crest. Thus, the measuring tape was placed parallel to the floor and above the upper hip bone. The CDC suggests the criterion of WC is 101.6 cm (40 in.) for men and 88.9 cm (25 in.) for women. Based on the CAPL grading system, the possible maximum score converted from BMI and WC is 17.

***Aerobic capacity.*** Aerobic capacity was assessed via a 20-m Progressive Aerobic Cardiovascular Endurance Run (PACER). Participants were required to run across the 20-m distance at a pace that increased with the beep sounds. The time between recorded beeps decreased as the level increased. The score is the number of laps reached before the participant was unable to keep up with the recording for two consecutive beeps. Based on the grading system, the possible maximum score converted from PACER performance is 42.

***Musculoskeletal fitness.*** Muscular strength was assessed by grip strength, which indicates upper body strength, and muscular endurance was assessed by plank, which indicates core strength or torso strength. Participants stood in an upright position and held the dynamometer with arm straight and in line with the forearm at the level of the thigh. While hearing the word *squeeze*, participants gripped the dynamometer with maximal force. Two trials with each hand were done and the combination of maximum score for each hand represented the total score. Based on the grading system, the possible maximum converted score for grip strength is 17. The plank test was used as an indicator of muscular endurance. During the test, participants held the correct position as long as possible and that time was recorded. Based on the grading system, the maximum score converted from plank performance is 17.

***Flexibility.*** The sit-and-reach test was used to indicate flexibility of the lower back and hamstring muscles. Participants removed their shoes and sat on the floor with legs straight ahead and parallel to the floor. They placed the soles of their feet flat against the sit-and-reach box. They placed their hands on top of each other with the palms facing down while reaching forward along the measuring line as far as possible. The testers ensured participants' hands remained level throughout the assessment. Participants held the position for 2 s while the distance was recorded. The performance in sit-and-reach test was recorded as the best of two trials. Based on the grading system, the maximum converted score from actual performance for flexibility is 17.

**Motor performance**. Motor performance was measured through performance of the CAPL obstacle course. Participants performed two-foot jumping, sliding, catching, throwing, and skipping and one-foot hopping and kicking. The performance of the participants was assessed based on time to complete the course and criterion-referenced assessment of skill levels. The more physically literate participant would be able to perform optimal balance between speed and accuracy. Based on the grading system, the maximum score converted from performance is 42.

**Daily physical activity level.** Participants wore research-grade accelerometers (ActiGraph GT3X+, Pensacola, FL, USA) for the assessment of step counts. Participants wore the accelerometer for 7 days, including weekend days, on the right hip and maintained their routine daily schedule as close as possible. For an accurate reflection of participant physical activity levels, data were collected to detect noncompliance with a minimum required wear time of 8 hr/day. If this criterion was not met, that day was excluded from data analysis. Participants who were missing more than 2 weekdays or 1 weekend day were given the monitor a second time to obtain data from the missing days. Data from any participant with more than 2 missing weekdays or 1 missing weekend day were not included in analyses.

**Cognitive factors.** Cognitive factors included 10 questions that assess participants' knowledge regarding physical activity and sedentary behavior, physical fitness, and safety during physical activity (see Appendix A). Participants were asked to complete this questionnaire online outside the testing setting, which reduced distractions. The score of these 10 questions was summed for a possible maximum score of 18 for cognitive factors.

## Experimental Procedure

Informed consent for each participant was obtained before the beginning of testing. Testing of participants was completed by the professor of PE 3133 Adapted Physical Education and PE 4173 Test and Measurement in Health and Physical Education. All testing administrators in this study had undergraduate degrees in kinesiology and received practical training sessions. The administrators demonstrated each protocol and each participant was partnered with another and was tasked with recording measurements on the Fitness Assessment Record Sheet (see Appendix B). The administrators observed the protocols being performed and reported performance results and corrections as required.

Upon arriving in the testing field, participants completed a demographic measures questionnaire (e.g., height, weight, WC, behavior checklist, medical history) and the PAR-Q. The demographic questionnaire and PAR-Q screened for health issues that may be exacerbated by aerobic exercise. Seven participants were excluded from the study because of their physical or mobile limitations. In addition, participants went through handgrip, sit-and-reach, and PACER tests.

A week later, participants completed plank and obstacle course tests. After the completion of all the tests, participants were provided a Web link to carry out an online questionnaire about knowledge and understanding of interests toward physical activity and health during their own free time. Moreover, to record their daily walking steps, participants wore an accelerometer at right hip level from the following day for 7 days. The accelerometers were initialized at a sampling rate of 30 Hz. The data for daily walking steps were analyzed at 10-s epochs via Kinesoft v. 3.3.75 software.

## Data Analysis

Statistical analysis was performed in SPSS 25.0. A single-sample *t* test determined if there was a statistically significant difference between different domains of physical literacy (physical fitness, motor performance, daily physical activity level, and cognitive factors) between the study sample and the achievement level of a 12-year-old student in CAPL. Because the data followed a normal distribution, a Pearson product–moment correlation coefficient (two-tailed) was used to evaluate the relationship between the physical fitness, motor performance, daily physical activity level, and cognitive factors. The significance level was set at .05.

# Results

## Physical Fitness

As Table 1 shows, participants had significantly better flexibility, $M_{male} = 31.51 \pm 8.64$, $M_{female} = 39.99 \pm 5.69$, compared with a 12-year-old student, $M_{boys} = 24.8$, $t(26) = 3.72$, $p < .001$, for males, $M_{girls} = 33.1$, $t(6) = 3.27$, $p = .018$, for females. However, only male participants significantly had better performance in muscular strength ($M_{male} = 99.15 \pm 16.84$) compared with a 12-year-old student, $M_{boys} = 45$, $t(26) = 15.42$, $p < .001$. Further, mean BMI of participants was high (27.63 kg/m$^2$) and categorized as overweight. Participants' WC did not exceed the criteria of the CDC. On the other hand, participants had significantly poorer performance in aerobic capacity, $M_{male} = 33.78 \pm 16.64$, $M_{female} = 19.29 \pm 5.44$, $M_{boys} = 45$, $t(26) = -2.95$, $p = .007$, for males, $M_{girls} = 44$, $t(6) = -11.54$, $p < .001$, for females, and in muscular endurance, measured as plank test, $M = 102.01 \pm 16.64$, compared with a 12-year-old student, $M = 127$, $t(29) = -3.39$, $p = .002$.

## Motor Performance

As Table 1 shows, participants performed significantly poorer in motor performance, measured via obstacle course test, $M = 23.93 \pm 2.15$) compared with a 12-year-old student, $M = 27$, $t(29) = -7.82$, $p < .001$.

**Table 1**
*Participants' Performance in Physical Literacy*

| Assessment | PETE students *M* ± *SD* | 12-year-old students | *t* | *p* |
|---|---|---|---|---|
| Physical fitness | | | | |
| BMI | 27.6 ± 5.02 | 24.8⁺ | 2.98 | .006* |
| WC (cm) | | | | |
| Males | 88.88 ± 13.58 | 101.6⁺ | −4.64 | < .001* |
| Females | 80.29 ± 8.37 | 88.9⁺ | −2.44 | .051 |
| PACER (lap) | | | | |
| Males | 33.78 ± 16.64 | 44 | −2.95 | .007* |
| Females | 19.29 ± 5.44 | 43 | −11.54 | < .001* |
| Handgrip (kg) | | | | |
| Males | 99.15 ± 16.84 | 45 | 15.42 | < .001* |
| Females | 64.50 ± 24.59 | 44 | 2.205 | .070* |
| Plank (s) | 102.01 ± 40.29 | 127 | −3.39 | .002* |
| Sit-and-Reach (cm) | | | | |
| Males | 31.51 ± 8.64 | 24.8 | 3.72 | < .001* |
| Females | 39.99 ± 5.69 | 33.1 | 3.27 | .018* |
| Motor Performance | | | | |
| Obstacle Course | 23.93 ± 2.15 | 27 | −7.82 | < .001* |
| Daily Physical Activity (step) | 14587.98 ± 5160.96 | 15000 | −.44 | .667 |
| Cognitive Factor (point) | 13.94 ± 2.02 | 14.8 | −2.34 | 0.26 |

*Note*. BMI = body mass index; WC = waist circumference; PACER = Progressive Aerobic Cardiovascular Endurance Run.

*$p$ < .05. ⁺criteria for adults.

## Daily Physical Activity Level

Participants did not perform significantly more daily walking steps, M = 14587.98 ± 5160.96, compared with a 12-year-old student, $M = 15000$, $t(29) = -.44$, $p = .667$, as indicated in Table 1.

## Cognitive Factors

As Table 1 shows, participants had higher knowledge and understanding of physical activity and sedentary behavior, physical fitness, and safety steps, $M = 13.94 \pm 2.02$, than did a 12-year-old student, $M = 14.8$, $t(29) = -2.34$, $p = .26$.

## Relationship Among Three Domains of Physical Literacy

Since CAPL combines physical fitness and motor performance as the physical competence component, the summed scores in the performance of physical fitness test and motor performance assessment can be converted with a maximum of score of 32. As Figure 1 shows, a significantly positive relationship was found between overall performance in the physical competence component and cognitive factors among participants ($r = .52$, $p = .003$). However, as Figure 2 indicates, no relationship between daily physical activity level and cognitive factor was reported ($r = -.03$, $p = .876$).

# Discussion

The importance of the physical education teacher's role, particularly for effective and credible teaching of physical education, has been highlighted in the literature. Physical educators are expected to be role models to students through their acts, behaviors, and bodies (Silverman & Mercier, 2015). Thus, the Society of Health and Physical Educators (2014) suggested physical education teachers need to be physically literate persons. Tremblay and Lloyd (2010) defined physical fitness, motor performance, physical activity behaviors, and cognitive factors as important areas for physical literacy. However, there has been a noticeable dearth of research regarding how preservice physical educators learn and practice physical literacy. Because physical education teachers play an important role in helping students to be physically literate individuals, the primary purpose of this study was to examine physical literacy among preservice physical educators compared with the Canadian national standard for a 12-year-old elementary student. CAPL was adopted

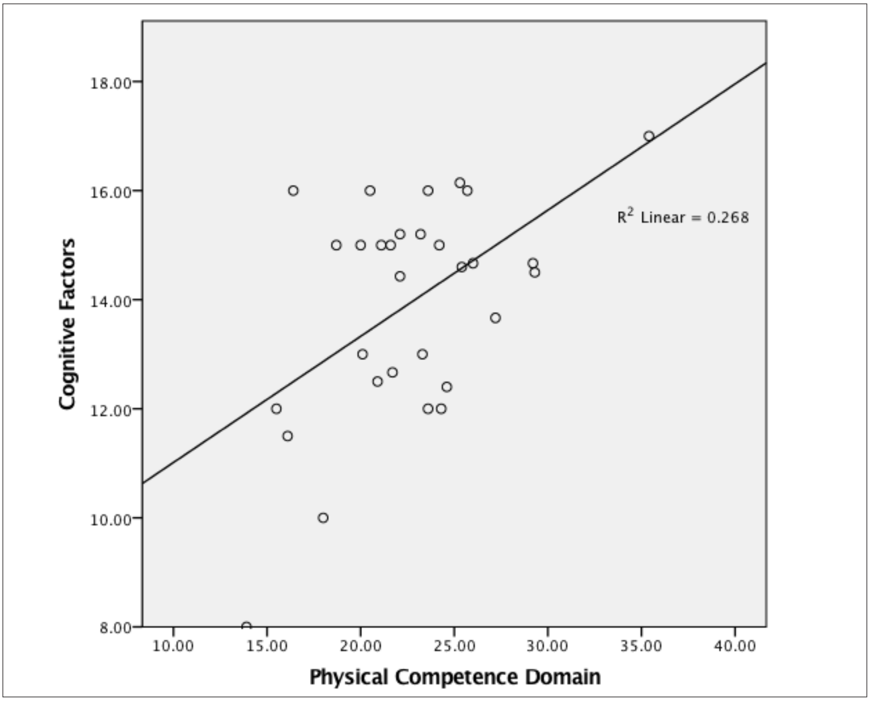


***Figure 1.*** The relationship between cognitive factor and performance in physical competence in physical education teacher education students.

because it is the first comprehensive protocol that accurately and reliably assesses a broad spectrum of abilities that contribute to physical literacy. The preservice physical education teachers in this study performed poor in terms of aerobic capacity, muscular endurance, and motor performance. Further, preservice physical education teachers demonstrated poor cognitive factors, such as knowledge and understanding with regard to physical fitness and physical activity. Moreover, preservice physical education teachers performed similar daily walking steps as a Canadian 12-year-old elementary student. An association between cognitive factors and physical competence (i.e., the combination of physical fitness and motor performance) was evident but not seen in the connection with daily walking steps among preservice physical education teachers.

Preservice physical educators in this study performed better than a 12-year-old Canadian 12-year-old elementary student in the tests for muscular strength and flexibility, which is consistent

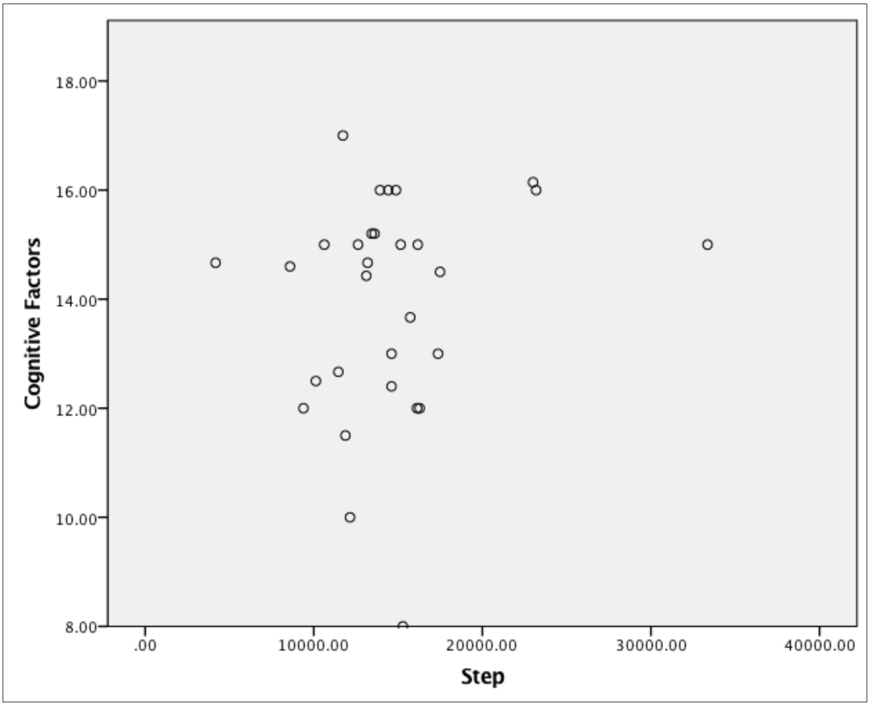


***Figure 2.*** The relationship between cognitive factors and daily physical activity in physical education teacher education students.

with findings by Ervin, Fryar, Wang, Miller, and Ogden (2014) and Nikolaidis, Calleja-González, and Padulo (2014), which indicate older groups performed better in grip strength test and sit-and-reach test than young age groups. This corroborating evidence likely suggests a significant positive trend with age for muscular strength and flexibility. Because there was no difference in physical activity levels (i.e., steps), sex hormones (i.e., testosterone and estrogen) may play a vital role in muscle size and flexibility. The growth and maturation in body function (e.g., increased lean muscle mass) may lead to advanced performance in handgrip and sit-and-reach tests among preservice physical educators. Hence, young children should not be regarded as miniature young adults regarding to their physical characteristics.

Furthermore, physical education teacher education (PETE) students showed poor performance in aerobic endurance and muscular endurance in this study. One reason for this might be their body composition. The average BMI was 27.62, which is categorized as overweight based on the definition from the Centers for Disease Control and Prevention (2009). Power, Ullrich-French, Steele, Daratha, and Bindler (2011) demonstrated a negative association between obesity status and PACER performance in adolescents. Similarly, Ervin et al. (2014) showed the length of time the plank was held decreased as weight status increased for youth. Thus, overweight status in the current study seems to have a negative effect with measures that involved lifting the body. Overweight among preservice physical education teachers may pose a significant physical problem during the performance of physically demanding tasks in the future.

Additionally, in this study, the knowledge and understanding domain of physical literacy was low and an inverse association was found between cognitive factors and physical competence domain, including physical fitness and motor performance among PETE preservice physical educators. Hence, the insufficient level of relevant knowledge and understanding of physical fitness might explain the poor performance in the physical competence domain. Keating, Silverman, and Kulinna (2002) pointed out that PETE students had only slightly positive attitudes toward physical fitness tests and did not believe strongly that physical fitness tests were important or useful. Castelli and Williams (2007) found that physical education teachers were very confident in their knowledge of health-related physical fitness; however, their test scores did not meet the standard of achievement expected of a ninth-grade student. A physical educator is supposed to be a credible and reliable resource who provides information regarding the importance of health-related knowledge for students. However, consistent with previous findings, the findings in this study show a deficiency in health-related knowledge among PETE students. This issue is particularly important because of the growing prevalence of pediatric obesity and low levels of physical activity. PETE programs may need to prepare PETE preservice physical educators to enhance their personal health to effectively influence their effectiveness as future physical education teachers.

Surprisingly, participants performed similar daily walking steps as a 12-year-old student. However, light physical activity, such as walking steps, may not be sufficient enough to maintain and promote physical fitness and motor behavior. Moderate-to-vigorous physical activity (MVPA) appears more important than light physical activity for muscular fitness and many motor behaviors, such as bone mineral density, lower limb muscle strength, functional mobility, and balance (Wu et al., 2017). Barnett, Lubans, Salmon, Timperio, and Ridgers (2017) demonstrated that the level of physical activity may predict motor performance in young adults. Specifically, they found that a high level of total physical activity was able to predict low target deviation in an unpracticed bimanual coordination task. Further, Gutin, Yin, Humphries, and Barbeau (2005) indicated that vigorous physical activity explained more variance in cardiovascular fitness and the percentage of body fat after controlling for age, sex, and race. Thus, it seems as if the amount of MVPA may be pivotal to improving aerobic capacity, muscular fitness, body composition, and motor behavior. On the other hand, there was no relationship between cognitive factors and daily physical activity level in this study, even though Chen et al. (2017) suggested that level of knowledge is a strong predictor of the time spent in physical activity. Future studies should include a measure to assess the time spent in MVPA and its effect on other domains of physical literacy.

This study acknowledges some limitations and that future studies will be needed. First, this study had a small sample size. All of the participants came from the same PETE program and their learning in the program may have affected the results, although the differences were evident with moderate to strong effect sizes. This preliminary result is promising but needs to be replicated with a larger sample to reduce bias and errors. Furthermore, the concept of physical literacy was adopted from Tremblay and Lloyd (2010) and included partial measures from the CAPL. Thus, the current findings may not truly capture overall levels of physical literacy among participants. In addition, steps in this study may not differentiate levels of physical activity that are associated with physical fitness and motor performance (Wu et al., 2017). Hence, it is recommended that future studies include other physical activity measures, such as MVPA time, to identify whether they can sustain physical competence.

In summary, the findings of this study indicate preservice physical educators demonstrate a low level of physical literacy compared to a 12-year-old Canadian student. In particular, consistent with previous studies (Disch, Santiago, & Morales, 2012; Miller & Housner, 1998), preservice physical educators in this study scored poorly on the knowledge instrument. This is the first study that has explored physical literacy in physical educators. Therefore, these findings will be useful for teachers and policymakers to review current teacher education curriculum and emphasize the health-related interactions and life experiences of future physical educators. Further studies are needed to replicate the findings of this study through a large sample size and more physiological measures to enhance understanding of the level of physical literacy and physical activity and knowledge status in physical educators.

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# Appendix A

## Online Questionnaire for Knowledge and Understanding

In this project, when we talk about physical activity, we mean when you are moving around, playing, or exercising. Physical activity is any activity that makes your heart beat faster or makes you get out of breath some of the time. Why are we asking you these questions? We want to know what teacher candidates like you think about physical activity, sports, and exercise.

Please remember:

- There are no right or wrong answers. We only want to know what you think.
- If you do not know an answer, please write your best guess.
- There is no time limit, so please take all the time you need.

1. **What grade are you in: (please select one)**
   - ○ Freshman
   - ○ Sophmore
   - ○ Junior
   - ○ Senior
2. **Are you a: (please select one)**
   - ○ Male
   - ○ Female
3. **Please enter your birthday**
   MM /DD/YYYY
4. **How many minutes each day should children do physical activities that make their heart beat faster and make them breathe faster, like walking fast or running? Count the time they should be active at school and also the time they should be active at home or in their neighborhood.**
   - ○ 10 minutes
   - ○ 20 minutes
   - ○ 30 minutes
   - ○ 30 minutes to 1 hour

5. **Sometimes children watch television, play video games, or play on the computer or on a smartphone. What is the most time that children should look at a screen each day? Do not count the time that they have to look at a screen to do homework.**
   - ○ 30 minutes
   - ○ 30 minutes to 1 hour
   - ○ 2 hours
   - ○ 4 hours
6. **There are many different kinds of fitness. One type is called endurance fitness, aerobic fitness, or cardiorespiratory fitness. Cardiorespiratory fitness means…**
   - ○ How well muscles can push, pull, or stretch
   - ○ How well the heart can pump blood and the lungs can provide oxygen
   - ○ Having a healthy weight for our height
   - ○ Our ability to do sports we like
7. **Muscular strength or muscular endurance means...**
   - ○ How well the muscles can push, pull, or stretch
   - ○ How well the heart can pump blood and the lungs can provide oxygen
   - ○ Having a healthy weight for our height
   - ○ Our ability to do the sports we like
8. **Select all that apply to what you feel describes what healthy means**
   - ☐ Being skinny
   - ☐ Eating well
   - ☐ Not being sick
   - ☐ Looking good
   - ☐ Feeling good

9. **This story about Sally is missing some words. Fill in the missing words below. Each word can only be used to fill one blank space in the story.**

   **Word Bank: Fun, Endurance, Good, Pulse, Strength**

   **Sally tries to be active every day. Running every day is good for her heart and lungs. Sally thinks that physical activity is ______________and is also _____________ for her. At her sport team's practice she does more running to improve her __________________. The team also does exercises like push-ups and sit-ups that increase her __________________. After exercising, she checks her heart rate which is also called a _______________.**

   First blank ____________________________________________
   Second blank __________________________________________
   Third blank ___________________________________________
   Fourth blank __________________________________________
   Fifth blank ____________________________________________

10. **Select which activities you always or almost always wear safety gear (like helmet or shin pads) when you do the activity.**
    - ☐ Hunting
    - ☐ Monkey Bars
    - ☐ Skateboarding
    - ☐ Swinging
    - ☐ Skipping
    - ☐ Biking
    - ☐ Baseball
    - ☐ Swimming
    - ☐ Running
    - ☐ Waterskiing
    - ☐ Inline Skating

**11. If you wanted to GET BETTER AT A SPORT SKILL like kicking and catching a ball, what would be the best thing to do?**

- ○ Read a book about kicking and catching a ball
- ○ Wait until you get older
- ○ Try exercising or being active a lot more
- ○ Watch a video, take a lesson, or have a coach teach you how to kick and catch

**12. If you wanted to IMPROVE YOUR FITNESS, what would be the best thing to do?**

- ○ Read a book about improving your fitness
- ○ Wait until you get older
- ○ Try exercising or being active a lot more
- ○ Watch a video, take a lesson, or have a coach teach you how to improve your fitness

**13. If you were allowed to pick what you do after school, which activity would you pick?**

- ○ Play video/computer games
- ○ Go to my sports team's practice
- ○ Read
- ○ Walk my dog
- ○ Do homework
- ○ Chat with friends online
- ○ Play outside with my friends
- ○ Watch television

## Thank You

**Thank you for taking the time to complete this survey.**

# Appendix B

## Physical Fitness and Motor Performance Data Collection Sheet

**Participant:** ______________________________________
**Test Date:** ____ /______ /______
**Examiner(s):** _____________________________________

| | | | |
|---|---|---|---|
| **Age of Participant** ___ | **Gender** Male/Female (Circle) | | |
| **Body Weight** _______ **(kg)** _______ **(kg)** | **Waist Circumference** _______ **(cm)** _______ **(cm)** | **Height** _______ **(cm)** | **Percentage of Body Fat** _______ **(%)** |
| **Pacer Laps (20 m)** _____ | | | |
| **Left Handgrip 1** _________ **(kg)** | **Left Handgrip 2** _________ **(kg)** | **Right Handgrip 1** _________ **(kg)** | **Right Handgrip 2** _________ **(kg)** |
| **Plank Time** _______ **(s)** | | | |
| **Obstacle Course Time 1** __________ **(s)** | **Obstacle Course Score 1** ___________ | **Obstacle Course Time 2** __________ **(s)** | **Obstacle Course Score 2** ___________ |