Awareness Between the Association of Physical Activity and Academic Achievement in Lansing Community College Students

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Introduction

Individuals, who participate in the recommended amount of daily physical activity, exponentially benefit from many positive health outcomes by reducing the risk of chronic diseases and improving self-esteem, concentration, and stress (U.S. Department of Health and Human Services (USDHHS, 2008). The more physically active you are, the greater the health benefits (USDHHS, 1996). The Physical Activity Guidelines recommend adolescents should participate in at least sixty or more minutes of moderate to vigorous aerobic activity daily (USDHHS, 2008). Despite the recommended benefits of physical activity, many Americans are not achieving the recommended physical activity levels (CDC, 2010). In Michigan, only about half of adults participate in thirty minutes of moderate physical activity on five or more days per week (CDC, 2009).

Higher levels of physical activity have been associated with improved academic test scores and schools who have adopted improved physical education classes have noticed significant improvements in reading, math and science among low income students (Ratey, 2008). It may be because physical activity also improved attention, memory and processing speed, therefore making them better problem solvers (Ratey, 2008). Physical activities play a critical role in academic achievement and should specifically be a part of the school curriculum (Castelli, Hillman, Buck, & Erwin, 2007).

Despite all the documented academic benefits of physical activity, the majority of Michigan high schools do not require physical education classes on a daily basis. In 2009, 67% of high schools nationwide, and 69% of Michigan high schools did not offer physical activity classes on a daily basis (USDHHS, 2010). Lansing Community College (LCC) is the third largest (in enrollment) community
college in Michigan and services over 30,000 students per year (Lansing Community College, n.d). There is a large age range for community college students (17-60 years). LCC often supports a unique non-traditional student profile such as adults working full or part time jobs while returning to school, and first-generation postsecondary education students (American Association of Community Colleges, n.d.). Thus, requiring (LCC) students to participate in physical activity classes will help improve the physical and cognitive health of its students.

**Purpose**

The purpose of this study was to determine LCC student’s knowledge regarding the association between physical activity and academic achievement. The primary objectives were to (a) examine student’s knowledge and perceived health benefits of physical activity, (b) examine student’s physical activity barriers, (c) examine self-rated health status and academic achievement in relation to physical activity intensity level performed, (d) examine student’s knowledge regarding the relationship between physical activity and academic achievement, (e) examine student’s knowledge of physical activity classes available through LCC.

**Methods**

A cross-sectional design was used to determine the knowledge of LCC students regarding the association between physical activity and academic achievement. The study population consisted of a sample of undergraduate LCC students. The eligibility criteria consisted of 1) been over the age of 18 and 2) enrolled during the Fall 2010, and 3) understood the survey. Students had the opportunity to access the online survey link from an e-mail invitation to their LCC student e-mail, LCC’s Facebook page, or through a LCC student eNewsletter. To start the survey process, an initial introductory e-mail went out to all LCC students inviting them to participate in the online survey. A voluntary $5.00 incentive was offered to the first 100 students to take the survey. Out of the 775 responses, 52 participants did not
complete the survey, 22 were duplicates, and 89 completed in less than 5 minutes. The total number of valid survey responses equal to 612.

**Measures**

Student demographic questions: age, gender, racial background, marital status, work/volunteer hours, enrollment status, current year in school, self-reported grade point average (GPA), credits currently enrolled, and self-rated health status were assessed (ACHA, 2010). LCC’s physical activity survey assessed student’s knowledge by determining whether students perceived maintain desired weight, improved energy, improved sleep and decreased risk of chronic disease, decrease in depression, lower blood pressure, improved attention, lower cholesterol, improved memory, and improved current school grades as health benefits from physical activity. Additionally the knowledge of specific benefits related to physical activity was assessed, such as help control weight, improve muscular strength, lower risk of heart attack and stroke, improve energy level, help control stress, lower the risk of diabetes, improve learning, lower risk of some cancers, improve memory, improve GPA/test scores/overall class grades, control or improve ADHD, and grow neurons in the brain. The barriers for lack of physical activity were assessed by using possible perceived barriers such as not enough time, not motivated, won’t stick with it, need a buddy, not convenient, lack of encouragement, bad weather, family obligations, don’t enjoy it, no self-confidence, boring, no family support, injury/health reasons, and no parks close by (Daskapan, Tuzun, and Eker, 2006). Knowledge of the physical activity classes at LCC was determined by asking students if they knew about various physical activity classes available at LCC, such as Weight training, Swimming, Aerobics, Introductory Fitness, Total Fitness, Basketball, Karate/Judo, Volleyball, Adult Fitness/Cardiac Rehabilitation, Exercise for Learning Readiness, Boxing, and Soccer (LCC, 2010).
Results

The descriptive statistics, the chi-square test, the Pearson correlation and the Partial correlation were used. The student demographics consist of a mean age of 28.58 years, with the majority (69%) of participants being female. There was a higher frequency of white (85%) participants compared to all other races combined. Additionally, 72% of participants were single, separated or divorced. There were two prominent work categories within the student population. The largest group of students (30%) did not work at all while the next largest group (19%) worked 20-29 hours per week. Most of the students (59%) were enrolled as full time students with the majority (63%) being either first or second year at LCC. The cumulative GPA of the survey participants consisted primarily of students in good academic standing since 36% reported an “A”, 43% reported a “B”; and only 15% reported a “C”, 2% reported a “D” and 0% reported an “F”.

Knowledge of physical activity health benefits

The most frequent perceived health benefit (84%) was that physical activity maintained desired weight, followed by improved energy (80%), followed by improved sleep (70%), and decreased risk of chronic diseases such as heart disease/cancer/diabetes (66%). The majority of students knew that physical activity could help to control weight (100%), improve muscular strength (100%), decrease the risk of heart attack and stroke (98%), improve energy level (98%), help control stress (97%), and decrease risk of diabetes (90%). Notably, even though only 66% viewed decreased risk of chronic disease as a health benefit of physical activity, 98% of participants said they currently knew that physical activity reduced their risk of heart attack and stroke, 71% knew it reduced their risk of some cancers, and 90% knew it lowered their risk of diabetes. Therefore, students knew of a variety of health benefits such as maintain desired weight, improved energy, and improved sleep very well.
**Barriers**

The most common physical activity barriers students chose was “Do not have enough time,” (36%) followed closely by “Not motivated” (32%), and “Will not stick with it.” The barriers listed by students demonstrated that student’s time is over scheduled, which could lead to decreased motivation. Additionally, students expressed they knew they would not continue with the physical activity program after they started it.

**Intensity level and self-rated health status**

There was a correlation between walking and self-rated health status, $r = 0.13$, $n = 602$, $p = 0.00$. After controlling for covariates, there was still a correlation between walking and self-rated health status, $r = 0.13$, $n = 568$, $p = 0.00$. There was a correlation between moderate physical activity and self-rated health status, $r = -0.36$, $n = 611$, $p = 0.00$. After controlling for covariates, there was still a correlation between moderate physical activity and self-rated health status, $r = -0.38$, $n = 575$, $p = 0.00$. There was a correlation between vigorous physical activity and self-rated health status, $r = -0.34$, $n = 609$, $p = 0.00$. After controlling for covariates, there was still a correlation between vigorous physical activity and self-rated health status, $r = -0.35$, $n = 573$, $p = 0.00$. These results indicated that regardless of low, moderate, or vigorous intensity level performed; any level of physical activity demonstrated improved self-rated health status.

**Intensity level and academic achievement (GPA) benefits**

There was no correlation between walking self-reported GPA, $r = -0.02$, $n = 604$, $p = 0.65$. After controlling for covariates, there was still no correlation between walking and self-reported GPA, $r = -0.01$, $n = 571$, $p = 0.84$. There was no correlation between moderate physical activity and self-reported GPA, $r = -0.01$, $n = 587$, $p = 0.73$. After controlling for covariates, there was still no correlation between moderate physical activity and self-reported GPA, $r = -0.02$, $n = 578$, $p = 0.62$. There was
correlation between vigorous physical activity and self-reported GPA, $r = -0.01$, $n = 609$, $p = 0.77$. After controlling for covariates, there was still no correlation between vigorous physical activity and self-reported GPA, $r = -0.01$, $n = 576$, $p = 0.90$. The results indicated that regardless of intensity of physical activity performed, there was no relationship between physical activity intensity and student’s self-reported GPA. Additionally, even when controlling for covariates, there still was no relationship between physical activity intensity and student’s self-reported GPA.

**Knowledge of physical activity and academic achievement**

The results indicated that 51% perceived that physical activity could improve attention and 41% perceived that physical activity could improve memory. However, only 30% of students selected the benefit that physical activity could improve current school grades, which indicated students did not know the cognitive benefits of physical activity.

Students’ knowledge of the specific health benefits in engaging physical activity showed 78% indicated that physical activity could improve their learning, 71% indicated physical activity could improve memory, 57% indicated physical activity could help to improve their GPA, while only 36% indicated that physical activity could grow neurons in the brain. There was a discrepancy between student knowledge of physical activity benefits and their perceived health benefits of physical activity, meaning that students did not completely know about the relationship between physical activity and academic achievement (see Table1).
Table 1

Student Knowledge of physical activity and academic achievement

<table>
<thead>
<tr>
<th></th>
<th>N</th>
<th>%</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total</td>
<td>612</td>
<td>51</td>
<td>0-1</td>
</tr>
<tr>
<td>1. What are the health benefits of physical activity?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Improve attention</td>
<td>311</td>
<td>51</td>
<td></td>
</tr>
<tr>
<td>Improve memory</td>
<td>248</td>
<td>42</td>
<td></td>
</tr>
<tr>
<td>Improved current school grades</td>
<td>186</td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>2. Current knowledge of physical activity benefits (1=Yes)</td>
<td>611</td>
<td>78</td>
<td>0-1</td>
</tr>
<tr>
<td>Improve learning</td>
<td>501</td>
<td>78</td>
<td></td>
</tr>
<tr>
<td>Improve memory</td>
<td>462</td>
<td>71</td>
<td></td>
</tr>
<tr>
<td>Improve GPA, test scores, or overall class grades</td>
<td>420</td>
<td>57</td>
<td></td>
</tr>
<tr>
<td>Control or improve ADHD</td>
<td>385</td>
<td>56</td>
<td></td>
</tr>
</tbody>
</table>

**Knowledge of physical activity classes**

Table 2 indicated that students knew about a variety of physical activity classes, but did not know about all of the physical activity classes offered through LCC. Most students knew about classes such as weight training (74%), swimming (69%), aerobics (66%), and fitness classes (65% and 59%).

Unfortunately, only 29% of students knew about Exercise for Learning Readiness. The majority of students had knowledge regarding classes that were easily visible on campus, such as weight training in the weight room, swimming classes in the pool, and fitness classes in the fitness center. However, classes that were located off campus, in less visible areas, or in areas that could be used for multi-purpose use were less known about, such as adult fitness, boxing, and soccer classes. Notably, most students did not
know about the Exercise for Learning Readiness class which was a physical activity class specifically designed to teach students about the cognitive and academic benefits of physical activity (see Table 2).

Table 2

Student Knowledge: Physical activity classes at LCC

<table>
<thead>
<tr>
<th>Knowledge of physical activity classes at LCC</th>
<th>N</th>
<th>%</th>
<th>Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>Weight Training</td>
<td>450</td>
<td>74</td>
<td></td>
</tr>
<tr>
<td>Swimming</td>
<td>424</td>
<td>69</td>
<td></td>
</tr>
<tr>
<td>Aerobics</td>
<td>402</td>
<td>66</td>
<td></td>
</tr>
<tr>
<td>Introductory Fitness</td>
<td>395</td>
<td>65</td>
<td></td>
</tr>
<tr>
<td>Total Fitness</td>
<td>362</td>
<td>59</td>
<td></td>
</tr>
<tr>
<td>Basketball</td>
<td>302</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>Karate or Judo</td>
<td>296</td>
<td>48</td>
<td></td>
</tr>
<tr>
<td>Volleyball</td>
<td>266</td>
<td>44</td>
<td></td>
</tr>
<tr>
<td>Adult Fitness/Cardiac Rehabilitation</td>
<td>247</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>Exercise For Learning Readiness</td>
<td>179</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>Boxing</td>
<td>178</td>
<td>29</td>
<td></td>
</tr>
<tr>
<td>Soccer</td>
<td>174</td>
<td>28</td>
<td></td>
</tr>
</tbody>
</table>

Amount of academic benefit knowledge and walking.

Students who had knowledge that physical activity could control or improve ADHD, $\chi^2(2, N = 604) = 6.98, p = 0.03$ and students who had knowledge that physical activity could improve GPA/test scores/ or overall class grade, $\chi^2(1, N = 413) = 4.32, p = 0.04$ had a higher a higher probability of participating in walking. Students who had knowledge that physical activity could control or improve ADHD and had knowledge that physical activity could improve GPA/test scores or overall class grades had a higher probability of participating in walking.
Amount of academic benefit knowledge and moderate physical activity.

Students who participated in moderate physical activity and perceived improved current school grades as a health benefit of physical activity, \( \chi^2(7, N = 611) = 14.43, \ p = 0.04 \) and students that had knowledge that physical activity could improve learning, \( \chi^2(7, N = 500) = 16.78, \ p = 0.02 \) had a higher probability of participating in moderate physical activity. Students who perceived improved current school grades as a health benefit of physical activity and students that had knowledge that physical activity could improve learning had a higher probability of participating in moderate physical activity.

Discussion

Even though LCC student’s physical activity participation is suboptimal, it is similar to other college students (Gyurcisik et al., 2004 and Nelson et al., 2007). Similar to previous research, students knew the overall benefits of physical activity (Lovell et al., 2010 and Grubbs et al., 2002). Students at LCC were similar to other college students in that they perceived maintaining desired weight, improved energy and improved sleep as physical activity benefits, before they perceived decreased risk of chronic diseases as a benefit (Grubbs et al., 2002 and Lovell, et al., 2010). Students did not know about the cognitive and academic benefits of physical activity. Improving school test scores, GPA, and attention are all cognitive or academic benefits of physical activity (CDC, 2010), yet very few LCC students perceived these as health benefits. Therefore, LCC students, like other college students did not demonstrate knowledge regarding the cognitive or academic benefits of physical activity (Grubbs et al., 2002 and Lovell, et al., 2010). Also as expected, the most frequent barriers students encountered were they did not have enough time to participate in physical activity, they were not motivated, and they would not be able to continue participating in physical activity. With students balancing multiple demands, it was not a
surprise when analysis showed that LCC students faced similar physical activity barriers as other college students (Grubbs et al. 2002).

A major unexpected finding was that increased student knowledge regarding specific cognitive health benefits of physical activity did actually increase the probability of physical activity participation. The perceived benefits, as defined by the Health Belief Model (HBM), demonstrated students were more likely to participate in physical activity when there was a significant amount of worth associated with it. LCC students most likely had a strong importance to control or improve their ADHD and/or improve their GPA or test scores. These results were also demonstrated when college students indicated they would be more likely to participate in physical education when they placed a strong positive value to the physical activity (Chen, A. and Liu, X., 2009 and Abu-Moghli, Khalaf, and Barghoti, 2010).

It was also determined that physical activity intensity was not associated with student’s self-reported cumulative GPA. This study only measured the relationship between 30 minutes of physical activity and academic achievement. Time may not be the only measurement to assess physical activity in relation to GPA. Other studies which reported no correlation between physical activity and academic achievement demonstrated that several variables could affect the relationship between physical activity and academic achievement (Coe, et al., 2006, Trudeau et al., 2008 and CDC, 2010). The amount of time per physical activity session, amount of weekly physical activity, and type of physical activity instruction could all possibly affect cognitive and academic response.

**Strengths and limitations**

This study was one of the first physical activity studies conducted at LCC that was able to attain a large sample of the student population. The relationship between physical activity and academic achievement is a fairly new research topic, and especially in the collegiate setting. Also this is one of the
first studies to determine student’s knowledge regarding the cognitive and academic benefits of physical activity and in relation to any physical activity behavior change. Despite the promising findings in this study, there are several the limitations. The demographics skewed toward female and Caucasian. This may not be an actual representation of LCC’s student population. Additionally, the GPA measured was determined by students self-reported GPA instead of their actual calculated GPA. This study only assessed 30 minutes of moderate or vigorous physical activity per day. Therefore, the study was not able to assess more than 30 minutes. Additionally, the survey did not ask how long the students had been participating in a physical activity program. It is possible that students who chronically participated in physical activity would receive greater benefits compared to students who had just started a physical activity program (USDHHS, 2008).

Implications for the future

The findings from this study could influence future physical activity participation of college students. Although most students did not have knowledge regarding the cognitive and academic benefits of physical activity, those who had this knowledge were more likely to participate in low to moderate levels of physical activity. Since LCC students did not meet the recommended guidelines for physical, students need to be educated about the cognitive and academic benefits of physical activity.

Subsequently, in order to provide students with increased participation support, faculty members and administrators need to be educated about the cognitive and academic benefits of physical activity. Third, policy change needs to consist of changing core curriculum requirements that would add physical activity classes. Offering programs that teach behavior change methods, such as physical activity and health education classes, can increase physical activity participation and self-efficacy. Requiring students to meet specific physical activity curriculum requirements would need to be implemented targeting on
cognitive improvements. Lastly, academic advisors need to advise student to participate in a physical activity class each semester.

**Works Cited**


