Increasing Physical Activity Behaviors through a Comprehensive School Change Effort

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Abstract

There has been an increased call for schools to address public health needs related to physical inactivity and weight gain. The negative health effects of inactivity are even more severe for Indigenous peoples. The purpose of the current project was to implement a one year theory-based curricular change initiative in an Indigenous North American community aimed at integrating physical activity (PA) and healthy behavior knowledge. Participants were 320 Pima Indian children from ten schools in a single Indigenous American community, including 38 classroom and 7 physical education teachers; assigned as intervention (27 classes) or comparison (11 classes) participants. ANOVA results indicated both groups became significantly more active over time. The intervention groups’ behaviour was less stable ($\alpha = .71$) over time versus the comparison group ($\alpha = .86$) suggesting positive behaviour changes. Change takes time; however, these initial findings shows progress in increasing physical activity behaviours at school in an understudied and disadvantaged population.

Increasing Physical Activity Behaviors through a Comprehensive School Change Effort

One need not look far or hard to find evidence of the many public health issues facing the world today. In most of the developed countries the health issues are frequently related to obesity, heart disease, diabetes and cancer. Given that those diseases are often linked to physical inactivity, that topic is also of importance (World Health Organization [WHO], 2004; 2005).

A full review of the public health literature is beyond the scope of this paper, but an overview of trends lends some insights into the magnitude and importance of these issues. For example, over the last decade in the USA the prevalence of obesity among adults has typically increased each year, from 19.4% in 1997 to 27.4% in 2008. Diagnosed diabetes rates have also increased over time with a 5.1% increase in 1997 and 7.9% increase reported early in 2008. Meanwhile, a modifiable risk factor, that is, regular leisure time physical activity, has remained quite constant with 29.8% and 29.5% of adults indicating regular participation in leisure time physical activity (in 1998 and 2008, respectively). Furthermore, the annual percentage of adults reporting excellent or very good health has decreased from 69.1% in 1998 to 66.2% in 2008 (Centers for Disease Control and Prevention [CDC], 2008).

Sadly, similar negative health trends also affect children’s health. It is well documented that many children are physically inactive and become even less active as they age (CDC, 1997; Strong et al., 2005). Surveillance studies from the USA (e.g., Levin, Louwry, Brown, & Dietz, 2003), Australia (e.g., Dollman & Martin, 2003), Canada (e.g., Tremblay & Willms, 2003) and Ireland (e.g., Boreham Twisk, Savage, Cran, & Strain, 1997) have shown relationships between physical inactivity and body fatness or BMI. A recent meta-analysis has also shown low levels of physical activity and high levels of inactivity to be associated with increases in overweight in children (Rowlands, Ingledeew, & Eston, 2000). The negative trend of reduced physical activity patterns and increased dietary consumption has lead to childhood overweight and ultimately adult overweight and obesity. This national trend of decreased physical activity and increased weight that is apparent in the USA (e.g., Levin et al., 2003), is also occurring in most other developed countries such as Australia (e.g., Marshall, Owen, & Bauman, 2004), and England (Hughes, Li, Chinn, & Rona, 1997).
The negative health effects (i.e., obesity, diabetes) related to inactivity are even more severe for minority populations, especially for Indigenous peoples (Salbe, Weyer, Lindsay, & Tatranmi, 2002). In 2003, 53.7% and 27.3% of Pima Indian boys and girls respectively in the USA were above the 95th percentile for BMI. Similarly, Indigenous Australian populations, specifically Aboriginal and Torres Strait Islander children suffer a prevalence of overweight and obesity that is double that of non-Indigenous children (Abbott, Haswell-Elkins, Fell, Vlack, & Macdonald, 2005). In both the USA and Australia, unfavourable body composition in youth is likely related to lower physical activity (PA) levels. These inactivity and increased weight trends have long-term significance as children age and face the possible development of serious health problems such as diabetes, heart disease, high blood pressure and cancer (WHO, 2004, 2005).

One critical factor in reversing these negative health trends and creating positive adult and childhood wellness is increasing people’s PA. This effort, along with improving nutritional habits, can lead to reduced risk for many chronic diseases. Positive associations have also been found between PA and bone mineral density in children and adolescents (Welk, Eisenmann, & Dollman, 2006).

Given the importance of PA, it has become a critical health priority. Organizations worldwide have developed PA guidelines for children and youth. The USA, Australia and UK recommend that children participate in 60 minutes a day of at least moderate PA (e.g., brisk walking; Australian Government Department of Health & Ageing, 2008; Cavill, Biddle, & Sallis, 2001; USDHHS, 2008). Canada uses gradual PA guidelines that culminate with youth participating in 60 minutes of moderate PA, 30 minutes of vigorous activity, and reduced non-active by 90 minutes every day (Canada’s Physical Activity Guide to Healthy Activity Living, 2002). The USA and UK guidelines further recommend muscle strengthening exercises 2 or 3 times a week (Cavill, Biddle, & Sallis, 2001; USDHHS, 2008).

Achieving these PA guidelines will clearly take a concerted effort by many parties and one of the essential participants is school personnel. Schools as intervention points have been recommended by CDC (1997), the Prevention Institute and American Academy of Pediatrics (2003), the WHO’s Global School Health Initiative (1996) and Getting Australia Active (Bauman, Bellew, Vita, Brown, & Owen, 2002). There is certainly a historical precedent for schools acting as agents of change related to public health (Cuban, 1992) and regardless of history, schools do seem to be a logical choice for changing student health patterns as they are already well positioned to provide new knowledge and opportunities to children. Schools are also the one social institution where nearly all children can be accessed by intervention efforts due to the compulsory attendance laws of most countries. In traditionally underserved populations, schools may also serve as a primary resource centre for children and adults with regard to information and access to facilities.

How to intervene and effectively work with schools on student health; however, is not quite as clear cut. Physical education is certainly one strong possibility and has a long history of responding to public health needs. Physical education addressing health and wellness of students in the USA can be traced back to Lemuel Shattuck in the State of Massachusetts in 1850. At the time, he suggested that schools add physical training to promote individual and public health.
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(Shattuck, 1850; Welk et al., 2006). Physical education programs should play a significant role, but their effectiveness is significantly influenced by the often limited time and resources available, and the sometimes very large enrolments in physical education classes. Recognizing the limitations of physical education as a sole source of PA intervention, recent investigators have explored additional methods of increasing PA during the school day. Two promising efforts include the use of structured recess (Connolly & McKenzie, 1995) and classroom activity breaks (Ernst & Pangrazi, 1999; Stewart, Dennison, Kohl III, & Doyle, 2004). These efforts can work in concert with physical education classes to provide additional and different PA movement experiences for children with limited additional cost. Although promising, little information exists with regard to the implementation or effectiveness of these programs across different settings. One study of the Take 10! in class PA program showed that students’ maintained moderate physical activity participation throughout their activity break sessions measured via accelerometry (Stewart et al., 2004).

The current project followed a one year health behaviour driven curricular change initiative in an Indigenous USA community aimed at integrating PA and academic content related to healthy lifestyles across ten schools. It is part of a larger study involving curricular change and school wellness. The purpose of this particular study was to determine if PA and BMI classifications maintained or became more favourable after a year long, school-based healthy living intervention taught by classroom and physical education teachers in an Indigenous American community. It was hypothesized that through the school-based change efforts, students’ PA participation at school would increase while BMI levels maintained or decreased.

The results of this study are significant for several reasons. First, school based interventions are a logical and cost effective means of changing children’s healthy living knowledge and behaviour, but educators know little about how to implement or assess such programs. The unique collaboration between physical education and classroom teachers in this study is a promising but little understood option that needs more investigation. Second, the unique context in which this study occurred is a critical one to understand better. Indigenous peoples around the world have significantly higher health risks and this trend was true for the Native American tribe under study. This investigation also provides insights into both a specific, at risk group as well as more generally the influence of context and its impact on change.

Method

Overview and School District Needs

After receiving permission from the University Institutional Review Board, the Tribal Council, and principals, interested elementary classroom teachers and physical education teachers from 10 schools agreed to participate in this project. Informed consent was provided by teachers and parents/guardians with students assenting to participate. Grounded in the public health needs literature, this year-long project focused on infusing PA and healthy behaviour knowledge through a curricular change initiative into all schools across one Indigenous American community in the Southwest (with one major Tribal affiliation). Across the schools and community, current challenges included poor attendance, and performance on academic tests, high teacher and administrator turnover, and high rates of obesity, diabetes, and alcohol addictions (Ambler, 1998; Caballero et al., 2003).
Participation in the year-long curricular change initiative required teachers’ attendance at five after-school workshops focused on infusing PA and healthy behaviour knowledge into the curriculum. Teachers were provided with classroom sets of pedometers and PA equipment appropriate for the classroom (classroom teachers) or physical education classes and a small stipend. Two mentor teachers (external to the District) were assigned to all participating teachers. They visited teachers’ classrooms at an agreed upon date/time each month and observed instruction related to PA and healthy behaviour knowledge, or co-taught a lesson with the teacher, or modelled the teaching of a lesson when needed.

Teacher participants were required to teach a minimum of 10 lessons that integrated PA and academic content throughout the school year. The lessons were very general and mentor teachers helped classroom and physical education teachers modify the lessons to be appropriate for content and developmental level. Lesson included the following content: (a) recording pedometer data, (b) establishing a baseline for PA, (c) goal setting, (d) establishing a pedometer/activity word wall, (e) walking vs. jogging, (f) fitness concepts, (g) incorporating math and graphic skills, (h) incorporating writing activities, (i) the scientific process, and (j) integrating social studies. Outlines of the standards based lessons were developed for the teachers and they were free to modify the basic outline and order of lessons or lesson ideas to best fit their students’ needs. Sample lesson ideas are available in Table 1. To complement the PA based lesson ideas, classroom teacher participants were asked to provide daily activity breaks for students at school (3-10 minutes) while physical education teachers modified their lesson structure to increase PA participation along with reinforcing concepts taught by classroom teachers. Finally, teachers were given the option of having nutrition focused guest speakers come to their classes. One speaker focused on the nutritional aspects of junk food like soft drinks and potato chips while the other speaker was a Pima tribal community member who prepared and discussed traditional native foods and nutrition with the classes.

Participants

Youth participants were 320 Pima Indian boys (n=136) and girls (n=184) at the elementary and secondary levels from 10 schools in a single Indigenous American community in the Southwest. Of those schools, five were elementary, three were middle and two were high school. Two schools were public, one was Catholic, and seven were governed by the Community Tribal Council. Thirty-one classroom teachers and seven physical education teachers participated in this project, pedometer data was only collected with students in 3rd-12th grade. Teachers were invited to participate as intervention or comparison participants. Intervention and comparison classes were present at almost all of the schools as per the Tribal Council Education committee requirement. Further demographic data for the participants are available in Table 2.

Instruments

Pedometers were used in the current project to track students’ PA patterns at school. Pedometers measure vertical oscillations of body movement from the hip, providing a total count of accumulated ambulatory movement of steps taken (Vincent & Pangrazi, 2002) and have garnered increasing international support as an acceptable measure for assessing children’s PA levels of children in field settings (Tudor-Locke, Williams, Reis, & Pluto, 2002). Student participants in the current project wore a Walk4Life 2505 pedometer shown to provide valid and
reliable estimates of youth PA and of steps (Beets, Patton, & Edwards, 2005; Beighle & Pangrazi, 2006; Crouter, Schneider, Karabulut, & Bassett, 2003; Le Masurier et al. 2005). For example Crouter et al. (2003) found this pedometer was accurate (at 80 m·min\(^{-1}\)) with mean values ± 1% of actual steps.

**Data Collection Procedures**

**Pedometer preparations.** In order to ensure correct calibration of the Walk4Life 2505 pedometers, all batteries were replaced and a series of shake tests were performed prior to data collection based on guidelines provided by Vincent and her colleagues (Vincent & Pangrazi, 2002; Vincent & Sidman, 2003). Pedometers were sealed during data collection. This process involves attaching a plastic tie around the exterior of the pedometer to prevent participants from meddling with the display panel, accidentally resetting the pedometer, or being able to see their step counts. Student participants in this project knew that their PA was being measured and had previous experience with pedometers (Vincent & Pangrazi, 2002).

**Procedures.** Prior to data collection, students participated in a review of pedometer procedures at their school taught by a member of the research team or their physical education teacher who was trained to conduct the orientation and practice opportunities. Students also practiced wearing pedometers in several physical education classes or in their classrooms to diminish potential novelty and reactivity effects prior to data collection. Students were instructed to wear pedometers at all times at school and not to tamper with them. Students who tampered (e.g., shook) with pedometers lost the privilege of participation.

Research team members were present at the school and conducted daily pedometer data collection procedures. Students wore pedometers (Walk4Life 2505) for four consecutive school days in September and again in May in order to give a representative sample of weekday PA. Four days have been shown to be adequate time in order to accurately measure children’s PA patterns (Trost, Pate, Freedson, Sallis, & Taylor, 2000). Tudor-Locke, McClain, Abraham, Sisson & Washington (in press) also found 2-8 days to represent PA patterns in youth under free-living conditions. At the end of each day, research team members recorded steps for each student, reset the pedometers to zero, and resealed them. Research team members reminded students to put on their pedometers each morning and check placements. The team members were present at the schools all day to ensure that students were wearing pedometers. If pedometers were lost or not returned, students were not given a second pedometer.

Demographic information (i.e., age, sex, race/ethnicity) were collected from the parents or schools. Weight (to the nearest 0.1kg) and height (to the nearest 0.5cm) were directly measured without shoes using a digital scale (Seca 882 Digital BMI Scale) and stadiometer (Seca 214 Portable Stadiometer) during non-pedometer data collection days at each school by members of the research team.

**Data analyses**

Data analyses included ANOVA investigating pre/post group changes in PA and BMI by group (intervention versus comparison). ANOVA was also run to investigate possible gender and grade level differences in PA. Due to multiple ANOVA analyses Bonferroni adjustments were made (k=4). Internal consistency reliability analyses were conducted to investigate the stability
of PA behaviours, that is, high (e.g., >.80) internal consistency reliability suggests little
behaviour change. Finally, descriptive statistics were also run on the variables.

Results

ANOVA investigating PA and BMI changes. Both groups (intervention and comparison)
became significantly more active over time ($F(1, 319) = 20.10, p < .001$, partial eta squared; $\eta = .06$). There was no significant group main effect $F(1, 319) = 3.10, p < .079$). Mean changes were
622 steps/day and 474 steps/day for the intervention and comparison groups, respectively. For
BMI, both groups had a slight increase in their BMI with no significant group main effect ($F(1, 307) = 1.01, p = .32$). Also at post-test, BMI results showed 66.7% and 69.4% for girls and boys,
respectively, in the “at risk for overweight” or “overweight” categories using the Centres for
Disease Control American classifications. There were no gender differences in PA patterns ($F(1, 319) = 1.73, p=189$). There were however grade level differences ($F(1, 319) = 5.56, p<001$;
partial eta squared; $\eta = .14$). Grade level differences were due to large change scores for sixth
grade students (3884.40) and seventh grade students (2480.53) that were significantly different
from 3rd-5th and 8th grade students.

Stability of behaviours. The intervention groups’ behaviour was less stable ($\alpha = .71$) over
time versus the comparison group ($\alpha = .86$) suggesting less stability which may mean positive
behaviour changes were occurring. Descriptive statistics by group membership are available in
Table 3.

Discussion

Results support the generally favorable changes in PA patterns with intervention students
showing less stability in their physical activity patterns after a year long school-based healthy
living intervention taught by classroom and physical education teachers in an Indigenous
American community. If the assessment lens used to judge effectiveness of the intervention
program is attainment of national governing bodies’ daily recommended PA then this program
seemed to work with this Indigenous American student population.

Utilizing the ratio of 100 steps is equivalent to one minute of PA (Miller, Brown, &
Tudor-Locke, 2006), the indigenous students in the current sample averaged 53 (intervention)
and 45 (comparison) minutes of PA while at school. At post test, these students were coming
close to accumulating the minimum recommendation of 60 minutes of daily PA for youth in the
USA, UK, and Australia (Australian Government Department of Health and Ageing, 2008;
Cavill, Biddle, & Sallis, 2001; USDHHS, 2008) during their time at school.

International studies investigating pedometer-determined step counts during children’s
school day have shown higher levels of PA participation. Cox, Schofield, Greasley, and Kolt
(2006) found in a group of 91 New Zealand primary school children that they were active an
average of 76 minutes (boys) and 61 minutes (girls) at school. Similarly, Loucaides and Jago
(2006) examined the PA patterns of 104 Cypriot elementary school children reporting that they
were active at school for 68 and 51 minutes, respectively, for boys and girls. Results from the
current study are more similar to two previous studies from the Southwestern USA, as was this
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study’s participants. In a group of suburban students, Tudor-Locke and her colleagues (2006) found children were active for 68 (boys) or 49 (girls) minutes at school. In another study of Indigenous Southwestern American children from two different tribal communities, authors reported students accumulating 40-42 minutes of daily PA at school (Johnson, Kulinna, Darst, & Pangrazi, 2007).

Although group differences were not found in the current study (intervention vs. comparison), the intervention group did have a higher post step count and larger change score. In addition, the intervention group also seemed to have less stable PA patterns. Tracking of behaviours indicated that the comparison students remained relatively stable in their PA behaviour while the intervention students’ PA patterns were less stable at the end of the year, suggesting behavioural change had occurred.

In contrast to our hypothesis, both groups became more active rather than just the intervention group. We suspect that the increased comparison group activity is at least partially attributable to cross-contamination since both intervention and comparison students were at the same small schools and children interacted frequently. This research design (with comparison and intervention teachers at each school) was required by the Tribal Council Education Committee. For example, if one third grade class at a school was involved in this project then the students were generally motivated by the pedometers and interested in increasing their step count. Those same motivated students would then have recess and sometimes before/after school interactions or programming with students from other grades. It seems likely that friends joined in the excitement of pedometer recording and participated more actively than they might have otherwise given their research participating friends’ excitement.

We also hypothesized that students’ BMI levels would be maintained or decrease in the intervention students. This investigation did not show a significant influence on body mass of the students. The relatively modest changes in PA were clearly not enough to counteract maturational trends and the students’ entering body mass status. It is important however that both before and after the investigation over 65% of the students were classified overweight or at risk for being overweight. Clearly additional investigations are needed to better understand the many factors that contribute to student overweight issues.

We know that students PA patterns change across the years and generally they become less physically active as they leave primary school and enter secondary school (CDC, 1997; Strong et al., 2005). We found the most active students were in grades six and seven (12-14 years old). Having 6th and 7th grade students more active then the younger students in this study is in opposition to the vast literature on children’s PA patterns (children get less active as they leave primary school). This unusual finding may be attributed to teacher interest in the project. Although the sample size is too small to analyze by teacher, it appeared that teachers with a personal interest in PA and healthy behaviours spent more time teaching this content (Cothran, Kulinna, Garn, Brusseau, & Ferry, 2008) and therefore may have had more active students.

School change efforts take time. This curricular change effort with pedometer lessons/activity breaks taught by classroom teachers and supported by physical education teachers may take years to fully understand as the first year of an investigation is almost always a
challenging one for all involved with few large scale successes immediately apparent. The observed changes with all students (intervention and comparison) becoming significantly more active at the end of the school year has several very positive components.

First, on average the intervention group increased their daily PA by over 600 steps while the comparison group increased approximately 475 steps. The increased PA observed over time corresponded to an extra 31 and 24 minutes per week of PA at school for the intervention and comparison groups, respectively.

Second, although the results of this study were modest (physical activity) or non-existent (body mass measurements), the study still provides important information. Any PA change is a positive one as PA behaviours are hard to change and the need for change in this community was great. Given the limited scope of the intervention, it is exciting to see that change did occur and with additional time or a more extensive intervention we anticipate more significant change could occur. It is also important to note that the data collected provide important benchmark data on an understudied population and can also be used to refine curriculum changes focused on the targeted behaviour and its association with overweight in Indigenous youth in America and elsewhere. Further work is also need to determine the influence of this type of intervention on PA outside of the school day.

Third, increases in PA can lead to decreased overweight in youth. In summarizing a review of PA-geared obesity interventions, Shaya, Flores, Gbarayor, and Wang (2008, p. 193) wrote “… [these intervention studies] illustrate the remarkable high efficacy of PA in reducing obesity-related measures and increasing overall physical fitness of school aged subjects.” Particularly relevant to the Indigenous participants in this study, research studies on the onset of Type 2 diabetes and other metabolic problems in youth are now reporting that an early onset may enhance the severity of the metabolic problems later in adulthood. Based on findings from the Northern Ireland Young Hearts Project it may also be possible for obese children to have greater risks in adulthood than individuals who become obese as adults (Boreham, Twisk, Murray, Savage, Strain, & Cran, 2001).

Finally, and importantly, these results suggest that classroom teachers may be willing and able allies in the battle against negative health trends for children. Take 10! is another class activity breaks program that has shown that students maintain moderate intensity PA during 10 minute classroom activity breaks (Stewart et al. 2004). In addition, Ernst and Pangrazi (1999) found that short PA breaks during class activities influenced overall PA of children. With cooperative school wide efforts, particularly when PA is combined with academic integration, all teachers in the school can fulfil their academic mission as well as their mission to care for the whole child.
References


Table 1

*Lesson Objectives*

<table>
<thead>
<tr>
<th>Title</th>
<th>Objective</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recording Pedometer Data</td>
<td>Students will demonstrate their understanding of pedometers by recording their daily accumulated step count and if required, their daily activity time.</td>
</tr>
<tr>
<td>Establishing a Baseline</td>
<td>Students will learn how to establish a baseline by using teacher-designed data. When students can successfully establish a baseline with teacher designed data, they are now ready to work with their own data.</td>
</tr>
<tr>
<td>Goal Setting</td>
<td>Students will learn how to establish their own personal goal for increasing their activity level.</td>
</tr>
<tr>
<td>Establish a Pedometer/Activity Word Wall</td>
<td>Students and teachers working together will establish a word wall of activity words they have learned while working with their new pedometers. This wall will be added to throughout the school year.</td>
</tr>
<tr>
<td>Walking versus Jogging</td>
<td>Students will determine how walking and jogging differ in accumulating steps and activity time with their pedometer.</td>
</tr>
<tr>
<td>Fitness Concepts</td>
<td>Students will understand why each of the five components of health related fitness are essential to improving the length and quality of their own life.</td>
</tr>
<tr>
<td>Incorporating Math and Graphing Skills</td>
<td>Students will reinforce their math critical thinking skills and computation skills by using pedometer data to solve math problems.</td>
</tr>
<tr>
<td>Incorporating Writing Activities</td>
<td>Students will reinforce their writing skills by incorporating their pedometer information into their writing.</td>
</tr>
<tr>
<td>The Scientific Process</td>
<td>Students will demonstrate their understanding of the scientific process by completing a walking and jogging activity.</td>
</tr>
<tr>
<td>Integrating Social Studies with your Pedometer Data</td>
<td>Students will use their social study skills and pedometer step count to determine the distance and/or time it will take them to travel from point to point.</td>
</tr>
</tbody>
</table>
Table 2

Description of Schools and Participants

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<tr>
<th>Participants</th>
<th>Intervention n=234</th>
<th>Comparison n=86</th>
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<tbody>
<tr>
<td>Gender</td>
<td>Males =99</td>
<td>Males=37</td>
</tr>
<tr>
<td></td>
<td>Females=135</td>
<td>Females=49</td>
</tr>
<tr>
<td>Tribal Affiliations</td>
<td>15 Tribal</td>
<td>7 Tribal</td>
</tr>
<tr>
<td></td>
<td>Affiliations/Combinations</td>
<td>Affiliations/Combinations</td>
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<tr>
<td></td>
<td>Reported (83.5% Pima)</td>
<td>Reported (92.2% Pima)</td>
</tr>
<tr>
<td>Grade</td>
<td>3rd n=53</td>
<td>3rd n=17</td>
</tr>
<tr>
<td></td>
<td>4th n=61</td>
<td>5th n=45</td>
</tr>
<tr>
<td></td>
<td>5th n=24</td>
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<td></td>
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<td></td>
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<td></td>
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<tr>
<td>Teachers</td>
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<td>Physical Education Teachers</td>
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<td>1</td>
</tr>
<tr>
<td>Schools</td>
<td>10</td>
<td>10</td>
</tr>
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</table>

N=320 Participants
### Table 3

**Descriptive Statistics by Group**

<table>
<thead>
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<th></th>
<th>Participants</th>
<th>Intervention</th>
<th>Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>BMI at Pre Test</strong></td>
<td>25.39 (7.02)</td>
<td>26.88 (7.25)</td>
<td></td>
</tr>
<tr>
<td><strong>BMI at Post Test</strong></td>
<td>25.99 (7.23)</td>
<td>28 (8.23)</td>
<td></td>
</tr>
<tr>
<td><strong>School Day Steps at Pre Test</strong></td>
<td>4594 (2222)</td>
<td>4232 (2277)</td>
<td></td>
</tr>
<tr>
<td><strong>Post School Day Steps at Post Test</strong></td>
<td>5262 (2959)</td>
<td>4469 (2787)</td>
<td></td>
</tr>
<tr>
<td><strong>Range</strong></td>
<td>488-11285</td>
<td>289-10082</td>
<td></td>
</tr>
</tbody>
</table>

*Note. BMI=Body Mass Index; Pre BMI data collection took place in September and post data collection took place in May.*