

A survey of teacher and student perspectives on how running is taught and evaluated in British Columbia schools

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Abstract

Objective: Running is a simple and inexpensive exercise to maintain cardiovascular health. We aimed to evaluate student and teacher perspectives on the incorporation of running in physical education classes in British Columbian schools to determine how running is taught in schools.

Methods: All 60 superintendents representing the school districts in British Columbia were contacted. They gave written approval for our research team to send a survey to schools within their districts. Teacher and student perspectives on running in middle and high schools were collected.

Results: Teachers (n=63) and students (n=597) would like more information on proper running form and the cardiovascular benefits associated with this exercise. There is inconsistency in reporting medical conditions, and it is not clear whether students are graded fairly in comparison to one another ($p < 0.05$).

Conclusion: There is a lack of education in schools on running. Improvements to the incorporation of running within the physical and health education curriculum may enhance student enjoyment and in turn help reduce sedentary behaviours and associated comorbidities in the general population.

Introduction

The economically developed world has documented a high prevalence of obesity and health related complications, including diabetes in childhood and adolescence, which threaten longevity.¹⁻⁶ As a result, public health goals aim to increase physical activity levels to help reduce the prevalence of these conditions, as well as the economic burden of chronic disease on the medical system.^{4,6-8} Physical literacy has become a key focus of physical activity and is defined as “the motivation, confidence, physical competence, knowledge, and understanding to value and take responsibility for engagement in physical activities for life”.⁹ Fundamental movement skills such as running are a key component of physical literacy and provide the foundation for higher level sport skills that are then incorporated into various decision-making situations.⁹ Mastery of physical literacy skills in childhood allows individuals to be active as children and through all phases of adulthood,¹⁰ physically literate children have improved health indicators and are more likely to be physically active.¹¹⁻¹³

Physical education (PE) classes provide an opportunity for children to develop physical literacy and accordingly have become a focus for intervention.^{14,16} Running is a fundamental movement skill that is incorporated into PE classes, although it is unclear whether children are formally taught how to run in a structured way that focuses on the individual's progress. Running improves cardiorespiratory health, enhances self-esteem, and is an inexpensive activity that can be incorporated into a healthy active lifestyle over the lifespan.^{12,7,14} Unfortunately, there are often barriers to participation, and these benefits require perseverance and commitment.¹⁷ An appropriate warm-up and cool-down, along with a periodized program (one that includes a variety of speeds and time intervals) and education about appropriate technique, wear, and stretching, allows runners to train in a structured, progressive manner to make running a manageable and enjoyable activity with improvements that are attainable, achievable, and suitable for the majority.^{7,17}

While almost all children are able to safely participate in their PE classes, some children have chronic medical conditions that require a modified exercise program to meet their needs. In economically developed countries, an estimated 10-31% of children under the

age of 18 years have a chronic medical condition—most commonly asthma or congenital heart disease.¹⁸⁻²² These conditions may impact an individual's physical activity level, and considerations should be made to ensure safe participation in PE, but there is limited research investigating how these differences are incorporated into PE classes. Catering to the different needs of children and adolescents with various chronic medical conditions also presents an additional challenge for the PE teacher. Clinically, many children with congenital or inherited heart disease have abnormal cardiovascular responses to exercise; for these children, modified exercise programs are necessary, and performance-based assessments are particularly inappropriate. However, it is not clear what approach is being taken in schools to tailor the PE classes for these children.

We sought to better understand how running was incorporated into the physical and health education curriculum in schools in British Columbia (B.C.), Canada. The objectives of the study were: 1) to determine how PE instructors teach students how to run as a form of exercise; 2) to investigate how students are evaluated on their running performance in their PE class; and 3) to determine if chronic medical conditions are considered in the teaching and evaluation of PE.

Materials and Methods

Ethical approval was obtained from the University of British Columbia Children's & Women's Research Ethics Board and the Office of Research Ethics at Simon Fraser University. All participants gave informed consent prior to completing the survey.

Protocol

With permission from the B.C. Physical Education Association, the Ministry of Education, and the B.C. Teacher's Federation, we contacted each school district superintendent within the 60 public school boards in B.C. If the superintendent provided an approval letter allowing the research team to contact schools in their district, principals for each school with grades 4 to 12 were contacted and asked if teachers and their students could participate in the study. All teachers and students who taught PE or were taking PE classes who were interested in participating in the study were included. All school districts, schools, teachers, and students that did not respond were not included in the study.

Surveys

Teacher and student surveys underwent stakeholder review by a group of four teachers who were currently teaching elementary and middle school

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grades, prior to beginning this project. Surveys were distributed from January 2011 to June 2012. The survey was available as either a paper copy mailed to schools or online using SurveyMonkey (SurveyMonkey.com, LLC, Palo Alto, California, USA). Each survey included both closed and open-ended questions and was divided into four sections: personal background information, student medical history, teaching of running, and grading and evaluation. Surveys were sent to teachers and students to gain their perspectives on how running is taught in the current physical education curriculum. Both students and teachers were able to skip questions if they wished.

Statistics

All statistical analyses were performed in Sigmaplot 11 (Systat Software Inc, San Jose, CA). Data were reported as number of responses, percentages of responses to that particular question, or means ± standard error, as applicable. Significant differences were assumed when $p < 0.05$. Differences between teachers and students were evaluated using either the Fisher's exact or chi-squared analyses.

Results

There was a response rate of 32% from all school districts, with 19 school districts agreeing to participate; 25 districts did not reply after repeated email and telephone contact, and 16 declined participation (five did not want to participate, two were already involved in other research studies, and nine were unable to participate due to the 2011-2012 school year job action) (Figure 1). In total, 175 schools in these 19 districts were contacted, and 19 schools responded, an 11% response rate. Completed surveys were obtained from 63 teachers and 597 students. The students were all from classes taught by the teachers.

Personal characteristics

The majority of teachers had been instructing PE classes for more than five years (69%) in primary to senior grades. The teachers' undergraduate education was diverse (Figure 2), with only 38% of teachers specifically trained in PE or a related discipline (Kinesiology or Human Kinetics). The remainder completed their undergraduate training in Art (29%; Geography/History N=5, English N=4, Psychology/Sociology N=5, Unspecified discipline N=2), Science (6%: Chemistry N=1, Forest Science N=1, Unspecified discipline N=1), or Education (27%). There were more responses from teachers in suburban areas than from students in suburban areas (Table 1).

Thirty-one teachers (65%) ran as a form of exercise, but most teachers participated in a variety of activities to keep fit. Teachers reported exercising on average 4.2 ± 0.5 days per week with 49% exercising for five or more hours per week.

Student responses represented grades 4 to 12, with the majority of students in grades 7 (43%), 8 (27%), and 9 (23%), giving a mean age of 13.5 ± 0.1 years (47% male). The majority of students reported that they do run outside of school (74%), and 198 (33%) students reported participating in other forms of physical activity.

Running: teaching, grading, and evaluation

More teachers (68%) than students (42%, $p < 0.01$) reported that proper running form was taught in PE classes, with more teachers than students reporting PE incorporated education on appropriate body position, cool-down, and the risk and avoidance of injury (Table 1). More teachers (70%) reported that different types of running (e.g. sprints, intervals, or sustained running) were incorporated into the PE class, compared to 49% of students ($p < 0.05$). Only 60% of teachers discussed or required appropriate footwear for running; 15% of teachers cited financial concerns as reasons why some children did not have appropriate footwear, and 22% of teachers stated that current fashion trends created challenges around getting students to wear appropriate footwear.

The health benefits of running were discussed in PE class according to 70% of teachers but only 43% of students ($p < 0.01$). There was a lack of agreement between teachers and students concerning what types of stretching were included before or after running, with fewer students reporting that stretching was incorporated in running classes and students reporting greater emphasis on dynamic stretching and slow running than teachers (Table 1). Both students (78%) and teachers (66%) reported

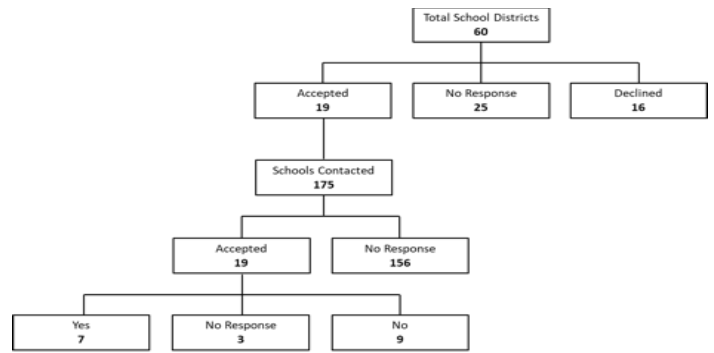


Figure 1 | British Columbia (B.C.) district and school participation. There are 60 school districts in British Columbia. 19 schools responded to our request for participation and 7 schools completed the survey (63 teachers and 597 students).

that running was graded based on speed or distance covered, with no significant difference between their responses ($p = 0.123$); the beep test (a 20 metre timed shuttle run test)²³ and the one-mile run (where students run one mile as fast as they can) were the most frequently used evaluation tools. More teachers (98%) than students (42%, $p < 0.001$) reported that the grading of students with medical conditions would be tailored to their physical limitations. More students than teachers commented that they were encouraged to increase their running distance or speed in a structured way ($p < 0.01$). Both teachers (49%) and students (61%) noted that students were encouraged to record their running progress (Table 1).

Additionally, 21 of 32 teachers (66%) thought change to the current physical education and health curriculum was required. In general, they supported that running is an activity in which students can easily participate. Teachers reported that running is not always taught properly (47%), and that this could be improved with more professional development activities for PE teachers (41%) to help them address logistic concerns, incorporate individualized approaches, and address concerns regarding students with medical disorders that impact their ability to exercise.

In contrast to only 34% of teachers who thought current PE classes were satisfactory, 65% of students who responded said PE classes were satisfactory. The responses from the remaining 35% of students indicated that improvements were necessary in order to motivate all individuals to participate. The main areas identified for change by the students were: grading based on individual performance over time instead of relative to the most athletic of their peers, more variety in each class with the inclusion of running, removal of the beep test, and more education on both how to run and the benefits associated with exercise.

Medical history

Only 69% percent of teachers and 55% of students reported that a medical form is completed before participation in PE class (Table 1). Additionally, 80% of teachers but only 56% of students reported that there was a standard procedure for reporting medical conditions ($p < 0.05$).

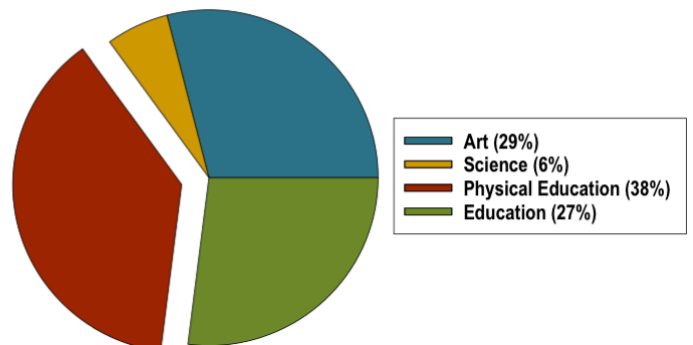


Figure 2 | Academic background of the teachers surveyed. Only 38% of teachers (red) had an undergraduate education in a related discipline (physical education, kinesiology, or human kinetics). The remainder completed their undergraduate training in disciplines related to arts, science, or education.

Table 1 | Student and teacher responses. Percentage responses for each question are shown. Statistical significance was compared using the Fisher Exact test.

| | Students (%) | Teachers (%) | p |
|--|--------------|--------------|--------------|
| School area | | | |
| Urban | 29 | 42 | 0.100 |
| Suburban | 21 | 44 | 0.001 |
| Rural | 50 | 19 | 0.180 |
| Health condition | | | |
| | 12 | - | - |
| Medical form | | | |
| | 55 | 69 | 0.095 |
| Run outside school | | | |
| | 74 | 65 | 0.417 |
| Education on proper running form | | | |
| Position | 37 | 60 | 0.012 |
| Warm-up | 86 | 92 | 0.452 |
| Cool-down | 44 | 81 | 0.012 |
| Running types | 49 | 70 | 0.015 |
| Possible injury | 28 | 54 | 0.002 |
| Warm-up/stretching activities | | | |
| Static stretching | 55 | 49 | 0.493 |
| Dynamic stretching | 43 | 62 | 0.025 |
| Slow running | 37 | 62 | 0.005 |
| Other | 18 | 19 | 1.000 |
| Education on footwear | | | |
| | 75 | 60 | 0.031 |
| Health benefits of running | | | |
| | 43 | 70 | 0.001 |
| Encouraged to increase distance/speed | | | |
| | 81 | 61 | 0.003 |
| Record achievement | | | |
| | 61 | 49 | 0.135 |
| Graded on speed/distance | | | |
| | 78 | 66 | 0.123 |
| Individualized grading | | | |
| | 42 | 98 | 0.001 |

Another discrepancy in the responses was that 30% of teachers, but 80% of students, reported that there was a procedure for updating changes to medical conditions during the school year ($p < 0.05$).

Surprisingly, 41% of teachers stated that not all PE teachers were aware of student medical conditions. Teachers reported that a general medical form used in schools was filled out by parents and submitted to the school office, but that there was no specific form used for PE classes to identify medical conditions that would affect participation. Almost one-third of teachers (31%) reported that substitute teachers are rarely advised of medical conditions.

A chronic medical condition was reported by 12% of students, with asthma being the most common condition reported. Of the 65 students who reported a chronic medical condition, 41 said that their doctor had recommended running as a form of exercise, but 36 said they had been advised to lower their activity levels because of their health condition.

Discussion

This study provides perspectives from both teachers and students on how running is taught in B.C.. Running is incorporated into the PE class, and teachers report that they teach different types of running as well as proper running form. A high percentage of both teachers and students surveyed reported that grading is based on speed or distance covered. While many teachers reported that grading would be tailored in those with medical conditions, a large percentage also noted that PE teachers were not always aware of medical conditions and substitute teachers were rarely advised on medical conditions of students. This has potentially important implications for expectations and safety in the PE class.

Incorporation of running into the physical education class

Running is one of many fundamental movement skills that is learned in early childhood, develops with age, and can be incorporated into a

healthy active lifestyle in adulthood.¹³ PE provides an opportunity to teach students about running. While teachers incorporated running into their PE classes, students did not identify that they were taught different types of running or proper running technique. The discrepancy between teacher and student responses may be related to the fact that students are not understanding the information that they are being taught, or not retaining the information discussed. Educational support to enhance student retention of information may be of benefit.

This difference in responses may also partly reflect the teachers' lack of specific expertise in this area, and not having the correct tools to educate students; the teachers' undergraduate education was diverse and not always tailored to PE classes. Both teachers and students expressed interest in learning more about running to increase their motivation in both teaching and participation. As such, professional development in the area of running, stretching, fitness, and the associated health benefits might improve the transmission and retention of information to students. Future development of the current curriculum, perhaps with the incorporation of a mastery motivational climate (which fosters intrinsic motivation of the student to engage in running) or a game sense approach, may lead to the fulfillment of these objectives.^{7,17,24}

Physical fitness is pertinent for cardiovascular health in all individuals regardless of the presence of chronic medical conditions, and the challenge remains to deliver appropriate information early in student development.²⁰ The physiological benefits associated with regular exercise should be explained to the population at large to give individuals motivation to improve their health. Physical literacy has been identified as a key component that benefits physical activity levels, health, and body composition.^{11,12} Additional information in terms of how to incorporate running as a periodized program inside and outside of the classroom will give students the tools to develop an active lifestyle.⁷ It has been shown that students are more likely to continue to participate in physical activity if they believe in its value and find it interesting.^{7,20} As such, there is a niche to be filled by experts to enable the translation of information concerning physical literacy and running in schools so as to promote active lifestyles and health benefits in the community.²⁵

Grading and evaluation

Student running performance was often graded in PE classes based on speed or distance covered, with the use of the beep test and the one-mile run most often reported; however, these tests actually evaluate cardiorespiratory fitness,²³ highlighting a problem in the evaluation of running performance. Particularly in the presence of chronic medical conditions, it may be more appropriate to set student goals and tailor exercise programs based on individual improvements over the course of a semester or school year, with the long-term goal of providing students with an understanding of commitment to exercise over their lifespan. This idea has been considered in the Achievement Goal Theory, where individuals target competency-based aims relating to physical mastery or performance, and which has been explored in an effort to understand how to motivate children to exercise.^{7,17} It is clear that teaching methods and the approach to physical activity must consider that there is a learning process based on individual ability.⁷ In addition, motivation is key to success with exercise programs,²⁴ and if this is incorporated into PE classes and assessment, students will be more likely to pursue an active lifestyle. Although some teachers did report using this approach, student responses differed, potentially suggesting a lack of formalization of assessment and expectations in this area. Physical activity should be promoted in schools to educate students not only on its importance, but also on suitable adaptations to cater to all ability levels, particularly given that certain medical conditions can interfere with an individual's ability to exercise.

Consideration of chronic medical conditions

This study has documented the prevalence of chronic medical conditions in a sample of B.C. schools (12%) and related this to the incorporation of running within the physical education and health curriculum. This proportion of affected students is towards the lower end of the range reported in the literature (10–31%),^{18–22} possibly due to the definition in the survey being interpreted incorrectly by students (“Do you have a long-lasting health condition that affects you when you exercise?”).

However, one commonality with the literature was concordance in the most commonly reported condition, which was asthma, and supports previous studies.^{19,20} Overall, it is pertinent to have the resources that cater to these students' needs.²⁰ Furthermore, it is unclear how students with chronic medical conditions are graded against their peers; one teacher commented that these students typically did not receive high grades.

Approximately 40% of teachers reported that PE teachers were not always aware of medical conditions. Schools did not have a medical form specific to PE classes for reporting conditions that may limit a student's ability to exercise. This is important as some children may be graded unfairly based on a lack of understanding of their medical condition, and could even be put into unsafe conditions for their health. A general health form was often submitted to the school office, but teachers commented that this was not always completed. In PE classes, it seems appropriate that a medical form or health screening tool is available to students during their first PE class to address any conditions that may affect their performance and participation. The PAR-Q survey is a validated instrument that is recommended for people aged 15-69 years as a prescreening tool before carrying out an exercise program.^{26,27} A recent revision (the PAR-Q+) is reported to be targeted for all age groups and is currently undergoing validation.²⁸ Although the wording is not applicable to younger students, a variation may be useful to firstly describe the risks associated with exercise, but also to educate students on exercise physiology and exercising safely. This remains to be implemented, but is another area for consideration for development. In the interim, parent completion of the PAR-Q+ may provide useful information for PE teachers.

Limitations

The low response rates of the school districts and the individual schools limit the generalizability of our findings. The process of gaining permission to contact schools in B.C. to obtain information about current practices was time consuming and was made more difficult by the job action that occurred during the 2011-2012 school year. Nine districts cited the job action as a barrier to participation in this study. Response rates of schools were also low in school districts that approved the study, which further limits the generalizability of our findings. We were unable to ascertain the reason for the low response rate.

There are inherent risks of bias with survey studies. It is possible that responders to surveys are those that are most interested in the subject matter. Survey studies are especially challenging in younger age children who may be particularly prone to self-reporting inaccuracies compared to older children or adults. Similarly, while the wording of the student survey was aimed at a young audience and reviewed by a group of teachers for appropriateness, it is possible that some of the younger children may not have fully understood the questions (we did provide the opportunity for students to skip questions). Despite these potential inaccuracies, the students' perceptions about how running is taught and evaluated in their PE class was important for our understanding. The discrepancy in the teachers' and students' responses potentially highlights the need for enhanced discussion about running, its health benefits, and how it is evaluated. Communication between students and teachers regarding pertinent health concerns is an important area to address for PE teachers.

The majority of responses in this data set were from students in grades seven to nine which is another area of potential bias. Physical activity declines with age and progression through the school system.²⁰ Accordingly, future studies in both younger and older students may lead to further insight into how student attitudes and motivation change as they age.

Finally, while teacher and student surveys were reviewed by a group of four teachers who were currently teaching elementary and middle school grades, a representative student population would be helpful to validate the survey for students. A validation study was beyond the scope of this project.

Conclusion

Teachers and students have varying perceptions about how running is taught. The evaluation of running is often based on performance and may not account for the intrinsic limitations of the many children with chronic medical conditions. Notably, there is a demonstrated interest from both students and teachers for more education on running form, technique, and its benefits.

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