

Running head: TEACHER PERCEIVED BARRIERS TO IMPLEMENTING REGULAR PHYSICAL ACTIVITY

Teacher Perceived Barriers to Implementing Regular Daily Physical Activity
in Simcoe County Elementary Schools

Master of Public Health Project

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August 19, 2008

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Abstract

Background

Teachers in Ontario are expected to implement 20 minutes of daily physical activity (DPA) into their daily programming, due to the Ministry of Health Promotion guidelines adapted in 2006. This study examined whether or not teachers perceived barriers to implementing the daily 20 minutes of DPA, and if so what those barriers were. This study also examined potential solutions to these barriers in order to enable teachers to successfully implement the DPA into their programs.

Methods

A survey was distributed to a convenience sample of 137 certified elementary school teachers from a public school board in Simcoe County. Participants were asked to rank several previously identified barriers to DPA and possible solutions using a five-point Likert-scale. Participants were also asked two open-ended questions in order to gain further information on any other perceived barriers not mentioned in the survey, and also on any other solutions not mentioned in the survey. The quantitative data was analysed and the open-ended questions were transcribed, examined, and themes were generated.

Results

Teachers reported four main barriers to DPA implementation: lack of time due to other curriculum pressures, lack of resources, lack of space, and lack of staff and student “buy in” to DPA. Participants also indicated many possible solutions to DPA barriers, including: activities that utilize minimal equipment, music resources, exercise videos, whole school DPA approach, and student leaders for DPA.

Conclusion

Many of the solutions indicated by participants are inexpensive, easy to implement, and will be successful in reducing the effect of many of the important barriers to DPA examined in this study.

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Introduction

Obesity is becoming more and more commonplace in both adults and children. Globally, one billion people are classified as overweight and of these; at least 30% are considered obese (World Health Organization, 2003). The obesity trend is not only appearing in adults, but also in children. Lobstein and Frelut (2003) report that 10% of the world's school-age children are overweight. Overweight status in children has increased dramatically all over the world in both industrialized and developing countries, although the problem is most pronounced in the world's richest countries. Eberstadt (2003) claims that most developed countries including Canada, the United States, Australia, England, Germany and Italy suffer from this serious public health dilemma in a great magnitude. Over 15 percent (almost nine million) of 6-19 year olds in the United States are obese, and double this number are overweight, according to body mass index (BMI). This is more than triple the number of overweight and obese people who were in this age category in 1980.

Statistics Canada (2002) reports that 37 percent of Canadian kids between two and 11 are overweight, and half of these kids are considered obese. Eberstadt (2003) adds, "Canada now has more fat children than fat adults" (p. 2). With the increased incidence and prevalence of overweight and obese children come the associated health risks. Children are now being diagnosed with chronic diseases related to their excess weight. Such diseases include hypertension, type two diabetes, sleep apnea, fat-linked cancer, gall bladder disease, non-alcoholic fatty liver disease, and orthopaedic disorders. More specifically, there has been a five-fold increase in sleep apnea cases, a three-fold increase in gall bladder disease, and a doubling of diabetes diagnoses in children less than 18 years of age (Eberstadt, 2003). Furthermore, overweight and obese children are also susceptible to psychosocial issues including

stigmatization at school, depression, and risk of eating disorders later in life (Eberstadt, 2003). Schwimmer et al. (2003) also report that students who are severely obese miss significantly more school days than those who are at a healthy weight. The health risks associated with obesity could also impact the amount of time a child spends at school, and therefore, the quality of his or her education. Independent of baseline socio-economic status and performance on aptitude tests, individuals who are overweight as adolescents are less likely to marry, spend fewer years in school, and are more likely to become poor adults (Kim et al., 2005).

There are many different risk factors associated with obesity. Koplan et al. (2005) report that child obesity is a major public health problem and demands national attention. The group suggests that there are a multitude of factors leading to child obesity, including “genetic, biological, psychological, sociocultural, and environmental” (p. 58), and that these factors both work independently and interact together. Simply stated, an imbalance energy intake and expenditure results in overweight and obesity (Skidmore & Yarnell, 2004). Therefore, overweight and obesity can occur if an excess of energy is taken in by consuming too many calories, and not burning off these calories with physical activity. Although the energy expenditure equation appears simple, there are other factors playing a role in this equation, such as genetic and environmental factors, making it quite complex (Lustig, 2001). Children with heavy parents are likely to be overweight or obese themselves. Both Arluk et al. (2003) and Eberstadt (2004) report that maternal heaviness is the single best predictor of child obesity. This could have either genetic or environmental components (Skidmore & Yarnell, 2004).

The media could also play a role in the increase of child obesity rates. Children spend approximately four hours per day watching television (Lafee, 2005), where they are not only engaging in sedentary activity, but they are also exposed to commercials advertising sugary

beverages and fatty foods (Koplan et al., 2005). Eberstadt (2004) reports that children whose mothers work outside the home have increased likelihood of being overweight or obese, perhaps because there is no one home to monitor food choices or encourage outdoor play. These children who are home alone after school are often likely to spend time watching television, surfing the Internet, or playing videogames, while eating unhealthy snacks. There are many factors contributing a role in child obesity, however, the two main preventable causes of obesity are consumption of too many calories and lack of physical activity (Skidmore & Yarnell, 2004).

Physical Activity and Obesity

An important contributing factor to child obesity is a low amount of physical activity. Manios et al. (2006) suggest that a sedentary lifestyle may be the single most important factor in rising obesity rates. The group suggests that the rising rates of obesity may be more closely related to low levels of energy expenditure. Furthermore, American National Survey data indicate that children are currently less active than they have been in previous surveys (The American Academy of Pediatrics, 2003), and this decrease in physical activity is strongly associated with an increase of weight and the associated adverse health outcomes (Cole et al., 2006). Moreover, an increase in physical activity is associated with improvements in physiological and psychological health (Verstraete et al., 2006).

Physical Activity at School

Not only are children increasingly more sedentary at home, but they are also sedentary at school. Only eight percent of elementary schools and six percent of middle and high schools provide the suggested amount of physical activity, which is 150 minutes per week for younger children, 225 minutes per week for older children and teens (Goldsmith, 2005). Taras and Potts-Datema (2005) report that only between 6% and 8% of schools in the United States provide the

recommended daily physical activity time to students. Increasing the amount of time spent on student physical activity in the schools will likely assist students in developing their own active and healthy lifestyles. Datar & Strum (2004) examined the effect on physical education instruction time on elementary school students' change in BMI. They found that when one extra hour of physical activity was added per week from kindergarten to grade one, the BMI of overweight and obese children was reduced. School-based physical education and health education programs have the potential to be successful, particularly if these programs target all children, and not simply those that are physically inactive or overweight at baseline. Children spend a large portion of time at school, so this time and these facilities are available and could potentially hold physical activity intervention programs. Physical activity behaviours are beginning to form in childhood and adolescence, and therefore, interventions aimed at developing healthy habits will have a long-term impact (Sharma, 2006).

School-based Physical Activity Intervention Programs

Pyle et al. (2006) suggest that school-based programs are successful when they target a wide range of children, and focus on prevention methods rather than treatment. The group further suggests that there are many children who are not currently overweight, but are at risk for becoming obese in the future. It is important to target all children, specifically since research suggests that interventions are not as successful once the individual has already reached overweight or obese status (Canning et al., 2004). Therefore, increasing physical activity habits in the younger years set the foundation for a healthy lifestyle that is used regardless of weight status. The group reports that in order for children to engage more in physical activity, the activity must be enjoyable to the child, and the child must have a positive attitude regarding the activity they are doing. Jargo & Baranowski (2004) reviewed the literature and found many

inexpensive methods that are successful in increasing the physical activity levels of school-age children. For example, the group found that “the number of balls available per child was a significant indicator of physical activity” (p. 158) in many American elementary schools. Furthermore, the group also found that increasing the aesthetic beauty of playground equipment led to the increased use of that equipment, thus, increased levels of physical activity. Painting school playgrounds in several British elementary schools led to a significant increase, “approximately 18 minutes per day in the amount of time that British children spent engaged in moderate to vigorous physical activity” (p. 158). Stratton (2000) found similar results by putting fluorescent markings on playground equipment in elementary school yards. Verstraete et al. (2006) found that purchasing and making available inexpensive game equipment such as balls, hoops, scoops and flying discs significantly increased children’s moderate to vigorous physical activity during lunch break and recess.

It is important to teach children the benefits of physical activity, however, they must also have opportunities to be physically active at school, and find physical activity pleasurable. Baur & O’Connor (2004) stress the importance of choosing lifestyle physical activity such as playing a favourite sport, or engaging in a non skills-based physical activity, as oppose to fitness drills. Although both types of exercise can cause similar weight loss in the short-term, people who participate in lifestyle activity can maintain the weight change over the long-term, which is not true for those who choose programmed aerobic activity. The reason for this is that people, especially children, are more likely to stay on an exercise program if it includes activities that they enjoy, as oppose to exercise that they feel forced to take part in (Baur & O’Connor, 2004).

Promoting physical fitness at school can impact a child at home, in the community, and everywhere else in his or her life by helping to foster positive attitudes towards a physically

active lifestyle. Murphy et al. (2006) found that previously sedentary teenage girls were able to adhere to a teacher-led physical activity program. However, the girls who were provided with the personal skills to lead their own physical activity program were more successful with sticking to their own program in the long term. Therefore, providing children with the skills to be in control of their own physical activity, as well as developing positive attitudes towards physical activity is likely to produce self-efficacy and the likelihood that they will remain physically active throughout their lives.

Naylor, et al. (2006) conducted a randomized control study in British Columbia whereby students in grades four to six in 10 different schools were randomly assigned to either a control (usual practice) or an intervention group. In the *Action Schools!* intervention group, the teachers were provided with more resources, communication and program flexibility. The students in the *Action Schools!* intervention groups received on average, an extra 10 minutes of physical activity per day, and an increase in integration of physical activity across the school day. Schofield, Mummery, and Schofield (2005) found that a 12-week self-monitoring and education program on walking led to a significant ($p = 0.03$) increase in physical activity. This increase was seen for both the student walkers who set minute (time) goals as well as pedometer (step) goals for themselves.

Daily Physical Activity

Although child obesity is a great public health concern, and low levels physical activity has been associated with obesity and the related health burdens (Verstraete et al., 2006), there are not a large amount of school-based programs aimed at increasing the levels of physical activity in children (Sharma, 2006). In 2006, the Ministry of Health Promotion in Ontario announced that every elementary school student will be participating in 20 minutes of daily physical activity

(DPA) every day. This has become a mandated part of the elementary curriculum (Ministry of Health Promotion, 2006). Although this is a positive step towards improving the health of children, there have been difficulties with implementing this new health promotion strategy.

Dwyer et al. (2003) examined teachers' perspective on barriers to implementing physical activity in Toronto area publicly funded elementary schools by conducting in-depth focus groups. Although new curriculum guidelines came out in 1998 regarding physical activity expectations of elementary school students, many teachers reported difficulty in meeting these expectations, and that the expectations were not being met. Many teachers reported that no more than 60 minutes of physical activity were provided per week. Three categories of barriers were derived from these focus groups. Teachers agreed that there was a low priority of physical education in their schools, there was a lack of performance indicators and measures for physical education, and there was lack of appropriate infrastructure and equipment. The main concerns were that curriculum expectations in other subjects were too demanding, particularly in mathematics and language. The pressures of performing well on standardized tests allowed for little time for physical activity. Often gymnasiums in schools are overbooked and used for other events such as assemblies and presentations, and therefore classes are forced go outside or in the classroom for physical activity. Furthermore, students are not moderately to vigorously physically active during the times when they are expected to be engaged.

The purpose of the present study is to take the barriers derived by Toronto area teachers and determine if these barriers are also negatively impacting the amount and quality of physical activity occurring in elementary schools in the Simcoe County areas, where the population is a mixture of urban and rural inhabitants. This area has recently undergone a mandated 20 minutes of daily physical activity (DPA) in schools that is in addition to regular physical education

classes and recess. The present study will survey a group of teachers to determine if they are facing barriers to implementing 20 minutes of DPA into their daily programs, and if so, what these barriers are. Teachers will also be asked to provide input by ranking the helpfulness of some solutions to overcome perceived barriers to DPA. It is only when clear barriers to physical activity are identified, that suggestions can be made to overcome these barriers and therefore increase the amount of physical activity that can be integrated into the curriculum in order to influence the health and well being of children.

Research Questions and Hypotheses

There are three research questions in this descriptive, cross-sectional study:

1. Do public elementary school teachers face barriers to implementing 20 minutes of DPA to their students?
2. What are teachers' perceived barriers to implementing 20 minutes of DPA to their students?
3. What solutions do teachers have to overcome these barriers?

The null hypothesis (h_0) is that teachers will report facing no barriers to successfully implementing 20 minutes of quality DPA, and therefore, there will be no solutions to break down barriers. However, based on a study by Dwyer et al. (2003), the alternative hypothesis (h_a) is that teachers do face barriers to implementing 20 minutes of DPA, specifically: lower priority for physical education, lack of performance measures, and lack of sufficient infrastructure. It is hypothesized that the solutions teachers may provide will be based on the barriers limiting DPA, such as more time for physical education, explicit performance measures, as well as sufficient and safe infrastructure.

Methods

Participants

The non-probabilistic convenience sample consisted of 137 teachers from 12 elementary schools in a Simcoe County area school board. The teachers were certified elementary school teachers able to work in a publicly funded board. Table 1 and figure 1 show the distribution of full-time and part-time teachers who participated in the study.

Table 1

Distribution of Full-time and Part-time Study Participants

Teaching status	Frequency	Percent	Cumulative percent
Full-time	127	92.7	92.7
Part-time	10	7.3	100

Procedure

Ethics approval for research protocol was granted from the school board participating in the study, as well as Lakehead University. The school board ethics committee allowed for schools to be contacted for participation from areas 1 and 2 of the school board. Thirty-six principals from these schools were presented with the study at the regional principals meeting in April, 2008, and asked for their school's participation. Twelve principals agreed to allow their staff to participate in the study. Each principal was given enough surveys for the staff as well as directions on how to distribute the surveys to the staff at a time that was convenient for them.

Questionnaire

A short, 38-item survey was assembled for the purpose of this study. The survey consisted of 36 Likert-scale questions, in order for participants to rank several pre-determined

barriers to DPA, and also several solutions to implementing regular DPA into their programs. There were also two open-ended questions, whereby participants had the opportunity to mention any barriers or solutions that were not in the predetermined lists. Since the research in this area is exploratory, there was a lack of Likert-scale surveys in the literature. Therefore, a qualitative study by Dwyer et al. (2003) was used to generate a list of teacher-perceived barriers to DPA and also a list of solutions. The themes generated from focus groups in the Dwyer et al. (2003) study were used as a basis for developing the Likert-scale questions in this study. Prior to distribution, the survey was reviewed by an expert panel of educators.

Participants were given a cover letter explaining the purpose of the study (Appendix A), a consent form to sign and provide permission to participate (Appendix B). Afterwards, they completed the short 38-item Likert scale survey (Appendix C), where they were asked to rank several barriers to DPA (adapted from the findings of the qualitative study by Dwyer et al., 2003) on a five-point scale (1 = strongly disagree, 2 = disagree, 3 = neither agree nor disagree, 4 = agree, 5 = strongly agree). Teachers were also provided with a list of solutions to break down DPA barriers and were asked to rank these as well (1 = very unhelpful, 2 = unhelpful, 3 = neither helpful nor unhelpful, 4 = helpful, 5 = very helpful). In addition, to gain more in-depth information, there were two open-ended questions on this survey, whereby teachers had the opportunity to add any barriers or solutions that were not already mentioned in the survey. Participants were asked not to put their names anywhere on the surveys in order keep anonymity.

Analysis

Once the surveys were returned, the data was entered into SPSS version 16.0. Descriptive statistics were taken from each item on survey, and information was found on the mean and

standard deviation. Paired t-tests were done on specific pairs of similar survey items to determine if the answers for one item differed significantly from the other. Furthermore, the information from the open-ended questions were transcribed into a Microsoft Word document and analysed for response trends. Analyses were run using SPSS to determine the percentage of participants who responded to the open-ended questions.

Results

Of the 36 principals that were presented with the study, 12 agreed to have their schools participate (33%). Altogether 170 teacher surveys were administered, with 137 completed and returned, which indicates a teacher response rate of 81%.

Rankings of the Barriers to DPA

The barriers to DPA were listed in the survey and ranked by the teacher participants. Table 2 shows the descriptive statistics for each barrier statement.

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Table 2

Distributions, means and standard deviations for each “barrier to DPA” statement (n = 137)

	Strongly disagree n (%)	Disagree n (%)	Neither agree nor disagree n (%)	Agree n (%)	Strongly agree n (%)	Mean	Standard deviation
Staff and administration believe DPA important	1 (.7)	6 (4.4)	24 (17.5)	77 (56.2)	29 (21.2)	3.93	.79
There is administration support for DPA at school	4 (2.9)	10 (7.3)	23 (16.8)	67 (48.9)	33 (24.1)	3.84	.97
Scheduling DPA is easy	15 (10.9)	38 (27.7)	28 (20.4)	39 (28.5)	17 (12.4)	3.04	1.23
There is enough supervision for DPA walks	7 (5.1)	31 (22.6)	36 (26.3)	51 (37.2)	12 (8.8)	3.22	1.06
There are too many time demands for DPA	6 (4.4)	21 (15.3)	22 (16.1)	55 (40.1)	33 (24.1)	3.64	1.14
DPA takes more than 20 min away from curriculum time	4 (2.9)	29 (21.2)	21 (15.3)	53 (38.7)	30 (21.9)	3.55	1.13
Curriculum demands in other subjects do not negatively affect DPA	26 (19.0)	50 (36.5)	21 (15.3)	32 (23.4)	8 (5.8)	2.61	1.20
It is easy to integrate DPA into other subject areas	8 (5.8)	62 (45.3)	33 (24.1)	32 (23.4)	2 (1.5)	2.69	.94
Curriculum is clear about physical education expectations	3 (2.2)	25 (18.2)	46 (33.6)	58 (42.3)	5 (3.6)	3.27	.88
Compared with other subjects physical education is a high priority	6 (4.4)	52 (38.0)	41 (29.9)	33 (24.1)	5 (3.6)	2.85	.96
Physical education frequency is addressed in the curriculum	7 (5.1)	33 (24.1)	52 (38.0)	40 (29.2)	5 (3.6)	3.02	.94
EQAO puts pressure to focus on math and language at the expense of DPA	1 (.7)	6 (4.4)	20 (14.6)	68 (49.6)	42 (30.7)	4.05	.83
It is easy to measure DPA performance	9 (6.6)	42 (30.7)	34 (24.8)	51 (37.2)	1 (.7)	2.95	.99

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Table 2 Continued

Distributions, means and standard deviations for each “barrier to DPA” statement (n = 137)

	Strongly disagree n(%)	Disagree n(%)	Neither agree nor disagree n(%)	Agree n(%)	Strongly agree n(%)	Mean	Standard deviation
Physical education equipment is sufficient and properly maintained	5 (3.6)	37 (27.0)	23 (16.8)	66 (48.2)	6 (4.4)	3.23	1.01
School gym is sufficient	24 (17.5)	33 (24.1)	8 (5.8)	66 (48.2)	6 (4.4)	2.98	1.27
Physical education is often cancelled when the gym is needed for presentations	4 (2.9)	25 (18.2)	20 (14.6)	52 (38.0)	36 (26.3)	3.66	1.14
Outdoor physical education facilities are adequate	25 (18.2)	44 (32.1)	18 (13.1)	45 (32.8)	5 (3.6)	2.72	1.21
Outdoor physical education facilities are safe	14 (10.2)	27 (19.7)	27 (19.7)	57 (41.6)	12 (8.8)	3.19	1.16
Classrooms are large enough for indoor DPA	27 (19.7)	64 (46.7)	17 (12.4)	26 (19.0)	3 (2.2)	2.37	1.07
Use of portables makes indoor DPA difficult	2 (1.5)	3 (2.2)	49 (35.8)	49 (35.8)	34 (24.8)	3.80	.89
Doing DPA in classroom is disruptive to other classes	7 (5.1)	38 (27.7)	30 (21.9)	42 (30.7)	20 (14.6)	3.22	1.16
Indoor DPA activities turn my classroom into a zoo	5 (3.6)	43 (31.4)	29 (21.2)	48 (35.0)	12 (8.8)	3.14	1.07
Students are always physically active during outdoor DPA	7 (5.1)	42 (30.7)	21 (15.3)	64 (46.7)	3 (2.2)	3.10	1.03
Students are always physically active during indoor DPA	5 (3.6)	51 (37.2)	36 (26.3)	44 (32.1)	1 (.7)	2.89	.93
There is adequate supervision when DPA is at an off-site location	5 (3.6)	22 (16.1)	46 (33.6)	57 (41.6)	7 (5.1)	3.28	.92

The statement, “*EQAO puts pressure to focus on math and language at the expense of DPA*”, had the highest mean response ($M = 4.05$), ($SD = .83$). In regards to curriculum expectations in other subject areas and time constraints, participants disagreed with the statements, “*Curriculum demands in other subjects do not negatively affect DPA*” ($M = 2.61$), ($SD = 1.20$), and “*Compared with other subject areas, physical education is a high priority at my school*” ($M = 2.85$), ($SD = .96$). The participants also disagreed with the statement, “*It is easy to integrate DPA into other subjects*” ($M = 2.69$), ($SD = 0.94$).

The statement, “*Classrooms are large enough for indoor DPA*”, had the lowest mean response ($M = 2.37$), ($SD = 1.07$). The participants also disagreed with the statements, “*The school gym is sufficient*”, ($M = 2.98$), ($SD = 1.27$), and “*Outdoor physical education facilities are adequate*”, ($M = 2.72$), ($SD = 1.21$). Participants ranked the statement, “*Outdoor physical education facilities are safe*” ($M = 3.19$), ($SD = 1.16$), higher than the statement, “*Outdoor physical education facilities are adequate*” ($M = 2.72$), ($SD = 1.21$), $t(136) = 6.54$, ($p < .01$).

When asked to rank indoor and outdoor DPA participation, participants ranked the statement “*Students are always physically active during outdoor DPA*” ($M = 3.10$), ($SD = 1.03$) higher than the statement, “*Students are always physically active during indoor DPA*” ($M = 2.8$), ($SD = .93$), $t(136) = 2.85$, ($p < .01$).

Rankings of the Possible Solutions to Break Down DPA Barriers

Possible solutions to break down barriers to DPA implementation were listed in the survey and ranked by the participants. Table 3 shows the descriptive statistics for each solution statement.

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Table 3

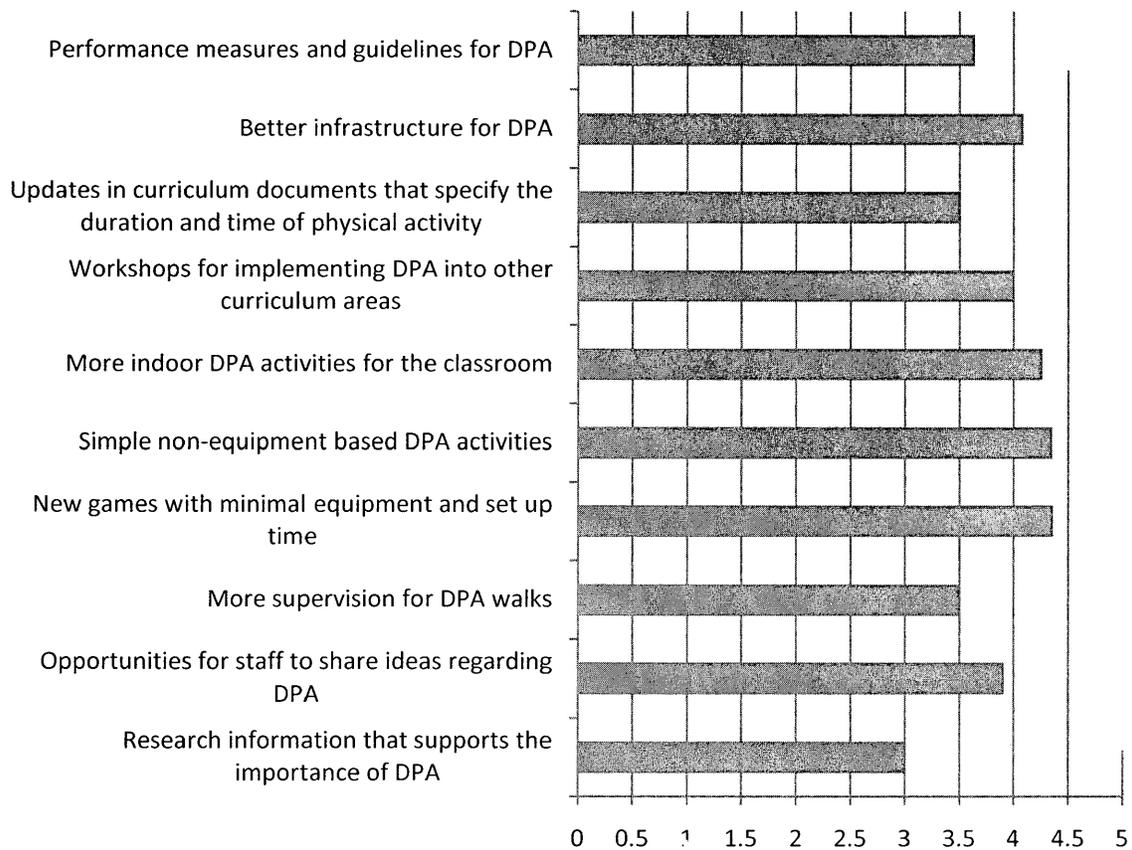
Distributions, means and standard deviations for each “solution to DPA barriers” statement (n = 137)

	Very unhelpful n (%)	Unhelpful n (%)	Neither helpful nor unhelpful n (%)	Helpful n (%)	Very helpful n (%)	Mean	Standard deviation
Research information that supports the importance of DPA	12 (8.8)	31 (22.6)	47 (34.3)	37 (27.0)	10 (7.3)	3.01	1.07
Opportunities for staff to share ideas regarding DPA	1 (.7)	6 (4.4)	23 (16.8)	82 (59.9)	25 (18.2)	3.91	.77
More supervision for DPA walks	3 (2.2)	12 (8.8)	54 (39.4)	50 (36.5)	18 (13.1)	3.50	.91
New games with minimal equipment and set up time	1 (.7)	2 (1.5)	4 (2.9)	70 (51.1)	60 (43.8)	4.36	.68
Simple non-equipment based DPA activities	1 (.7)	1 (.7)	4 (2.9)	74 (54.0)	57 (41.6)	4.35	.65
More indoor DPA activities for the classroom	2 (1.5)	3 (2.2)	7 (5.1)	70 (51.1)	55 (40.1)	4.26	.78
Workshops for implementing DPA in other curriculum areas	1 (.7)	9 (6.6)	17 (12.4)	73 (53.3)	37 (27.0)	3.99	.85
Updates in curriculum documents that specify the duration and time of physical activity	6 (4.4)	15 (10.9)	37 (27.0)	61 (44.5)	18 (13.1)	3.51	1.00
Better infrastructure for DPA	0 (0)	4 (2.9)	27 (19.7)	58 (42.3)	48 (35.0)	4.09	.81
Performance measures and guidelines for DPA	5 (3.6)	14 (10.2)	28 (20.4)	68 (49.6)	22 (16.1)	3.64	.99

Figure 1 shows each solution with the mean ranking. *New games with minimal equipment and set up time*, was ranked as the most helpful solution to breaking down barriers to DPA (M = 4.36), (SD = .68), this was closely followed by *simple non-equipment based DPA activities* (M = 4.35), (SD = .65), and *more indoor DPA activities for the classroom* (M= 4.26), (SD = .78).

Figure 1

Mean rankings for DPA solutions



The solution that was ranked least helpful was *research information that supports the importance of DPA* (M = 3.01), (SD = 1.07), followed by *updates in curriculum documents that specify the duration and time of physical activity* (M = 3.51), (SD = 1.00), and *more supervision for DPA walks*, (M = 3.50), (SD = .91).

Open-ended Responses Regarding Barriers to DPA

In terms of the open-ended questions, several themes were brought up by the teacher participants. For the question, “*Are there any other barriers to DPA that were not mentioned?*” These responses are summarized in table 4.

Table 4

Open-ended responses for “barriers to DPA implementation” (n = 50)

Barrier	Respondents who mentioned the barrier n (%)*
Time constraints and too many expectations in other curriculum areas	25 (50)
Lack of resources	12 (24)
Lack of space for indoor DPA and associated safety issues	11 (22)
Lack of staff training and “buy in” to DPA	5 (10)
Negative student outlook on physical activity	5 (10)
Noise and inappropriate student behavior during DPA	4 (8)
Unclear curriculum expectations	1 (0.5)

*Note: As a result of some respondents mentioning more than one barrier to implementing 20 minutes of DPA, percentages (%) will not add up to 100%.

50 participants responded (36% of all participants). Of those that responded, many did not bring up new barriers, but rather commented on barriers that were already mentioned. Twenty-five of the 50 respondents (50%) commented on time constraints and how it is difficult to fit DPA into

the day, particularly with the demands teachers face to cover other subject areas. A typical comment was:

There is not enough time in the day to meet all of the curriculum requirements, particularly in a split grade! It is difficult to fit it all in.

Other participants commented,

In a curriculum of multiple priorities, how does one balance it best? Doing it [DPA] for 20 minutes can be time consuming. Not enough time in the day to schedule everything.

Lack of space for indoor DPA and the associated safety issues were mentioned by 11 of the 50 respondents (22%). Many respondents reported that they were concerned with the space in the classroom, particularly in the upper elementary grades, where there are more students in the classes, and larger bodies. There is often the need to shuffle desks and other classroom furniture, which would then take more than 20 minutes of instructional time, as well as put the children at risk for injury. One participant responded:

Having taught junior classes with 27 [students] and primary with 16, the indoor DPA times can be a challenge for space and noise with larger classes (more kids/bigger bodies).

Another similar response:

There is very little room for movement in the classrooms. Safety is a huge issue for the junior/intermediate students, odour becomes an issue too!

Similarly, four of the 50 (8%) respondents referred to the noise issue and inappropriate student behavior during indoor DPA. Lack of resources was another theme that became prominent while analyzing the written comments of respondent. Twelve of the 50 participants (24%) commented on this issue. A typical response was:

Classroom instructional resources, AV equipment and student equipment are inadequate.

Many respondents also commented on the lack of ideas and games for DPA. Some also commented that there is not enough DPA equipment in each classroom, such as balls.

Five of the 50 respondents (10%) reported that student outlook on physical activity was negative at their schools. One respondent commented:

There was no mention of unmotivated/disinterested students who need DPA the most.

Another respondent commented on the fact that DPA has been perceived as “playtime”, and therefore, many students do not take it seriously, and is not supported by some members of the community. In addition, five respondents (10%) commented on the lack of staff training and “buy in” to DPA. Particularly in those schools where DPA is planned and executed by each classroom teacher separately, it may be looked over if the class needs to spend more time in other curriculum areas. One participant commented on the increased workload and planning that DPA brings:

The fact that it [DPA] is added planning and greater/added workload. Take out the added workload for DPA.

Another participant commented on the fact that DPA should not be a school initiative, rather a parent/home initiative:

I resent the imposition of the Ministry mandating that DPA SHALL occur in the schools as a knee jerk and politically convenient reaction to what is primarily and morally a parental responsibility. Money, resources and education should be aimed at parents in the community as well as traditional education/value teaching of children in school. Just

because it's easier for the government to download the responsibility onto teachers/employees doesn't mean it's the right decision.

One of the 50 respondents (0.5%) reported unclear curriculum expectations to be a barrier to successfully implementing 20 minutes of DPA.

Open-ended Responses Regarding Possible Solutions to DPA Barriers

Themes also developed in the other open-ended question in this survey, “*Are there any other helpful resources that would aid in the better management of DPA?*” These responses are summarized in table 5.

Table 5

Open-ended responses to “solutions to DPA implementation barriers” question (n = 45)

Solution to break down DPA implementation barrier	Respondents who mentioned the solution n (%)*
List of simple activities that utilize minimal equipment	7 (16)
Music resources (e.g. CDs)	5 (13)
Instructional DVDs and exercise videos	5 (13)
Reducing curriculum expectations in other subject areas	4 (9)
Whole school DPA approach	4 (9)
Student leaders during whole school DPA	3 (7)
Clearly defined objectives and assessment resources for DPA	2 (4)
Positive athletic role models for students	2 (4)
More physical education equipment (e.g. hula hoops, balls)	2 (4)
Teacher training and professional development for DPA	1 (2)
Education tools for parents to support DPA	1 (2)
Schedule gym time specifically for DPA	1 (2)
School-community links for DPA so that students can participate in recreational activities (e.g., skating, swimming)	1 (2)

*Note: As a result of some respondents mentioning more than one solution, percentages (%) will not add up to 100%.

Of the 137 survey participants, 45 responded (33%). Many of the respondents noted the need for resources, particularly music CDs (13%), instructional DVDs and exercise videos (13%), as well as a list of simple activities that utilize little equipment (16%). Four of the 45 respondents (9%) commented on the value of the “whole-school” DPA approach, whereby the whole schools does the same physical activity, such as walking, altogether at the same time. One respondent commented,

I feel our year of walking as an entire school has provided students and some staff with a sense of “school spirit and community”. I see health benefits, particularly with one of my students who is overweight. As a staff, I truly benefit physically and emotionally from our daily DPA walks.

Three respondents (7%) also commented on the use of student leaders during whole school DPA, whereby trained intermediate students lead indoor or outdoor DPA activities in assigned groups or classes. One respondent commented,

School wide DPA is a great idea! It gives a set time and ensures it gets done. DPALs – daily physical activity leaders are also great for DPA (gives older students responsibility), makes programming easier when activities are already set up.

Four of the 45 respondents to this question (9%) commented on the importance of reducing the curriculum expectations in other subject areas in order to include DPA, and two respondents commented on the need for clearly defined objectives and assessment resources for DPA. One respondent felt there was a need for teacher professional development, one suggested education tools for parents to support DPA, and two respondents recommended having positive DPA role models for students. One responded commented on the importance of scheduling gym time for

DPA, two respondents commented on the need for more physical education equipment, while another responded recommended school-community links for DPA so that students can participate in activities such as skating, skiing, and swimming programs.

Discussion

This study demonstrates that teachers do perceive barriers to successfully implementing 20 minutes of quality DPA, particularly time constraints due to pressures and expectations in other subject areas, such as literacy and numeracy. Participants have also indicated the importance of other perceived barriers to DPA including: lack of resources, lack of space, and lack of staff and student “buy in” to physical activity programs. Where a list of solutions to these barriers was provided, participants indicated the most helpful solutions to be: activities that utilize minimal equipment, music resources, exercise videos, whole school DPA approach and student leaders for DPA.

Lack of Time Due to Other Curriculum Pressures

The Education Quality and Accountability Office (EQAO) tests in particular, have put pressure on teachers to have their students perform well on these standardized tests, and thus more time is spent on core subjects at the expense of others, including physical education and DPA. Given that the means for the barriers: *EQAO puts pressure to focus on math and language at the expense of DPA, there are too many time demands for DPA, and DPA takes more than 20 minutes away from curriculum time*, are greater than 3.5, indicates that teachers do feel strong curriculum pressures in other areas and therefore, have difficulty fitting DPA and physical activity into their already full school day. Teachers also disagreed with the statements, *curriculum demands in other subjects do not negatively affect DPA, and it is easy to integrate*

DPA into other subject areas. Furthermore, when examining the written responses, 50% of the teachers who responded to the open-ended question “*Are there any other barriers to DPA that were not mentioned?*” reported time constraints and too many expectations in other curriculum areas. Teachers commented on this barrier again, even though it was already mentioned in the ranking portion of the survey. This further demonstrates the pressures that teachers feel to “get it all in” and therefore, have to make executive decisions on where to cut corners, and as a result, physical education and DPA are being modified or cut altogether.

In terms of solutions to aid in the time constraints of the day, some teachers commented on the importance of reducing curriculum expectations in other subject areas in order to allow for time to engage in physical activity. Many teacher participants also commented on the effectiveness of the whole school DPA approach, whereby, the whole school goes outside altogether at one time and walks or engages in another form of physical activity. This approach was reported to be appropriate since it is embedded into the day, whether it takes place first thing in the morning or lastly in the afternoon, it is built into the day and everyone does it, so it does not seem to be a time burden, as much as if the DPA was led by individual teachers at different times. Furthermore, some teacher participants also commented on the use of student leaders for DPA. Some schools are using DPALs (daily physical activity leaders), whereby intermediate students (grades seven and eight) are trained to deliver physical activity programs indoors to specific classes during whole school DPA time. This method is used particularly during rainy days or winter months where outdoor DPA is difficult. Although this does not necessarily cut down on the time it takes to do DPA, it does cut down on the planning and workload for the individual teacher to implement DPA. Furthermore, if DPA is a scheduled, whole school approach, less transition time is likely to be wasted, especially since the bell rings (similar to a

recess bell) to indicate that DPA is over and classes are to begin. Cochrane and Davey (2008) used the ecological model to study a community and individual physical activity initiative. They found that the environment influences the behaviour of the individuals; therefore, a program will have a greater impact if it is aimed towards a whole community, rather than just the individual. This further supports the need for a whole school DPA initiative. Students will benefit when they are part of a community initiative, whereby everyone is doing the same thing at the same time and this becomes part of the regular school routine, thus not only saving time, but also setting up school norms that encourage all members of the school to follow. Taras (2005) reports that children are more attentive and have increased focus after engaging in physical activity. Therefore, any time lost to physical activity is counterbalanced by more productive class time afterwards. This supports the need for whole school DPA, particularly in the morning before classes.

Lack of Resources

Lack of resources was also considered to be a barrier for teachers. Overall, participants found that the lack of physical resources such as balls, and hula hoops were lacking and thus making DPA implementation difficult. Also, participants reported that infrastructure resources, such as outdoor equipment and gymnasiums were insufficient as well. Teachers ranked each of these three items with a mean of less than 3.5, indicating that they disagreed with these statements: *physical education equipment is sufficient and properly maintained, outdoor physical education facilities are adequate, outdoor physical education facilities are safe.* Moreover, in the open-ended question of the survey, where teachers were asked to comment on any other barriers not mentioned in the ranking portion of the survey, 24% of teachers who responded to this question commented on not only the lack of physical resources and

infrastructure, but also the lack of teaching resources, ideas, and games to implement quick and easy DPA activities.

In addition, when examining the list of solutions to DPA barriers, the solutions with the highest mean ranking in terms of helpfulness included: *new games with minimal equipment and set up time, simple non-equipment based DPA activities, and more indoor DPA activities for the classroom*. Here, teacher participants have not only pointed out the lack of resources barrier to DPA, but have also pointed that simply providing more equipment and infrastructure, as well as a bank of fun and varied activities that use minimal resources, would be a simple solution to this barrier. There is support for a varied DPA program in the literature, as long as the program is noncompetitive, challenging, and enjoyable for students. Slawta et al. (2008) researched the outcomes of a 12-week physical activity program that emphasized cardiovascular fitness, flexibility, muscle strength, and bone development through a variety of activities. The group found that the program with varied activities were well-received by the children, particularly the activities that were noncompetitive and focused on improving individual fitness. Yin et al., (2005) provide a list of four criteria needed for children to develop intrinsic motivation to adhere to a physical activity program: a high value placed on effort, strong emphasis on learning and improvement, enjoyable and age appropriate activities that provide successful experiences, and cooperation among peers. Therefore, if teachers had the opportunity to work together to share ideas and create inexpensive resources, the children would benefit from a well-rounded and enjoyable DPA program that they would be likely to adhere to for the long term.

Furthermore, in the open-ended responses to solutions, many respondents mentioned the ideas of a comprehensive list of DPA activities, as well as music CDs, instructional DVDs and exercise videos, as well as a increasing the number of physical education equipment such as balls

and hula hoops. These ideas are supported in the literature. Verstraete et al. (2006) found that making available inexpensive game equipment such as hoops, balls, and flying discs significantly increased the physical activity levels of school age children. In a similar study, it was found that inexpensive methods for increasing the physical activity of children were successful, such as increasing the number of balls available to children and increasing the attractiveness of playground equipment with paint (Jargo & Baranowski, 2004). Furthermore, Stratton (2000) found that decorating playground equipment with fluorescent markings increased the use of the equipment and therefore, the physical activity levels of the children. With the exception of building new infrastructure, these solutions are relatively easy and inexpensive, yet teachers have reported the positive effect they would have on their overall physical activity and DPA programs.

Lack of Space

Lack of space for indoor DPA was also a major concern for teacher participants. Given that each of these responses had a mean of less than 3.5, teachers on average disagreed with these statements: *classrooms are large enough for indoor DPA*, and *students are always physically active during indoor DPA*. However, teachers also disagreed with these statements: *doing DPA in the classroom is disruptive to other classes*, and *indoor DPA activities turn my classroom into a zoo*. Of those teachers that responded to the open-ended question, 22% reported limited space to be an issue for indoor DPA, whereas only 8% reported noise and inappropriate student behavior to be an issue. This demonstrates that although space is an issue for indoor DPA, teachers do not necessarily feel that indoor DPA is disruptive or promotes inappropriate behavior.

Although space is a difficult barrier to rectify, one respondent commented on the idea of possibly signing out the school gym, specifically for DPA, as one would do for a regularly scheduled physical education class. This may not be feasible for all schools, however. The solution of providing instructional videos, CDs and a list of simple non-equipment activities may assist in the space issue. If teachers have the resources to make use of the little space they have, then perhaps it will no longer serve as a strong barrier. Furthermore, the idea of whole school DPA may also assist in the reduction of this barrier, as the students will likely spend less time during indoor DPA if it becomes a whole school initiative.

Lack of Training and Staff “Buy-in” to DPA

The open-ended response question regarding barriers to DPA also brought up the issue of lack of training and staff “buy in” to DPA, as well as negative student outlook on physical activity. Although negative student outlook on physical activity was not addressed in the ranking portion of the survey, there were two items based on staff and administrative beliefs on DPA. Overall, with a mean greater than 3.5 for both items, teacher participants agreed with the statements: *staff and administration belief that DPA is important*, and *there is administrative support for DPA*. This could demonstrate the possibility that although staff feel DPA is important for students, and supported by administration, they feel the pressures from other barriers, particularly time constraints due to curriculum pressures, lack of resources and space, and therefore look negatively upon DPA, even though they understand the importance and positive effects. To further support this, participants ranked the solution of *research information that supports the importance of DPA* the least helpful solution, indicating that they already understand the importance of DPA and further research to demonstrate this is not needed.

Several solutions were put forth regarding lack of staff “buy in”. *Opportunities for staff to share ideas regarding DPA and workshops for implementing DPA into other curriculum areas*, were both ranked as helpful as solutions to overcoming DPA barriers. If staff has the opportunity to share ideas, as well as become educated with further ideas, they will likely have more positive feelings regarding DPA, and pass these onto their students. Furthermore, if they are provided with the resources to do an adequate job in DPA implementation, or if a whole school approach with student led groups takes effect, they will likely feel less pressure and therefore, may also feel more positively towards DPA.

School boards could use their existing staff websites to create a forum whereby teachers are able to submit DPA ideas or activities that they have had success with. Teachers would have the opportunity to use ideas on the forum or contribute their own ideas. This would likely take some of the stress out of planning DPA activities, and perhaps in the process, change teacher attitudes. Changing negative staff attitudes towards physical activity will likely assist in changing negative student attitudes. If staff are positive regarding DPA, and implement fun and engaging activities for students to participate, the students will also look more positively towards physical activity, and see it as an enjoyable and important part of the day. Kamtsios and Digelidis (2008) suggest that all physical education lessons should be approached in a positive way, and all staff should urge students to participate in enjoyable activities that create positive attitudes and behaviours that students will keep with them throughout their lives. When children feel capable of participating in physical activity, and realize that it is fun, they will have a more powerful intention to continue with this behaviour (Goldbery & Dietz, 1996). Therefore, all DPA and physical education activities can develop students’ beliefs in their own ability and encourage participation in physical activity (Min-Hau & Allen, 2002). Furthermore, when students are

engaged and behaving positively, teachers will have increased positive attitudes towards the program (Naylor et al., 2006), and therefore, a positive cycle will begin.

Although the teacher participants disagreed with the statements: *curriculum is clear about physical education expectations, physical education frequency is addressed in the curriculum, and it is easy to measure DPA performance*, only one respondent commented on this as a barrier in the open-ended portion of the survey. Furthermore, when ranking the helpfulness of solutions for breaking down DPA barriers, *updates in curriculum documents that specify the duration and time of physical activity* was ranked as the third least helpful solution out of the 10 solutions listed. It was followed by *performance measures and guidelines for DPA*. This indicates that the lack specific duration and frequency of DPA in the curriculum documents as well as lack of performance measures is not as much of a barrier as the lack of time, resources, and space indicated by teachers.

Limitations

This study has limitations that may affect the generalizability of the findings, particularly to certified elementary teachers in the Simcoe County area, since it was conducted with one school board, using a small non-probabilistic convenience sample. Moreover, the survey tool utilized in this study was not a validated tool. The survey was simply derived from the findings of the qualitative study by Dwyer et al. (2003). More specifically, the statements used in the Likert scale ranking portion of the present study were taken from the comments made and themes derived in the Dwyer et al. (2003) study. Although, the survey did undergo brief analysis for internal validity, it was still not formally validated. Future research should expand the sample

size and use randomization to select the sample. It is also recommended to use a validated tool in order to enhance generalizability.

Implications for practice

Teacher participants have indicated four important barriers to regular, quality DPA implementation: time and other curriculum pressures, lack of resources, lack of space, lack of staff and student “buy in”. The participants have also indicated many solutions to break down barriers to DPA implementation, specifically: simple activities that utilize minimal equipment, music resources, instructional DVDs and exercise videos, opportunities for staff to share ideas, whole school DPA approach, and student leaders for DPA. Table 6 shows all of the barriers to DPA with some potential solutions.

Table 6

Barriers and solutions to implementing 20 minutes of quality DPA

Barrier	Solution
Lack of time/other curriculum pressures	Reducing curriculum expectations in other subject areas List of simple activities (that possibly could integrate into other subject areas)
Lack of resources	List of simple activities Music resources (e.g. CDs) Instructional DVDs and exercise videos More physical education equipment
Lack of space	Schedule gym time specifically for DPA Whole school DPA approach
Lack of staff training and “buy in”	Teacher training and professional development Increased activity bank and resources
Negative student outlook on physical activity	School-community links for DPA so students can participate in recreational activities (e.g. skating, skiing, swimming)
Noise and inappropriate student behavior during DPA	Whole school DPA approach Student leaders during whole school DPA Positive athletic role models for students
Unclear curriculum expectations	Clearly defined objectives and assessment resources for DPA

With the exception of reduced curriculum expectations and better infrastructure, many of the solutions indicated by teachers are inexpensive and easy to implement. Since many barriers to DPA interact with one another (for example, lack of resources can influence negative teacher attitudes, which can influence negative student attitudes, noise and behavior), solutions such as activity banks, music and DVDs are easy to implement and reduce many of the barriers of DPA. By investing and sharing fun and easy activities, staff and students will look upon DPA more

positively, and therefore will engage more rigorously and enjoy the health and academic benefits from the increased physical activity.

Child obesity is a serious problem and needs immediate attention. This is not only an issue for schools, but for all sectors, including public health professionals. There is a need for public health policy to develop plans to educate teachers and students on the benefits of a healthy lifestyle that include not only physical activity but nutrition and behavioural programs as well. Teachers and students also need to be educated on the seriousness of obesity and complications that can result from this condition. More public health research is needed to further study the factors associated with overweight and obesity as well as prevention methods, before this leads to serious adverse health outcomes. Public health professionals can support teachers in prevention programs for children. Teachers will not be able to successfully implement programs in schools unless they are educated and on board with the latest public health information. By working together with the latest research and policy and focusing on many of the social determinants of health, educators and public health professionals will likely be more successful in preventing and controlling child obesity.

References

- Alberta Education. (2006). Retrieved January 19, 2008, from <http://education.alberta.ca/teachers/resources/dpa.aspx>
- American Academy of Pediatrics. (2003). Policy statement: Prevention of pediatric overweight and obesity. *Pediatrics*, *112*(2), 424 – 430.
- American Medical Association. (2007). *National project on physical activity*. Retrieved January 29, 2008, from <http://www.amsa.org/cph/physical.cfm>
- Arluk, S. L., Branch, J. D., Swain, D. P., & Dowling, E. A. (2003). Child obesity's relationship to time spent in sedentary behaviour. *Military Medicine*, *168*(7), 583.
- Baur, L. A., & O'Connor, J. (2004). Special considerations in childhood and adolescent obesity. *Clinics in Dermatology*, *22*, 338 – 344.
- Canning, P. M., Courage, M. L., & Frizzell, L. M. (2004). Prevalence of overweight and obesity in a provincial population of Canadian preschool children. *Canadian Medical Association Journal*, *171*(3), 240 – 242.
- Cochrane, T., Davey, R. C. (2008). Increasing the uptake of physical activity: A social ecological approach. *The Journal of the Royal Society for the Promotion of Health*, *128*(1), 31 – 40.
- Cole, J. W., D'Auria, J. & Garner, H. (2006). An integrative research review: Effective school-based childhood overweight interventions. *Pediatrics*, *112*(2), 424 – 428.
- Craig, S., Goldberg, J., & Dietz, W. (1996). Psychosocial correlates of physical activity among fifth to eighth graders. *Preventive Medicine*, *25*, 506 – 513.
- Datar, A. & Sturm, R. (2004). Physical education in elementary school and body mass index: Evidence from the early childhood longitudinal study. *American Journal of Public Health*, *94*(9), 1501 – 1506.

- Dwyer, J. J., Allison, K. R., Barrera, M., Hansen, B., Goldenberg, E., & Boutilier, M. A. (2003). Teachers' perspective on barriers to implementing physical activity curriculum guidelines for school children in Toronto. *Canadian Journal of Public Health, 94*(6), 448 – 452.
- Eberstadt, M. (2003). The child-fat problem. *Policy Review, 117*, 1 – 18.
- Goldsmith, C. (2005). Supersized kids: The epidemic of obesity in children and teens. *Access, September-October, 20 – 25*.
- Jago, R., & Baranowski, T. (2004). Non-curricular approaches for increasing physical activity in youth: A review. *Preventative Medicine, 39*, 157 – 163.
- Kamtsios, S. & Digelidis, N. (2008). Physical activity levels, exercise attitudes, self-perceptions and BMI type of 11 to 12 year-old children. *Journal of Child Health Care, 12*(3), 232 – 240.
- Kim, J., Must, A., Garrett, M., Fitzmaurice, S., Gillman, M. W., Chomitz, V., et al. (2005). Incidence and remission rates of overweight among children aged 5 to 13 years in a district-wide school surveillance system. *Research and Practice, 95*(9), 1588 – 1594.
- Koplan, J. P., Liverman, C. T. & Kraak, V. I. (2005). Preventing child obesity. *Issues in Science and Technology, 21*(3), 57 – 64.
- Lafee, S. (2005). Another weighty burden. *School Administrator, 62*(9), 15 – 16.
- Lobstein, T., & Frelut, M. L. (2003). Obesity in children and young people: A crisis in public health. *Obesity Reviews, 5* (Suppl. 1), 4 – 104.
- Lustig, R. H. (2001). The neuroendocrinology of obesity. *Endocrinology Metabolism Clinical Journal of North America, 30*, 765 – 785.

- Manios, Y., Kafatos, I. & Kafatos, A. (2006). Ten-year follow-up of the Cretan Health and Nutrition Education Program on children's physical activity levels. *Preventive Medicine, 43*, 442 – 446.
- Min-Hau, C & Allen, P. (2002). The relationship between attitude toward physical education and leisure time exercise in high school students. *Physical Educator, 59*, 126 – 139.
- Ministry of Health Promotion. (2006). *Healthy schools condition healthy minds*. Retrieved March 5, 2008, from <http://www.mhp.gov.on.ca/english/news/2005/100605-2.asp>
- Monetlpare, W. (2002). Webulator for Calculating Sample Size. *Lakehead University*. Retrieved February 19, 2008, from <http://giant.lakeheadu.ca/~wmontelp/hfiles/webulators/SSprop.html>
- Murphy, N. M., Dhuinn, M. N., Browne, P. A., & O'Rathaille, M. M. (2006). Physical activity for bone health in inactive teenage girls: Is a supervised, teacher-led program or self-led program best? *Journal of Adolescent Health, 39*, 508 – 514.
- Naylor, P. J., Macdonald, H. M., Zebedee, J. A., Reed, K. E., & McKay, H. A. (2006). Lessons learned from Action Schools! BC – An 'active school' model to promote physical activity in elementary schools. *Journal of Science and Medicine in Sport, 9*, 413 – 423.
- Pyle, S., Sharley, J., Yetter, G., Felix, E. & Furlong, M. J. (2006). Fighting an epidemic: The role of schools in reducing childhood obesity. *Psychology in the Schools, 43*(3), 361 – 375.
- Schofield, L., Mummery, W. K., & Schofield, G. (2005). Effects of a controlled pedometer-intervention trial for low-active adolescent girls. *Medical Science of Sports Exercise, 37*, 1414 – 1420.

- Schwimmer, J. B., Burwinkle, T. M., & Vami, J. W. (2003). Health-related quality of life of severely obese children and adolescents. *Journal of the American Medical Association*, 289(14), 1813 – 1819.
- Skidmore, P. M. & Yarnell, J. W. (2004). The obesity epidemic: prospects for prevention. *Queen's Journal of Medicine*, 97, 817 – 825.
- Slawta, J., Bentley, J., Smith, J., Kelly, J. & Syman-Degler, L. (2008). Promoting healthy lifestyles in children: A pilot program of 'Be a Fit Kid'. *Health Promotion Practice*, 9(3), 305 – 312.
- Statistics Canada. (2002). National longitudinal survey on children and youth: child obesity. Retrieved January 31, 2008, from <http://www.statcan.ca/Daily/English/021018/d021018b.htm>
- Stratton, G. (2000). Promoting children's physical activity in primary school: An intervention study using playground markings. *Ergonomics*, 43, 1538 – 1546.
- Taras, H. (2005). A pediatrician's prescription to stem childhood obesity. *School Administrator*, 62(9), 14 – 15.
- Taras, H., Potts-Datema, W. P. (2005). Obesity and student performance at school. *Journal of School Health*, 75(8), 291 – 295.
- Verstraete, S. J., Cardon, G. M., De Clercq, D. L., De Bourdeaudhui, I. M. (2006). Increasing children's physical activity levels during recess in elementary schools: the effects of providing game equipment. *European Journal of Public Health*, 16(4), 415 – 419.
- Whitney, E. N. & Rolfes, S. R. (1999). *Understanding Nutrition* (8th ed.). Toronto: Nelson Canada.

World Health Organization. (2003). Obesity and overweight. Retrieved January 25, 2008, from <http://www.who.int/dietphysicalactivity/publications/facts/obesity/en/print.html>

Yin, Z., Hames, J. J., Moore, J. B., Humbles, P., Barbeau, P. & Gutin, B. (2005). An after school physical activity program for obesity prevention in children: The Medical College of Georgia Fit Kid Project. *Evaluation and the Health Professions*, 28(1), 67 – 89.

Appendix B: *Participant consent form*

Lakehead

UNIVERSITY

My signature on this sheet indicates that I agree to participate in a study by Cindy Middlemass Strampel, on TEACHER PERCEIVED BARRIERS TO DPA IMPLEMENTAION and it also indicates that I understand the following:

1. I have received explanations about the nature of the study, its purpose, and procedures.
2. I am a volunteer and can withdraw at any time from the study
3. There is no apparent risk of physical or psychological harm
4. The data I provide will be securely stored at Lakehead University for seven years.
5. I will receive a summary of the project, upon request, following the completion of the project.
6. I will not be named, or identified in any way in any materials published as a result of this study.

Signature of Participant

Date

Appendix C: *Participant survey*

Teacher Daily Physical Activity Knowledge and Beliefs Survey

Please read each of the statements below and circle the response that most appropriately represents your beliefs regarding daily physical activity (DPA) at your school.

1. My teaching status is

Full-time Part-time

2. Staff and administration at my school believe that DPA is important.

Strongly Disagree	Disagree	Neither Agree nor Disagree 3	Agree	Strongly Agree 5
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3. There is administrative support for DPA at my school.

Strongly Disagree	Disagree	Neither Agree nor Disagree 3	Agree	Strongly Agree 5
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3. Scheduling daily physical education is easy at my school.

Strongly Disagree	Disagree	Neither Agree nor Disagree 3	Agree	Strongly Agree 5
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4. There is enough supervision for DPA walks.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
		3		5

5. There are too many demands on time during the day for DPA.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
		3		5

6. DPA takes more than 20 minutes away from other curriculum time.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
		3		5

7. Curriculum demands in other subjects (math, language) do not negatively affect DPA time.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
		3		5

8. It is easy to integrate health and physical education into other subjects.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
		3		5

10. The provincial curriculum document is clear about expectations for physical activity during instructional time.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1		3		5

11. Compared with other subject areas, physical education is a high priority at my school.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
1		3		5

12. The frequency of physical activity is addressed in the specific expectations of the curriculum.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
		3		5

13. The pressures from Education Quality and Accountability Office (EQAO) scores have put more pressure on teachers to emphasize math and language, at the expense of physical education.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
		3		5

14. It is easy to measure DPA performance.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
		3		5

Teacher Perceived Barriers to Implementing Regular Physical Activity 50

15. Physical education equipment at my school is sufficient and properly maintained.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
		3		5

16. The gymnasium at my school is sufficient for my school's needs.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
		3		5

17. Physical education is often cancelled when the gymnasium is needed for a school assembly or presentations.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
		3		5

18. Outdoor physical education facilities are adequate at my school.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
		3		5

19. Outdoor physical education facilities are safe at my school.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
		3		5

20. Classrooms are large enough for indoor DPA.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
		3		5

21. The use of portables for classrooms makes indoor DPA difficult.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
.		3		5

22. Doing DPA in the classroom is disruptive to other classes.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
	-	3		5

23. Indoor DPA activities turn my classroom into a “zoo”

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
.		3		5

24. Students are always physically active during outdoor DPA time at school.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
		3		5

25. Students are always physically active during indoor DPA time at school.

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
.		3		5

26. There is adequate supervision when DPA is at an off-site location (e.g., walking off school property, public skating, etc.).

Strongly Disagree	Disagree	Neither Agree nor Disagree	Agree	Strongly Agree
.		3		5

27. Are there any other barriers to DPA that were not mentioned?

*What would you like to have in order to help support DPA at your school?
Please circle the response that applies most to you.*

28. Research information that support the importance of DPA

Very Unhelpful	Unhelpful	Neither Unhelpful nor Helpful	Helpful	Very Helpful
		3		

29. Opportunities for staff to share ideas regarding DPA

Very Unhelpful	Unhelpful	Neither Unhelpful nor Helpful 3	Helpful	Very Helpful
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30. More supervision for DPA walks

Very Unhelpful	Unhelpful	Neither Unhelpful nor Helpful 3	Helpful	Very Helpful
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31. New games with minimal equipment and set up time required

Very Unhelpful	Unhelpful	Neither Unhelpful nor Helpful 3	Helpful	Very Helpful
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32. Simple non-equipment based classroom friendly DPA activities

Very Unhelpful	Unhelpful	Neither Unhelpful nor Helpful 3	Helpful	Very Helpful
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33. More indoor DPA activities for the classroom

Very Unhelpful	Unhelpful	Neither Unhelpful nor Helpful 3	Helpful	Very Helpful
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34. Workshops for implementing DPA in other curriculum areas (e.g., cross-curricular – DPA and math, DPA and science, etc.)

Very Unhelpful	Unhelpful	Neither Unhelpful nor Helpful	Helpful	Very Helpful
		3		

35. Updates in curriculum documents that specify the during and time of necessary physical activity

Very Unhelpful	Unhelpful	Neither Unhelpful nor Helpful	Helpful	Very Helpful
		3		

36. Better infrastructure for DPA (e.g., gymnasium, outdoor facilities)

Very Unhelpful	Unhelpful	Neither Unhelpful nor Helpful	Helpful	Very Helpful
		3		

37. Performance measures and guidelines for DPA

Very Unhelpful	Unhelpful	Neither Unhelpful nor Helpful	Helpful	Very Helpful
		3		

38. Are there any other helpful resources that would aid in the better management of DPA?

Thank you for taking the time to complete this questionnaire. Your responses are greatly appreciated and will remain absolutely confidential