Vol 10 no 1

Revue phénEPS / PHEnex Journal

Daily Physical Activity (DPA) in Schools: Roles of Public Health Unit Personnel in Supporting the Policy

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Abstract

Relationships between public health and school personnel are examined in relation to the Daily Physical Activity (DPA) policy in Ontario elementary schools. Online surveys were administered to key personnel from 36 public health units in Ontario. Descriptive analysis assessed their role in building partnerships and supporting DPA. Relatively low levels of involvement in supporting DPA in school boards and schools were found. A number of barriers to involvement, including lack of reciprocal responsibility for engagement between public health and school personnel were reported. The results indicate some gaps in public health unit personnel involvement with the school system. Support and promotion of DPA policy implementation can be enhanced through development of stronger reciprocal relationships and innovative communication processes.

Keywords: Policy evaluation; organization of school health programs

Résumé

Les relations entre le personnel scolaire et celui de santé publique autour de la politique d'activité physique quotidienne de l'Ontario dans les écoles élémentaires font l'objet de cette étude. Le personnel clé de 36 unités de santé publique de l'Ontario a été invité à répondre à un sondage sur ce sujet. Une analyse descriptive des réponses a permis d'évaluer leur role dans l'établissement de partenariats pour appuyer cette politique. L'engagement pour appuyer cette politique avec les conseils scolaires et les écoles est relativement peu élevé. Le manque de responsabilité réciproque du personnel scolaire et de santé publique représente un obstacle parmi de nombreux autres. L'appui et la promotion de la politique d'activité physique quotidienne en vue de son implantation peuvent être améliorés par le biais de liens plus étroits entre ces deux categories de personnel et des processus de communication innovatrices

Mots clés: évaluation de politique; organisation de programmes scolaires de santé

Introduction

School-based physical activity policies and programs have been shown to be associated with a range of benefits including increased physical activity, fitness and additional health outcomes (Dobbins, Husson, DeCorby, & LaRocca, 2013; Institute of Medicine [IOM], 2013; Kahn et al., 2002). In 2005, the Ontario Ministry of Education (EDU) released Policy/Program Memorandum 138 which required elementary school students in grades 1-8 to "have a minimum of twenty minutes of sustained moderate to vigorous physical activity each school day during instructional time" (Ontario Ministry of Education, 2006, p.6). This policy, known as Daily Physical Activity (DPA) is important since, if implemented consistently, it would contribute to the targeted 60 minutes of moderate to vigorous physical activity per day recommended in Canadian and international guidelines for children and youth (Tremblay et al., 2011). While a number of other provinces have adopted DPA policies (Alberta Education, 2018; British Columbia Ministry of Education, 2018; Nunavut Department of Education, 2018; Olstad, Campbell, Raine, & Nykiforuk, 2015), the Ontario policy is unique in that it specifically states that DPA must be conducted during instructional time.

Previous overview papers, as well as studies conducted on a municipal level, indicate that DPA has not been implemented consistently in Ontario (Patton, 2012; Ramanathan, Allison, Faulkner, & Dwyer, 2008; Robertson-Wilson & Levesque, 2009; Stone, Faulkner, Zeglen-Hunt, & Bonne, 2012). To support evidence-informed decisions and enhance accountability, a joint report by Cancer Care Ontario and Public Health Ontario recommended that the provincial government "evaluate the implementation, feasibility and quality of the daily physical activity policy in Ontario elementary schools, and address the need for continued implementation" (Cancer Care Ontario & Ontario Agency for Health Protection and Promotion, 2012, p.36). To contribute to meeting this need, a series of studies (including the one reported here) was developed to evaluate the factors influencing initial development and implementation, as well as the current status of DPA implementation in Ontario (Allison et al., 2014; Allison et al., 2016; Shah et al., 2017; Allison et al., 2018). A key finding, based on representative sample surveys of elementary school administrators and teachers, was that 61% of administrators indicated that DPA was being implemented in fidelity to the policy requirements, while 50% of teachers indicated that it was being implemented in fidelity with the policy in their classrooms (Allison et al., 2016).

The school is seen as an important setting for facilitating inter-sectoral partnerships and actions to promote adolescent health (Healthy Kids Panel, 2013; IOM, 2013; Lee & Gortmaker, 2012). In Canada, both health and education are provincial responsibilities, with a resulting need for partnership, collaboration, and mutual support between these sectors in relation to school and student health. In the case of the Ontario DPA policy, EDU led the development and supported the initial implementation of DPA. They did this in collaboration with other ministries; however, school boards had the responsibility of implementing it within the education system (Allison et al., 2014).

The public health sector is also an important contributor to school health and well-being policies and programs. Through the Ontario Public Health Standards (OPHS) in place at the time of the study (Ontario Ministry of Health and Long-Term Care

[MOHLTC], 2008), and consistent with the Health Protection and Promotion Act (1990), the 36 Boards of Health in Ontario are responsible for meeting a broad array of requirements related to partnership, collaboration, and chronic disease prevention. Program Standards include working with school boards and schools to promote health policies in a number of topic areas including physical activity (MOHLTC, 2008). Foundational Standards (additional cross-cutting requirements) state that Ontario Boards of Health need to conduct population health assessment and surveillance in relation to a number of topic areas including physical activity (MOHLTC, 2008). Given the requirements specified in the original as well as the recently revised OPHS (MOHLTC, 2018), it is clear that the role and contributions of public health unit (PHU) personnel are potentially supportive of school physical activity policy and program interventions.

The study reported here examines the important question – what is the current role of PHU personnel in promoting, supporting, and monitoring DPA implementation in Ontario school boards and schools? Underlying this question is the extent to which PHU personnel perceive that they are contributing to DPA implementation, and the perceived receptiveness of the education system to contributions of assistance offered to them. In addition to its direct importance to the assessment of DPA implementation in Ontario and relevance to other provincial jurisdictions (Olstad et al., 2015), the current study also relates to broader issues concerning the nature of partnerships (Hunter & Perkins, 2012), collaboration between the health and education sectors, and the factors influencing policy implementation (Brownson, Colditz, & Proctor, 2012; Chaudoir, Dugan, & Barr, 2013; Durlak & DuPre, 2008). For example, while partnerships between public health and other sectors are frequently considered to be key to effective policy development and delivery, this is considered to be challenging and "difficult work" (Hunter & Perkins, 2012). In examining issues of roles and responsibilities, the current study also acknowledges the importance of contextual factors in evaluating complex health interventions (Hawe, 2015).

Method

Participants

To address the research question and related issues a 2013 survey of PHU personnel engaged in physical activity promotion was conducted. Study participants in the sample represented PHU personnel with informed perspectives on how the DPA policy was being implemented in school boards and schools within their geographic area. Participants in the study are described further in the Results section.

Instruments

Development of the online survey instrument was informed, in part, by documentation describing requirements for DPA in Ontario and OPHS guidelines. The instrument was reviewed by EDU personnel, and pilot-tested with research staff and personnel affiliated with PHUs. Both closed-ended (38 items) and open-ended questions (8 items) were included in the instrument, and completion of the online survey was intended to take 20 minutes. Closed-ended questions dealt with PHU personnel roles and experiences in building partnerships and promoting, supporting, and monitoring DPA in school boards and elementary schools in their region, and their perceived capacity to do so. The open-ended items focused on identifying perceived barriers and facilitators to

establishing and monitoring partnerships with school board and school personnel. A summary sample of open- and closed-ended items reported here appears in Table 1.

Table 1
Sample of Survey Items

Topic area	Sample survey question	Response options
Sample characteristics	What is your current title in your public health unit?	o Physical activity specialist/consultant o Health promotion specialist/consultant o School health manager/specialist o Public health nurse o Epidemiologist o Other, please specify _____
Supporting the DPA policy	Please indicate the degree to which you are involved with school boards/schools in any of the following related to DPA *(sample of involvement types listed)*: 1. Planning (at the school board level) 2. Educator training (in the school) 3. Support (e.g., delivery, endorsement, staff involvement) implementation of program activities 4. Monitoring	*The following response options were available for each type of involvement listed* o Not at all o A little bit o Somewhat o Very much o Extensively
Perceived level of DPA implementation	To the best of your knowledge, to what extent is the DPA policy implemented in the schools in your region?	o Not implemented at all o Somewhat implemented o Fully implemented o Don't know
Liaising with school boards and schools	Please indicate the personnel with whom you liaise regarding DPA by indicating how often you liaise with them in general *(sample of personnel types listed)*. 1. Supervisory officer (school board level) 2. Health and physical education consultant/specialist (school board level)	*The following response options were available for each type of personnel listed* o Daily o Weekly o Biweekly o Monthly o Semi-annually o A few times a year o Yearly o Not at all

	3. Principal (school level) 4. Classroom teacher (school level)	
Perceived PHU organizational capacity	A sufficient level of organizational capacity is in place within my public health unit to build partnerships with the school boards and the schools in my region regarding DPA.	o Strongly disagree o Somewhat disagree o Neither agree nor disagree o Somewhat agree o Strongly agree
Barriers and facilitators to establishing and/or maintaining partnerships	Thinking about the partnerships you have with school board and school personnel you liaise with regarding DPA, what do you think is the most important perceived barrier or challenge in establishing these partnerships?	Open-ended response option

Procedure

The study was approved by the University of Toronto Research Ethics Board and contained provisions for obtaining informed consent from participants, including their permission for the research team to report data at an aggregate level. As an initial step in identifying potential study participants, a notification email was sent to Medical Officers of Health in each of the 36 PHUs in Ontario. We subsequently contacted a director or manager in the appropriate department (health promotion; chronic disease prevention; school health) and requested them to designate contact information for up to two personnel involved in physical activity promotion, so that we could invite them to participate in the study. Sixty-five potential participants from PHUs were identified this way. Once we had our contact list, email invitations with a survey link were sent to all 65 contacts through FluidSurveys™, an online survey platform. A reminder email was subsequently sent a week following the initial invitation to those who had not yet participated in the survey. The online survey remained open for four weeks.

Data Analysis

Quantitative data were analyzed descriptively (i.e., frequencies, means, percentages) using SPSS version 21. Chi-square analysis (significance level set at $p<0.05$) was also used to assess potential differences in response by job category of the survey participants. Where >20% of cells had low expected counts, Fisher's Exact test was used. Some response categories were combined for parts of the analysis. Qualitative data, based on open-ended responses to items in the survey, were initially analyzed separately by two members (NS and SS) of the research team. Coding decisions were discussed and resolved jointly with the primary author (KA). Thematic content analysis was then conducted using NVivo10 qualitative research software to manage the data. Based on this analysis, summaries were subsequently developed to illustrate central themes for the current paper.

Analytic Sample

Personnel from 35 of the 36 (97.2%) PHUs participated in the online survey. Two invited participants from one PHU completed the survey together, reducing the total possible sample to 64. We received 56 completions to the survey (87.5% response rate). Participants identified themselves as public health nurses (PHNs) (32.1%), health promotion specialists/consultants (26.8%), school health managers/specialists (19.6%), physical activity specialists/consultants (12.5%), chronic disease and health promotion managers/directors (7.1%), and school board liaison personnel (1.8%). These groups were subsequently combined into three categories for bivariate analysis: health promotion/physical activity specialists (39.3%); PHNs (32.1%) and school health/chronic disease managers/school board liaisons (28.6%). The results from closed-ended questions (quantitative) will be presented first below, followed by results from open-ended questions (qualitative).

Results

Quantitative Results

Supporting the DPA policy. Participants were asked about their degree of involvement in a number of activities related to DPA. Overall, the results indicated a relatively low degree (a little bit/somewhat or not at all) of involvement in these activities. The highest degree of involvement (very much or extensively) was reported to be in: promotion, partnership development, supporting school initiatives to foster student leadership, supporting implementation of program activities, and support for access to equipment. However, even for these activities, less than 30.0% of participants were involved at this level. Participants reported very little involvement (a little bit/somewhat or not at all) in activities related to monitoring or evaluating the policy or for board-level, planning or training or coordinating programs in the community. As a general pattern, the findings indicated higher levels of involvement among school health/chronic disease managers, although these differences were significant ($p<0.05$) only in the case of planning at the school board level, with differences in involvement in evaluation approaching significance ($p=0.05$) (Table 2).

Perceived level of DPA implementation. Many participants (76.8%) reported that, to the best of their knowledge, DPA was somewhat implemented in schools in their region, while only 5.4% of participants reported it to be fully implemented and 16.1% did not know. There were no significant differences in the perceived degree of implementation by job category of the survey participants.

Table 2
Participant Involvement in Activities Related to Supporting DPA, by Job Category

Activities and level of involvement	Percentage involved[a] (%)				Fisher's Exact[e]	*p*-value
	Overall	Manager[b]	Nurse[c]	Specialist[d]		
Promotion					7.516	0.098
Very much/extensively	29.1	43.8	23.5	22.7		
A little bit/somewhat	58.1	56.3	70.6	50.0		
Not at all	12.7	0.0	5.9	27.3		
Partnership development					2.699	0.626
Very much/extensively	26.4	33.3	31.3	18.2		
A little bit/somewhat	50.9	40.0	43.8	63.6		
Not at all	22.6	26.7	25.0	18.2		
Support DPA school initiatives to foster student leadership					7.648	0.089
Very much/extensively	25.5	31.3	17.6	27.3		
A little bit/somewhat	61.8	68.8	76.5	45.5		
Not at all	12.7	0.0	5.9	27.3		
Support implementation of program activities					6.366	0.172
Very much/extensively	23.6	25.0	17.6	27.3		
A little bit/somewhat	60.0	75.0	64.7	45.5		
Not at all	16.4	0.0	17.6	27.3		
Support access to physical activity equipment					2.696	0.651
Very much/extensively	20.0	31.3	17.6	13.6		
A little bit/somewhat	61.8	50.0	70.6	63.6		
Not at all	18.2	18.8	11.8	22.7		
School-level educator training					1.574	0.853
Very much/extensively	12.7	18.8	11.8	9.1		
A little bit/somewhat	40.0	37.5	47.1	36.4		
Not at all	47.3	43.8	41.2	54.5		

Resource development					7.438	0.099
Very much/extensively	12.5	18.8	16.7	4.5		
A little bit/somewhat	57.2	68.8	61.1	45.5		
Not at all	30.4	12.5	22.2	50.0		
Evaluation					8.741	0.050
Very much/extensively	10.7	25.0	5.6	4.5		
A little bit/somewhat	26.8	25.0	44.4	13.6		
Not at all	62.5	50.0	50.0	81.8		
Coordinating programs within community					6.610	0.133
Very much/extensively	9.4	20.0	0.0	9.1		
A little bit/somewhat	41.6	53.3	31.3	40.9		
Not at all	49.1	26.7	68.8	50.0		
Planning at school board level					13.834	0.003**
Very much/extensively	5.6	13.3	0.0	4.5		
A little bit/somewhat	42.6	66.7	52.9	18.2		
Not at all	51.9	20.0	47.1	77.3		
Regional/Board-wide educator training					1.320	1.000
Very much/extensively	3.8	6.7	0.0	4.5		
A little bit/somewhat	47.1	46.7	50.0	45.5		
Not at all	49.1	46.7	50.0	50.0		
Monitoring					5.079	0.230
Very much/extensively	1.9	0.0	0.0	4.5		
A little bit/somewhat	31.5	50.0	18.8	27.3		
Not at all	66.7	50.0	81.3	68.2		

[a] Percentages may not equal 100% due to rounding. [b] Manager includes school health manager/specialist and/or school board liaison and/or chronic disease and health promotion manager/director. [c] Nurse indicates public health nurse. [d] Specialist includes health promotion and/or physical activity specialist/consultant. [e] Fisher's exact test value used due to low expected counts in > 20% of cells in each crosstab.

** $p < .01$

Liaising with school boards and schools. On a school board relationship level, over half (56.9%) of participants indicated that they liaised with Health and Physical Education (HPE) consultants/specialists regarding DPA, while 46.0% indicated that they liaised with supervisory officers and 16.2% with other school board personnel within the year. On a school relationship level, 65.3% of participants reported that they liaised with principals, 61.7% with classroom teachers, 57.8% with vice-principals, and 51.2% with HPE consultants/specialists within the year. For the most part, there were no significant differences by job category of the survey participants. However, there was a significant difference ($p<0.05$) between liaising with school board supervisory officers and job category of the survey respondents, with a higher percentage of school health/chronic disease managers reporting liaising with the supervisory officers than for the other two job categories of survey participants (Table 3).

Perceived PHU organizational capacity. Many participants agreed somewhat (42.9%) or strongly (28.6%) that a sufficient level of organizational capacity is in place within their PHU to build partnerships with the school boards and schools regarding DPA. However, fewer participants agreed somewhat (39.8%) or strongly (19.6%) with a similar statement about PHU organizational capacity to support the implementation of DPA in schools. There were no significant differences in perceived PHU organizational capacity to build partnerships or support DPA implementation by job category of the participants.

Table 3
Participant Liaison with School Board and School Personnel, by Job Category

School board/school personnel	Percentage liaising[a] (%)				χ^2	*p*-value
	Overall	Manager[b]	Nurse[c]	Specialist[d]		
School principal					2.867	0.242
At least once within the year	65.3	71.4	78.6	52.4		
Not at all	34.7	28.6	21.4	47.6		
Classroom teacher					0.941	0.646
At least once within the year	61.7	61.5	71.4	55.0		
Not at all	38.3	38.5	28.6	45.0		
School vice-principal					6.066	0.052
At least once within the year	57.8	69.2	76.9	36.8		
Not at all	42.2	30.8	23.1	63.2		
School board HPE consultant/specialist					3.839	0.154
At least once within the year	56.9	76.9	58.8	42.9		
Not at all	43.1	23.1	41.2	57.1		
School HPE consultant/specialist					1.785	0.467
At least once within the year	51.2	50.0	66.7	42.1		
Not at all	48.8	50.0	33.3	57.9		
School board supervisory officer					6.934	0.036*
At least once within the year	46.0	76.9	31.3	38.1		
Not at all	54.0	23.1	68.8	61.9		

[a] Percentages may not equal 100% due to rounding. [b] Manager includes school health manager/specialist and/or school board liaison and/or chronic disease and health promotion manager/director. [c] Nurse indicates public health nurse. [d] Specialist includes health promotion and/or physical activity specialist/consultant.
* $p > .05$

Qualitative Results

Participants identified numerous barriers and facilitators to establishing and/or maintaining partnerships with school boards and/or schools (school community). Six themes emerged from our analysis of responses to the open-ended questions dealing with these barriers and facilitators. These themes, summarized below, are labeled as barriers, though we include examples of factors reported as facilitating partnerships as well.

Lack of Accountability. Respondents indicated a lack of accountability by school boards and schools to the EDU and a lack of monitoring and evaluation as barriers to establishing and maintaining partnerships with the school community. A lack of ownership and responsibility was said to result in the policy not being enforced. Conversely, ongoing, mutual commitment to DPA from the top (i.e., Ministry of Health and Long-term Care [MOHLTC], EDU, school boards) was reported to facilitate partnerships.

Inconsistent Relationships. Lack of a consistent working relationship between provincial ministries (MOHLTC and the EDU) was perceived to impede partnerships with the school community as this relationship is needed to develop projects that are relevant, achievable, and sustainable. A lack of communication between PHUs and school community staff was also seen as a barrier to establishing and maintaining partnerships, and considered to be partly due to disinterest or competing priorities within school communities.

Conversely, other respondents indicated that PHUs having ongoing, supportive, and personal relationships with schools/school boards and knowing one another's strengths and weaknesses were reported to facilitate partnerships. Relationships built on credibility, regular communication, and accessibility to schools were also reported to facilitate partnerships. Additionally, participants felt that building trust with school board and school staff is crucial for successful partnerships.

Uneven Engagement of Personnel. Participants indicated that, depending on personalities and engagement within a specific setting, schools may not be interested in accessing PHU support. Additionally, a lack of passion for physical activity among school staff, difficulty in finding committed champions, and the lack of physical education specialists and public health nurses in schools were all reported as barriers. Conversely, respondents indicated that having and retaining a physical activity champion or specialist within the school community facilitates partnerships. Having a dedicated physical activity liaison person between PHUs and the school community, such as a PHN, was also reported to be useful.

Lack of Resources. A lack of resources was reported to impede partnerships with the school community. Examples include a lack of: school staff training to implement the policy, sustainable funding, time to address school priorities, and time on the PHU side to continuously nurture and prioritize these partnerships. Additionally, a lack of resources to implement DPA was also discussed as a barrier, including resource expectations from schools to support DPA, which PHUs are not always able to do in a sustainable manner. Without these resource incentives, it was reported to be difficult to establish and maintain partnerships.

Conversely, providing quality resources and ongoing training to support DPA were reported as facilitating partnerships. Similarly, time to establish and maintain relationships with school personnel and time to dedicate to support DPA were reported as

partnership facilitators. Support from the school boards for programs/ideas and collaborative support from the Director of Education in school boards and the Medical Officer of Health in PHUs provide further partnership facilitation.

PHU-related Factors. PHU-related factors were also discussed as barriers to partnerships. A lack of understanding from the school community as to what PHUs' role is when it comes to supporting DPA, including not understanding that it is part of their mandate to work with schools, has proven to be challenging. While PHUs are mandated to work with school boards/schools, school boards/schools are not mandated to work with PHUs—and this non-reciprocal mandate was reported to be a key barrier to partnerships. Staff turnover was also identified as a barrier, as relationships need to be re-established when personnel changes occur in school boards and schools, and these changes may occur frequently (e.g., every 1-2 years). Insufficient PHU capacity was also reported.

Respondents also reported PHU-related facilitators to partnerships, such as clarifying PHUs' role in supporting DPA and making the school community aware that the PHU is a resource and source of new ideas. Consistency was also reported to be key for partnership success, exemplified by stable staffing and practice over time. It was also reported that it is necessary to respect the school community boundaries in order to avoid being seen as the 'DPA police.' While mandating schools to work with PHUs has not occurred, some respondents indicated that this would facilitate partnerships.

Implementation Context. The policy implementation context was also discussed. A lack of alignment between public health and school priorities was reported. School boards/schools have competing priorities, and as a result, DPA sits lower on the priority list compared to, for example, literacy and numeracy, and bullying prevention. Participants reported that priorities and school culture are frequently determined by the administrator, so partnerships can go either way. Partnerships depend on what school boards/schools are looking for support in. It was reported that there has been a lack of interest in DPA, resulting in fewer requests for support from PHUs. The political climate during the survey year regarding the teacher unions was also reported to further complicate partnerships and decrease DPA implementation.

Finally, participants indicated that positioning DPA as a priority, if coming from school board and school administrators, facilitates partnerships. Additionally, it was felt that a link between DPA and benefits in numeracy/literacy or mental health may increase the priority of DPA. Offering support, resources, and training that are relevant to school board and school priorities were reported to help strengthen relationships.

Discussion

Results of our study indicate relatively low PHU personnel levels of involvement in supporting DPA, particularly in those activities that involve planning, monitoring and evaluation. Perceived barriers to establishing and maintaining partnerships with school board and school personnel partly explain low involvement. Such themes as lack of accountability, inconsistent relationships, uneven engagement of personnel, lack of resources, PHU-related factors, and implementation context emerged in our analysis, supported by a number of illustrations of each. These suggest possible underlying factors that may influence and contextualize the specific barriers cited by participants.

It is important to reiterate that the health and education sectors in Ontario (and Canada overall) represent large political and bureaucratic entities charged with provincial responsibility for these areas. As mentioned earlier in this paper, within the health system, public health is governed by the OPHS, which specifies extensive responsibilities for boards of health (and PHUs) to work with the education system in promoting student physical activity and many other health-related activities (healthy eating, growth and development, immunizations) in school boards and schools (MOHLTC, 2008). In this regard, DPA is one of many examples of school-based policies and programs which PHUs are mandated to support. Many of the themes emerging from our analysis of perceived barriers exemplify and reflect the complexities and challenges for both sectors. From the PHU side, the multiple demands of the OPHS requirements make devoting attention to one specific policy/curriculum requirement (e.g., DPA) difficult when many other content areas also require attention. PHU personnel participating in the study perceive that their school board and school counterparts are limited by their own institutional requirements to deliver high quality academic content and periodic shifts in the education system's expectations for emphasis on other important health-related priorities (substance use, bullying, mental health) which serve to compete with consistent delivery of DPA. Moreover, there is no reciprocal requirement for school board and school personnel to work with their counterparts in public health or to accept their offers of assistance. These findings are consistent with those of a study of public health partnerships in the UK in which such factors as a "silo mentality" and frequent central government changes in priorities negatively affected development and maintenance of successful inter-jurisdictional relationships and partnerships (Hunter & Perkins, 2012).

Given the challenges and complexities identified, what positive steps can be taken to enhance the role of PHU personnel in promoting and supporting DPA in Ontario school boards and schools? In addition to the specific facilitating factors mentioned by participants, we are aware of several recent and positive examples at the provincial and regional/local levels of institutional support for a search for common ground. At the provincial level, the EDU's Healthy Schools and Student Well-Being Unit of the Learning Environment Branch has revised their Foundations of a Healthy School framework, a document which exemplifies inter-sectoral interest in health (including physical activity) (Ontario Ministry of Education, 2014). Also, in 2014, both EDU and MOHLTC were provided with provincial government mandates to address the need for a school-based initiative to provide 60 minutes of physical activity (including before and after school as well as during instructional time) to students in elementary and secondary schools, indicating the need to enhance partnerships at this level (Ontario Office of the Premier, 2014).

Participants mentioned development of a recent mechanism to facilitate inter-sectoral partnerships around school health. On a regional and (in some cases) local level, joint meetings of representatives of the Council of Medical Officers of Health (COMOH) and the Council of Directors of Education (CODE) indicate important steps to enhance joint communication and progress in addressing school health priorities that rely on cooperation and collaboration between public health and school boards. Partnerships at this level should have positive influences on the potential for PHU personnel to enhance support of school boards and schools in relation to DPA and other health promoting initiatives.

Another positive approach is alignment of the importance of regular school-based physical activity (including DPA) with other priorities of the education system. For example, increasing evidence suggests a positive association of physical activity and fitness with student academic achievement, increased concentration, self-esteem, and improved mental health (Broshnahan, Steffen, Lytle, Patterson, & Boostrom, 2004; Ekeland, Heian, Hagen, Abbott, & Nordheim, 2004; Fedewa & Ahn, 2011; Lees & Hopkins, 2013; Ontario Ministry of Education, 2017; Rasberry et al., 2011). PHU personnel can continue to provide an important role in working with school boards and schools (as well as communities and families) to translate and disseminate this evidence in concrete ways that will influence school-based opportunities, policies, and practice.

The current study contributes to our understanding of several organization-level factors influencing implementation of the DPA policy in Ontario. Findings from recent surveys of Ontario school administrators and teachers to assess the status of DPA implementation fidelity in provincial elementary and middle schools (Allison et al., 2016), combined with the findings from the current study and an earlier study of the factors influencing DPA policy development and implementation (Allison et al., 2014), present a more complete picture of the status of DPA in Ontario. These studies contribute to the emerging knowledge base in the related fields of implementation science (Brownson et al., 2012), partnerships (Hunter & Perkins, 2012), and evaluation of complex interventions (Hawe, 2015). In addition, these studies provide evidence for consideration by those responsible for implementing and evaluating policy and program interventions in Ontario and, potentially, other jurisdictions.

Limitations

A number of study limitations, including a relatively small sample size, limit conducting more detailed analysis of the findings. However, we believe that our findings are representative of those PHU personnel most involved in promoting and supporting DPA in Ontario schools. Personnel from almost all (35 of 36 public health units in the province) completed the survey and the participant response rate was 87.5%. Moreover, these individuals were designated by their PHU as being most informed about the roles and experiences of PHU personnel in relation to promotion and support of DPA in school boards and schools. Another limitation is that the data provided were based on self-reported perceptions of PHU personnel and were not validated using other measures.

Finally, these perspectives of survey participants could be considered to be "one-sided" in that they reflected the perceptions and opinions of PHU personnel, not school board or school personnel. However, as mentioned, our provincial study of school administrators and classroom teachers provided additional context, as well as specific insights, on the factors (including perceived barriers) influencing DPA implementation (Allison et al., 2016).

Conclusions

In conclusion, we believe that findings from this study have contributed to a fuller understanding of the complex factors influencing the degree to which PHU personnel currently support DPA policy implementation in Ontario elementary schools. While there appear to be several contextual and institutional barriers to supporting DPA through

PHU-school board/school partnerships, there are also positive examples of how PHU personnel roles can help facilitate greater inter-sectoral partnerships and other system-level changes, with the goal of full DPA implementation in the future.

Implications for Policy and Future Research

We believe our study has relevance to understanding the complexities and challenges of education-health partnerships both in relation to other specific health issues and at additional jurisdictional levels (local/regional, provincial/state, national). Establishing positive and mutually supportive relationships between education and health sectors has the potential for enhancing school health policies to increase opportunities for physical activity and other school-based initiatives. Such policies and programs are central to the goals of health equity by attempting to "level the playing field" for students in terms of health promoting opportunities. Such initiatives will be strengthened by high level cooperation, communication and collaboration by decision makers, as illustrated in this study.

Future research on the status of DPA, and related policies and programs, should examine the extent to which changes in provincial political leadership (which transpired in 2018 in Ontario for example) influence these initiatives – either by strengthening or diminishing support for them. The relation between political decisions and the status of health and education policies continues to be a key issue in relation to school health and student well-being.

Acknowledgements

The authors would like to acknowledge Public Health Ontario for funding the study. Special thanks to the personnel from Ontario's public health units participating in the study.

References

Alberta Education. (2018). *Daily Physical Activity (DPA) Initiative.* Retrieved from https://education.alberta.ca/daily-physical-activity-dpa-initiative/program-supports/?searchMode=3

Allison, K. R., Schoueri-Mychasiw, N., Robertson, J., Hobin, E., Dwyer, J. J., & Manson, H. (2014). Development and implementation of the Daily Physical Activity policy in Ontario, Canada: A retrospective analysis. *PHEnex Journal, 6*(3), 1-18. Retrieved from http://ojs.acadiau.ca/index.php/phenex/article/view/1548/1300

Allison, K. R., Vu-Nguyen, K., Ng, B., Schoueri-Mychasiw, N., Dwyer, J. J. M., Manson, H., . . . Robertson, J. (2016). Evaluation of Daily Physical Activity (DPA) policy implementation in Ontario: Surveys of elementary school administrators and teachers. *BMC Public Health, 16,* 746. http://doi.org/10.1186/s12889-016-3423-0

Allison, K.R., Philipneri, A.N., Vu-Nguyen, K., Manson, H.E., Dwyer, J.J.M., Hobin, E. . . . Li, Y. (2018). School and classroom effects on Daily Physical Activity (DPA) policy implementation fidelity in Ontario classrooms: A multi-level analysis. *BMC Public Health, 18,* 802. https://dx.doi.org/10.1186%2Fs12889-018-5720-2

British Columbia Ministry of Education. (2018). *Daily Physical Activity.* Retrieved from: https://www2.gov.bc.ca/gov/content/education-training/administration/legislation-policy/public-schools/daily-physical-activity?keyword=daily&keyword=physical&keyword=activity

Brosnahan, J., Steffen, L. M., Lytle, L., Patterson, J., & Boostrom, A. (2004). The relation between physical activity and mental health among Hispanic and non-Hispanic white adolescents. *Archives of Pediatrics & Adolescent Medicine, 158*(8), 818-823. https://doi.org/10.1001/archpedi.158.8.818

Brownson, R. C., Colditz, G. A., & Proctor, E. K. (Eds.). (2012). *Dissemination and implementation research in health: Translating science to practice*. New York, NY: Oxford University Press, Inc.

Cancer Care Ontario & Ontario Agency for Health Protection and Promotion. (2012). *Taking action to prevent chronic disease: Recommendations for a healthier Ontario.* Toronto, ON: Queen's Printer for Ontario; 2012. Retrieved from Cancer Care Ontario website: https://www.cancercare.on.ca/common/pages/UserFile.aspx?fileId=125697 21.

Chaudoir, S. R., Dugan, A. G., & Barr, C. H. (2013). Measuring factors affecting implementation of health innovations: a systematic review of structural, organizational, provider, patient, and innovation level measures. *Implementation Science, 8*(22), 1-20. http://doi.org/10.1186/1748-5908-8-22

Dobbins, M., Husson, H., DeCorby, K., & LaRocca, R. L. (2013). School-based physical activity programs for promoting physical activity and fitness in children and adolescents aged 6 to 18. *Cochrane Database of Systemic Reviews, 2*, 1-260. https://doi.org/10.1002/14651858.CD007651.pub2

Durlak, J. A. & DuPre, E. P. (2008). Implementation matters: A review of research on the influence of implementation on program outcomes and the factors affecting implementation. *American Journal of Community Psychology, 41*(3), 327-350. https://doi.org/10.1007/s10464-008-9165-0

Ekeland, E., Heian, F., Hagen, K. B., Abbott, J., & Nordheim, L. (2004). Exercise to improve self-esteem in children and young people. *Cochrane Database of Systematic Reviews,* (1) Art No.: CD003683. https://doi.org/10.1002/14651858.CD003683.pub2

Fedewa, A.L. & Ahn, S. (2011). The effects of physical activity and physical fitness on children's achievement and cognitive outcomes: A meta-analysis. *Research Quarterly for Exercise and Sport, 82*(3), 521-535. https://doi.org/10.1080/02701367.2011.10599785

Hawe, P. (2015). Lessons from complex interventions to improve health. *Annual Review of Public Health, 36,* 307-323. https://doi.org/10.1146/annurev-publhealth-031912-114421

Health Promotion and Protection Act, R.S.O. c. H.7. (1990, c.H.7). Retrieved from: https://www.ontario.ca/laws/statute/90h07Healthy Kids Panel. (2013). *No Time to Wait: The Healthy Kids Strategy*. Toronto, ON: Queen's Printer for Ontario. Retrieved from: http://www.health.gov.on.ca/en/common/ministry/publications/reports/healthy_kids/healthy_kids.pdf

Hunter, D. & Perkins, N. (2012). Partnership working in public health: The implications for governance of a systems approach. *Journal of Health Services Research & Policy, 17*(Suppl 2), 45-52. https://doi.org/10.1258/jhsrp.2012.011127

Institute of Medicine. (2013). *Educating the student body: taking physical activity and physical education to school*. Washington, DC: The National Academies Press.

Kahn, E. B., Ramsey, L. T., Brownson, R. C., Heath, G. W., Howze, E. H., Powell, K. E., . . . Corso, P. (2002). The effectiveness of interventions to increase physical activity. A systematic review. *American Journal of Preventive Medicine, 22*(4 Suppl), 73-107.

Lee, R. & Gortmaker, S. L. (2012). Health dissemination and implementation within schools. In R. C. Brownson, G. A. Colditz, & E. K. Proctor (Eds.), *Dissemination and implementation research in health* (pp. 401-416). New York, NY: Oxford University Press.

Lees, C. & Hopkins, J. (2013). Effect of aerobic exercise on cognition, academic achievement, and psychosocial function in children: A systematic review of randomized control trials. *Preventing Chronic Disease, 10*, E174. https://dx.doi.org/10.5888%2Fpcd10.130010

Nunavut Department of Education. (2018). *Physical Education Grade 3*. Retrieved from: https://www2.gov.bc.ca/gov/content/education-training/administration/legislation-policy/public-schools/daily-physical-activity?keyword=daily&keyword=physical&keyword=activity

Olstad, D. L., Campbell, E. J., Raine, K. D., & Nykiforuk, C. I. (2015). A multiple case history and systematic review of adoption, diffusion, implementation and impact of provincial daily physical activity policies in Canadian schools. *BMC Public Health*, *15*, 385. http://doi.org/10.1186/s12889-015-1669-6

Ontario Ministry of Education. (2006). *Healthy schools resource guide: daily physical activity in schools, guide for school principals*. Toronto: Queen's Printer for Ontario. Retrieved from: http://www.edu.gov.on.ca/eng/teachers/dpa_principals.pdfOntario Ministry of Education. (2014). *Foundations for a healthy school: Promoting well-being is part of Ontario's Achieving Excellence Vision.* Toronto, ON: Queen's Printer for Ontario. Retrieved from http://www.edu.gov.on.ca/eng/healthyschools/resourceF4HS.pdf

Ontario Ministry of Education. (2017). *Revised policy/program memorandum for daily physical activity.* Toronto, ON: Queen's Printer for Ontario. Retrieved from http://www.edu.gov.on.ca/extra/eng/ppm/138.html

Ontario Ministry of Health and Long-Term Care. (2008). *Ontario public health standards.* Toronto, ON: Queen's Printer for Ontario.

Ontario Ministry of Health and Long-Term Care. (2018). *Ontario public health standards: Requirements for programs, services and accountability.* Toronto, ON: Queen's Printer for Ontario. Retrieved from: http://health.gov.on.ca/en/pro/programs/publichealth/oph_standards/docs/protocols_guidelines/Ontario_Public_Health_Standards_2018_en.pdf

Ontario Office of the Premier. (2014, September 25). [Letter to The Honourable Liz Sandals]. 2014 Mandate letter: Education. Toronto, ON. Retrieved from: https://www.ontario.ca/page/2014-mandate-letter-education

Patton, I. (2012). *School-based physical activity in children: An evaluation of the Daily Physical Activity program in Ontario elementary schools* (Doctoral thesis, The University of Western Ontario, London, Canada). Retrieved from https://ir.lib.uwo.ca/cgi/viewcontent.cgi?article=1929&context=etd

Ramanathan, S., Allison, K. R., Faulkner, G., & Dwyer, J. J. (2008). Challenges in assessing the implementation and effectiveness of physical activity and nutrition policy interventions as natural experiments. *Health Promotion International. 23*(3), 290-297. https://doi.org/10.1093/heapro/dan022

Rasberry, C. N., Lee, S. M., Robin, L., Laris, B. A., Russell, L. A., Coyle, K. K., & Nihiser, A. J. (2011). The association between school-based physical activity, including physical education, and academic performance: A systematic review of the literature. *Preventive Medicine, 52*(Suppl 1), S10-20. https://doi.org/10.1016/j.ypmed.2011.01.027

Robertson-Wilson, J. E. & Lévesque, L. (2009). Ontario's daily physical activity policy for elementary schools: Is everything in place for success? *Canadian Journal of Public Health, 100*(2), 125-129. http://dx.doi.org/10.17269/cjph.100.1769

Shah, S., Allison, K. R., Schoueri-Mychasiw, N., Pach, B., Manson, H., & Vu-Nguyen, K. (2017). A review of implementation outcome measures for school-based physical activity interventions. *Journal of School Health, 87*(6), 474-486. https://doi.org/10.1111/josh.12514

Stone, M. R., Faulkner, G. E., Zeglen-Hunt, L., & Bonne, J. C. (2012). The Daily Physical Activity (DPA) policy in Ontario: Is it working? An examination using accelerometry-measured physical activity data. *Canadian Journal of Public Health, 103*(3), 170-174. http://dx.doi.org/10.17269/cjph.103.3108

Tremblay, M. S., Warburton, D. E. R., Janssen, I., Paterson, D. H., Latimer, A. E., Rhodes, R. E., Duggan, M. (2011). New Canadian physical activity guidelines. *Applied Physiology, Nutrition, and Metabolism, 36*(1), 36-46. https://doi.org/10.1139/H11-009