

Facilitators and Barriers to Adopting Evidence-Based Physical Education in Elementary Schools

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Background: Evidence-based physical education (EBPE) programs have increased physical activity (PA) by as much as 18%, yet widespread adoption has not occurred. Understanding school facilitators and barriers to PE should prove useful to EBPE dissemination efforts. **Methods:** Pairs of principals and PE teachers from 154 schools (75 Adopters and 79 Non-Adopters) from 34 states completed questionnaires. Differences between Adopter and Non-Adopter schools were tested using *t* tests or Wilcoxon Signed Rank Tests and chi-square analyses. **Results:** Principals and teachers reported distinct PE curriculum adoption decision making roles, but few viewed themselves as very involved in program evaluation. Teachers in Adopter schools were more satisfied with PE program outcomes and had greater involvement in teacher evaluation and program decision making. Compared with teachers, principals were generally more satisfied with their school's PE program outcomes and did not share the same perceptions of PE barriers. However, principals also demonstrated a general lack of PE program familiarity. **Conclusions:** To facilitate EBPE adoption, dissemination efforts should target both principals and PE teachers. Increasing principal's knowledge may be instrumental in addressing some teacher perceptions of barriers to PE. Strategic advocacy efforts, including targeting policies that require PE program evaluation, are needed.

Keywords: physical education, curriculum, physical activity, health related outcomes

National data suggest sizeable percentages of children do not engage in sufficient physical activity (PA) for health purposes,^{1,2} and there is increased concern about their overweight and obesity.³⁻⁵ School physical education (PE) is highly recommended as a program for providing and promoting PA.^{6,7} In the United States, PE is an important component of coordinated and comprehensive school health programs,^{8,9} and it is mandated as a curriculum area in nearly all 50 states.¹⁰ Required PE is one of the few settings where children, particularly those from socioeconomically disadvantaged families, can accrue substantial minutes of moderate-to-vigorous physical activity (MVPA) and learn important generalizable movement and behavioral skills. As such, numerous agencies, organizations, and other entities concerned for public health support daily PE,^{8,10-13} and *Healthy People 2010*⁴ recommends that PE provide classes that engage students in PA at least 50% of lesson time.

National standards for K-12 PE programs exist,¹⁴ but they are written both broadly and generally and accommodate a wide spectrum of educational philosophies and practices. Providing and promoting health-related PA is

only one of the many education goals of PE, which also has expectations for children's motor skill, cognitive, social, and emotional outcomes.¹⁴ Numerous curriculum models, including developmental education, humanistic education, movement education, kinesiological studies, play education, and personal meaning are common in PE.^{15,16} Thus, the reality is that many PE programs do not emphasize the public health goals of promoting physical activity.^{17,18}

Because it has so many objectives, physical education has been criticized as having a "muddled mission."¹⁹ Meanwhile some professionals¹⁹⁻²¹ have promoted the concept of "health optimizing physical education" (HOPE), which has as its main goal the development of lifelong PA. Because of its public health focus, HOPE offers a substantial redirection from the broad-based perspective of PE; it prioritizes motivating students to engage in PA both during and outside of class time. While these goals may be found in other programs to some extent, HOPE programs emphasize providing enjoyable experiences during which students learn generalizable movement and behavioral skills that transfer into diverse activity opportunities offered at school, in the community, and later in life.¹⁹⁻²¹

PE is currently often marginalized in schools, and suffers from insufficient curriculum time allocations, low subject status and esteem, and inadequate financial and personnel resources.^{10,16} As a result, PE programs are challenged in their ability to contribute meaningfully to

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public health goals and they rarely engage children sufficiently to reach national recommendations for PA.^{17,18,22,23} Within the context of these challenges, several large-scale school health and physical activity studies have been conducted. These studies have been rigorously designed with interventions that were multifaceted and often included the development and evaluation of HOPE programs (eg, SPARK, CATCH, and Planet Health).^{24–26} Compared with the ‘typical’ PE taking place in measurement-only schools which served as controls, MVPA in PE classes in intervention schools increased by as much as 18%, without increasing the frequency or duration of lessons.^{27–29} These studies have produced compelling evidence that HOPE programs can increase PA and contribute more to public health goals than PE programs in control schools. The adoption and maintenance of these “evidence-based” programs has been closely linked with the availability of support for PE by the principal and other teachers in the school.^{30–32}

The Partnership for Prevention recently released a new tool, “Working with Schools to Increase Physical Activity Among Children and Adolescents in Physical Education Classes—An Action Guide”.⁸ This Action Guide indicates that PE classes can be enhanced by changing curricula, teaching practices, or policies to increase levels of physical activity and improve physical fitness. It advises implementing an evidence-based PE curriculum that increases students’ physical activity levels. Evidence-based PE (EBPE) programs are those that have a substantial research base for improving health-related behavior or outcomes. The Action Guide^{8, p.13} identified 3 evidence-based programs which were available for dissemination nationwide (ie, SPARK PE, CATCH PE, and Planet Health).

While these EBPE programs have been shown to be feasible and effective, they will have little impact if they are not used in schools. The process of getting others to use innovations and programs is referred to as *diffusion of innovations* and it includes distinct stages of dissemination, adoption, implementation, and institutionalization.³³ *Dissemination* is the process of creating an awareness of programs among the targeted population (eg, elementary schools) and includes informing stakeholders (eg, school principals, PE teachers) about the innovation as well as persuading them to try it. *Adoption* is the decision by an entity (eg, school district, individual schools or teachers) to commit to a program, usually identified as the purchase of program materials (eg, an active PE curriculum) or training (eg, teacher staff development). *Implementation* is the process by which the adopter actually carries out the program, and *institutionalization* is the integration of the intervention into the culture of the institution through continued program implementation and practice.

Studies have previously examined the implementation and institutionalization of EBPE,^{27,30–32} but their dissemination and adoption of programs is not well understood. Few studies have examined whether schools are aware of EBPE or the conditions which might inspire or stifle school decisions to adopt such programs. Therefore, the purposes of this study were to describe facilitators and obstacles to the adoption of EBPE in a sample

of elementary school principals and PE teachers and to compare and contrast perceived facilitators and obstacles to the adoption of EBPE in schools that *had* adopted and *had not* adopted EBPE.

Methods

Study Design and Participants

We used a static group comparison design in which principal and PE teacher questionnaire responses from elementary schools that had adopted one of three EBPE programs⁸ (ie, SPARK, CATCH, or Planet Health; referred to as “Adopters”) were compared with principal and teacher responses from similar schools that had not adopted those EBPE programs (ie, “Non-Adopters”). School participation required that the PE teacher and the principal complete questionnaires independently. School principals and PE teachers were selected because previous work showed these were the most influential people associated with PE policy and program implementation in schools.^{31,34–37} The study methodology was approved by a university institutional review board.

To help identify schools that had adopted EBPE, we enlisted assistance from SPARK Programs to obtain a list of elementary schools that had adopted SPARK within the past 2 years. Schools from this list were randomized within states and selected to participate in an effort to approximate the distribution of elementary schools among states. All “Adopter” schools had acquired EBPE curriculum/educational materials, participated in at least 1 full day of staff development, and received follow-up support/consultation. These 3 components have been documented as important parts of school-based interventions in effectiveness studies, and have been field-tested since 1994. In contrast, “Non-Adopters” were operationally defined as schools that have not adopted the SPARK, CATCH, or Planet Health programs. Non-Adopter schools were selected from National Center for Education Statistics (NCES) web site, and an effort was made to match Non-Adopter schools with Adopter schools on location, size, and community socioeconomic status. In some cases, schools selected from the NCES website were using an EBPE program (ie, SPARK, CATCH, or Planet Health), and in these instances were retained as participants and identified as “Adopters.”

To recruit schools, the teacher and principal were first contacted by phone. If verbal agreement to participate was obtained, an informed consent form and the questionnaire were sent via e-mail or facsimile; participants had the option to return completed questionnaires electronically or by facsimile. Upon receipt of a completed teacher and principal questionnaire from a school, a \$50 voucher to purchase physical education equipment was sent to the principal.

Instrumentation

Questionnaires used previously to assess teachers’ and administrators’ perceptions of school PE³⁷ were refined to focus on key hypothesized facilitators and barriers to

the adoption of EBPE. The questionnaire included items addressing Involvement in PE Policy (6 items; 5-point scale with anchors of “not involved” to “very involved”); Satisfaction with Current PE (7 items; 5-point scale with anchors of “very dissatisfied” to “very satisfied”); Beliefs about the Adoption of PE Curricula (16 items; 5-point scale with anchors of “not at all important” to “very important”); Barriers to PE Program Implementation (10 items; 5-point scale with anchors of “not a barrier” to “tremendous barrier”); and PE Stakeholder Influences (9 items; 5-point scale with anchors of “not at all influential” to “very influential”). Before conducting the study, an advisory board consisting of an elementary PE teacher, an elementary school principal, a school board member, and a school district PE curriculum director, reviewed the 2 sets of questionnaires for completeness and content validity.

Data Analyses

All data analyses were performed in SAS Version 9.12. Descriptive statistics for continuous variables were calculated using an appropriate measure of central tendency (mean or median) and variability (standard deviation and interquartile range [IQR]). Categorical variables were described using percentages. Differences between

Adopter and Non-Adopter schools were tested using *t* tests for independent samples or Wilcoxon Signed Rank Tests (continuous outcomes) and chi-square analyses (categorical outcomes). Within-school differences in the teacher and principal responses were tested using McNemar’s tests. Significance was set at an alpha level of .05.

Results

Adopter and Non-Adopter School Profiles

Principal and PE teacher pairs from 154 schools (75 Adopter, 79 Non-Adopter) from 34 states completed questionnaires. The descriptive characteristics of the Adopter and Non-Adopter schools are shown in Table 1. There were no significant differences by school type with respect to student enrollment numbers, student minority status, proportion of students eligible for free/reduced meal plans, number of PE specialists, teacher background and training, number of days of PE per week, PE class size, and resources including annual budget and facilities. The only exception was that a significantly greater proportion of Adopter schools had a gymnasium. Thus, Adopter and Non-Adopter schools did not differ substantially on potential confounders related to the adoption of EBPE.

Table 1 Demographic Characteristics of Adopter and Non-Adopter Schools

Element	Adopter Schools (N = 75)	Non-Adopter Schools (N = 79)
% teacher survey completed by PE specialist	89.3	93.7
% teacher survey completed by females	68.0	58.2
Median years in PE position	7.5 IQR = (2–16.5)	10 IQR = (4–17)
% principal survey completed by principal	92.0	94.9
Median years in principal position	4.0 IQR = (3–8)	5 IQR = (3–9)
% of schools >20% minority students	36.0	35.4
PE resources (% with)		
Gymnasium	85.3	69.6*
Multipurpose room	29.3	36.7
Blacktop playground	77.3	74.7
Grassy field	82.7	92.4
Enough equipment	81.3	76.0
Specialized training in PE (% with)		
Workshops or conferences	90.0	84.8
Elementary PE courses in college	78.7	73.4
Bachelors degree in PE	77.3	81.0
Masters degree in PE	30.7	36.6
Mean (SD) % students eligible for FRMP ^a	50.5 (29.2)	46.0 (26.5)
Mean (SD) student enrollment	524 (245)	496 (256)
Median # PE Specialists	1 (IQR = 1–1.6)	1 (IQR = 1–1.5)
Median # of PE days per week	2 (IQR = 1–4)	2 (IQR = 2–3)
Median class size	24 (IQR = 20–28)	23 (IQR = 20–27)
Median Annual PE Budget (\$)	750 (IQR = 360–2000)	1000 (IQR = 500–2000)

* Significantly different from Adopter Schools ($P < .05$).

^a Free or reduced meal plans.

Satisfaction With Current Program Outcomes

Table 2 provides data on the proportion of teachers and principals that reported being very satisfied with their current PE program's achievement of 7 student outcomes. In general, significantly more teachers in Adopter than Non-Adopter schools reported being very satisfied with their program outcomes, including: Providing lots of healthy physical activity ($P = .02$); teaching activities used for a lifetime ($P = .002$), teaching how to get along with others ($P = .0007$), improving sport and movement skills ($P = .003$), increasing confidence and self-esteem ($P = .01$); teaching concepts related to health and well-being ($P = .03$), and increasing physical fitness ($P = .001$). Significantly more principals of Adopter than Non-Adopter schools reported being very satisfied that their PE programs taught activities that students could use for a lifetime ($P = .04$). Proportionally more principals than teachers were very satisfied with current program outcomes. These differences were statistically significant for 3 characteristics: Providing lots of healthy physical activity ($P = .04$), teaching concepts related to health and well being ($P = .03$), and increasing physical fitness ($P = .001$).

EBPE Interest and Current Program Status

More teachers (74 vs. 58%) and principals (44.5 vs. 28%) in Adopter schools expressed higher interest in learning more about EBPE than their counterparts. Meanwhile, irrespective of school type, many teachers and principals reported being aware of EBPE programs. Relative to current PE program implementation, both teachers (100 vs. 28%, $P < .0001$) and principals (95 vs. 87.5%, $P = .08$) in Adopter schools more frequently reported using a specific curriculum than those in Non-Adopter schools. There

were also differences in agreement between principals and PE teachers in Non-Adopter schools about whether their school was using a specific PE curriculum (87.5% of principals reported yes vs. 28% of PE teachers).

Involvement in PE Decisions

Relative to decision making about PE, the 2 areas that teachers reported being very involved in were instructional (63%) and curricular (50%). In contrast, the 2 areas identified most frequently by principals were teacher evaluation (79%) and staffing (61%). Compared with those in Non-Adopter schools, proportionally more teachers in Adopter schools reported being very involved in decisions related to Instruction (70.7 vs. 55.7%; $P = .05$), Program Evaluation (44.0 vs. 22.8%; $P = .006$), and Teacher Evaluation (33 vs. 13.9%; $P = .007$). More Adopter teachers (44%) reported being very involved in program evaluation than others (Non-Adopter teachers, 23%; Adopter and Non-Adopter principals, 28%).

Beliefs Related to the Adoption of PE Programs

Table 3 identifies the proportion of teachers and principals considering specific characteristics as being very important in their decision to adopt a PE program. For student outcomes, most teachers ($\geq 76\%$) considered all 6 characteristics to be very important. Teachers in Adopter schools, however, were more likely than their Non-Adopter counterparts to report that the program should: Provide activity for all children ($P = .03$), improve physical fitness ($P = .04$), teach skills useful for a lifetime ($P = .02$), and help children be "physically active outside of school" ($P = .01$). Compared with principals, a greater proportion of teachers ($P = .04$) reported that improving children's movement and sports skills was very important in program adoption.

Table 2 Percent of Teachers and Principals Very Satisfied With Current PE Program Outcomes for Children

Program outcome component	Teachers				Principals				T vs. P ^a
	All %	Adopter % (N = 75)	Non-Adopter % (N = 79)	P	All %	Adopter % (N = 75)	Non-Adopter % (N = 79)	P	
Provides lots of healthy PA	50.3	60.0	40.5	.02	61.3	65.3	58.2	.36	.04
Teaches activities used for a lifetime	49.7	62.7	36.7	.002	51.0	60.0	43.0	.04	.79
Teaches how to get along	40.7	54.7	27.9	.0007	45.2	52.4	39.2	.11	.36
Improves sport and movement skills	40.7	53.3	29.1	.003	50.3	57.3	44.3	.11	.08
Increases confidence and self-esteem	41.3	52.0	31.7	.01	46.5	50.7	43.0	.34	.29
Teaches concepts related to health and well-being	34.8	44.07	26.6	.03	45.8	52.0	40.5	.15	.03
Increases physical fitness	33.6	46.7	21.5	.001	52.9	60.0	46.8	.10	.001

^a Comparison between PE Teacher and Principal responses (N = 154 schools).

Table 3 Percent of Teachers and Principals Identifying Characteristic as Very Important in Adopting a PE Program

Program characteristics	Teachers				Principals				T vs. P ^a
	All %	Adopter % (N = 75)	Non-Adopter % (N = 79)	P	All %	Adopter % (N = 75)	Non-Adopter % (N = 79)	P	
Outcomes for students									
Provides activity for all children	85.8	92.0	79.8	.03	87.1	90.7	83.5	.19	.74
Improves children's physical fitness	83.3	89.3	77.2	.04	80.0	81.3	78.5	.66	.48
Teaches skills useful for a lifetime	83.2	90.7	76.0	.02	74.8	77.3	72.2	.46	.07
Enjoyable to children	81.9	85.3	78.5	.30	72.9	78.7	67.1	.11	.08
Improves children's movement and sport skills	77.4	82.7	72.5	.13	67.1	68.0	65.8	.77	.04
Helps children be active outside of school	76.1	85.3	68.4	.01	66.5	65.3	62.1	.82	.06
Other considerations									
Fulfills district/state standards	80.0	85.3	74.7	.11	86.5	85.3	87.3	.72	.13
Easy for teachers to implement	65.8	77.3	54.4	.004	54.2	60.0	48.1	.14	.03
Has been teacher tested	65.2	74.7	55.7	.02	57.4	64.0	50.6	.09	.02
Has specific easy to follow lesson plans	64.5	69.3	59.5	.24	52.3	60.0	44.3	.05	.02
Provides instructional training for teachers	60.0	69.3	56.0	.02	61.3	65.3	57.0	.29	.81
Helps manage students	51.0	56.0	45.6	.20	54.2	62.7	45.6	.03	.55
Can be done with minimal amounts of equipment	51.0	56.0	45.0	.20	51.0	60.0	41.8	.02	1.0
Uses periodic self-assessment of fitness	41.9	45.3	39.2	.52	43.9	46.7	40.5	.44	.71
Documented in an experimental study	39.4	48.0	31.7	.04	37.4	33.3	40.5	.36	.71
Emphasizes competitive games	14.2	16.0	12.7	.65	20.7	21.3	19.0	.72	.09

^a Comparison between PE Teacher and Principal responses (N = 154 schools).

For considerations only indirectly related to student outcomes, fulfilling district/state standards was the characteristic most often identified as being very important by both teachers and principals ($\geq 80\%$); meanwhile, emphasizing competitive games was identified the least often ($< 21\%$). More teachers in Adopter schools considered 4 program elements to be very important: Being easy for teachers to implement ($P = .004$), having been teacher tested ($P = .02$), providing instructional training for teachers ($P = .02$), and having been documented in an experimental study. Compared with peers in Non-Adopter schools, significantly more principals in Adopter schools considered 3 program characteristics very important: That it had easy to follow lesson plans ($P = .05$), helped manage students ($P = .03$), and could be done with minimal amounts of equipment ($P = .02$). Compared with principals, a significant greater proportion of teachers identified 3 managerial considerations as very important in program adoption: Program is “easy for teachers to

implement” ($P = .03$), “has been teacher tested” ($P = .02$), and “has specific easy to follow lesson plans” ($P = .02$).

Barriers to Quality PE at Current School

Table 4 identifies the proportion of respondents that considered 10 specific characteristics as being barriers to quality PE at their school. The factors identified most frequently as tremendous barriers by both teachers and principals were the number of PE specialists, financial resources, and time in the school day. More teachers in Non-Adopter than Adopter schools identified indoor ($P = .04$) and outdoor ($P = .01$) facilities as tremendous barriers. A significantly greater proportion of principals in Adopter than Non-Adopter schools considered class size to be a tremendous barrier ($P = .05$). Significantly more teachers than principals perceived that (a) the number of PE specialists ($P < .009$), (b) financial resources ($P = .0001$), (c) low priority for PE ($P < .0001$), (d) large

class size ($P = .01$), (e) limited district support for PE ($P < .0002$), and (f) equipment and supplies were tremendous barriers to quality PE at their schools.

Stakeholder Influence on Program Adoption

In general, both PE teachers and principals considered PE specialists and district PE coordinators to be the most influential sources on program adoption. Meanwhile, few (<7%) teachers or principals considered either parents or classroom teachers to be extremely influential. More teachers in Adopter schools identified a special committee or task force to be extremely influential compared with those in Non-Adopter schools (18.7 vs. 6.3%; $P = .03$). There were no significant differences in perceived stakeholder influence among principals by school adoption status or overall between teachers and principals.

Discussion

Satisfaction with Current Program Outcomes

Overall, both teachers and principals were highly satisfied with their PE programs, and it is not surprising that more teachers in Adopter than Non-Adopter schools reported being very satisfied with their program outcomes. Satisfaction with current programs, however, could be a barrier to the adoption of EBPE unless there is strong external motivation for schools to seek an alternative program. To overcome this barrier, strategies to inform teachers and principals about EBPE should be formulated. In addition, advocacy efforts supporting requirements for schools to measure and report PE program outcomes are needed. In the US, there are few requirements for reporting program

outcomes (other than for the physical fitness testing that is done in some states). Thus, schools are often not accountable to report quality or quantity indicating metrics. It is interesting that more principals than teachers were highly satisfied that their current PE programs achieved many student outcomes. Responses by principals, however, were likely speculative; in their administrative roles they are often far removed from PE programs and lack intimate knowledge of their day-to-day realities. If schools were required to report on PE program effectiveness, principals' knowledge of programs would likely increase and their satisfaction levels might be different.

EBPE Interest and Current Program Status

Although satisfied with current PE programs, many teachers and principals expressed interest in learning more about EBPE. Interest in EBPE was especially true for teachers irrespective of school type and by nearly one-half of the principals in Adopter schools. Non-Adopter principals were the least likely to be interested in learning more about EBPE programs. Meanwhile many of them reported that their school was using a specific PE curriculum when their PE teachers said it was not (87.5 vs. 28%). These findings again underscore the need to increase the knowledge of principals about PE; by doing so, motivations toward the adoption of EBPE might increase.

Involvement in PE Decisions

Few teachers and principals viewed themselves as being very involved in the evaluation of PE programs. This finding is concerning, because it suggests that little evaluation of PE programs is being done. Again, policies requiring schools to report on PE processes and outcomes are needed; if in place, this would facilitate regular

Table 4 Percent of Teachers and Principals Identifying Characteristics as a Tremendous Barrier to Quality PE at Current School

Characteristic	Teachers				Principals				T vs. P ^a
	All %	Adopter % (N = 75)	Non-Adopter % (N = 79)	P	All %	Adopter % (N = 75)	Non-Adopter % (N = 79)	P-	
Number of PE specialists	21.9	20.0	24.0	.56	11.6	14.7	8.9	.26	.009
Financial resources	20.7	16.0	25.3	.17	10.3	10.7	10.1	1.0	.0001
Time in the school day	20.0	17.3	22.8	.42	15.5	16.0	15.2	.89	.27
Low priority for PE	13.6	9.3	17.7	.16	0.7	0.0	1.3	1.0	.0001
Large class size	9.7	6.7	12.7	.28	2.6	5.3	0.0	.05	.01
Limited district support for PE	9.7	8.0	11.4	.59	0.7	0.0	1.3	1.0	.0002
Indoor facilities	9.0	4.0	13.9	.04	7.1	9.3	5.1	.36	.49
Equipment and supplies	7.1	4.0	10.1	.21	2.6	2.7	2.5	1.0	.05
Requiring special training for classroom teachers	7.1	5.3	8.9	.53	2.6	2.7	2.5	1.0	.07
Outdoor facilities	4.5	0.0	8.9	.01	5.8	6.7	5.1	.74	.62

^aComparison between PE Teacher and Principal responses (N = 154 schools).

program evaluation and clarify the roles of individuals in the process. The finding that more Adopter than Non-Adopter teachers were involved in teacher evaluation is noteworthy. Involvement in teacher evaluation would likely inspire more accountability for the delivery of PE, and thus teachers might likely be more motivated to seek professional development to ensure that their programs were effective.

Beliefs Related to the Adoption of PE Programs

Overall, the results suggest that principals' and teachers' perspectives on the importance of specific outcomes and other considerations for program adoption are aligned with EBPE concepts. Dissemination efforts should consider these factors and tailor marketing messages accordingly. The finding that fewer teachers in Non-Adopter considered that programs should provide physical activity for all children, improve fitness, teach skills useful for a lifetime, and promote children to be physically active outside of school, suggests that unless specific training is undertaken these outcomes will not become a main focus of PE. Meanwhile, few preservice PE teacher education programs currently emphasize preparing teachers to promote PA outside of school, and some professionals associated with EBPE have called for teacher education reform.^{17,18,38}

Barriers to Quality PE

Both teachers and principals identified not having enough PE specialists, financial resources, and time in the school day were tremendous barriers to quality PE. Significantly more PE teachers than principals, however, perceived 5 different factors to be a great barrier (ie, number of PE specialists, financial resources, low priority for PE, large class size, and limited district support for PE). Our assessment of school characteristics indicated indoor facilities was the only significant difference found by school type, and more Non-Adopter than Adopter teachers reported the availability for indoor and outdoor facilities as tremendous barriers to quality programming. School facilities and many other reported barriers to quality programs are controlled by the principal and other administrators, and this may partially explain why teachers and principals differed in their perceptions of barriers to quality PE. Not having control over these barriers may lead teachers to feel PE is being marginalized. Meanwhile, data from this study also suggest that principals are not thoroughly familiar with their school's PE program; thus, increasing principal's knowledge may be instrumental in addressing some teacher perceptions of barriers to quality programming. In general, compared with peers in Non-Adopter schools, teachers in Adopter schools were more satisfied with their program outcomes and had greater involvement in teacher evaluation and program decision making. It is not possible to determine whether these factors led to the adoption of EBPE or that being in a school with EBPE helped instill these characteristics in teachers.

Stakeholder Influence on Program Adoption

Most respondents considered PE specialists, district PE coordinators, and principals to be the extremely influential sources of program adoption. When disseminating programs, it is critical to keep in mind that PE teachers are not only influential with their own principals, they also influence other teachers. Similarly, principals are also influenced by one another and by the district coordinator. Therefore, strategic efforts should be designed to help PE teachers understand their critical role in program adoption and to provide them with strategies for communicating programmatic needs with their principal. Strategies should also include creating opportunities for teachers and principals to network with one another. Principals indicated they are frequently influenced by a district coordinator, but many school districts do not have a PE coordinator. In districts without a coordinator or a strong advocate for PE, the adoption of new PE programs is not likely to be a focus of the principal. Therefore, dissemination efforts should include devising strategic school district approaches that facilitate district communication to site principals regarding PE program quality.

Study Limitations

The findings of this study are limited by the reliance of self-reports from teachers and principals, and thus we are unable to rule out the possibility of a social desirability bias. It is also possible that a school that reported not using one of the three evidence-based programs (and thus classified as a "Non-Adopter") was implementing a health-related PE curriculum. The cross-sectional nature of the study design also precludes our ability to infer causal relationships between the questionnaire responses and the adoption of EBPE. We did, however, compare schools that were similar on a myriad of school and socioeconomic influences that could influence the adoption of EBPE programs. In addition, securing school (and sometimes district) permission along with having the school PE teacher and principal independently agree to complete questionnaires in a timely manner proved challenging.

Conclusions

Findings of the study suggest that both PE teachers and principals play important roles in facilitating school adoption of PE programs. Overall and as expected, more PE teachers than principals expressed interest in learning about EBPE and they have very different perceptions of the barriers to quality programming. The findings also suggest that principals have limited in-depth familiarity with their school's PE program and that efforts to increase their knowledge are very much needed. In addition, given the high satisfaction levels with current programs by both teachers and principals, schools are independently not likely to seek out alternative programs. Efforts to disseminate EBPE should continue to target

teachers and teachers need to understand their critical role in communicating with their principal. Strategic plans that target principals also need to be developed, including designing district strategies that would result in communications with principals about their schools' PE program. Identifying principals that can champion EBPE and providing training at administrative professional development meetings might also prove to be an effective strategy. Implementing policies that require schools to evaluate PE programs and to report outcome metrics would likely facilitate greater principal familiarity with PE and it might motivate both teachers and principals to critically examine and perhaps seek out EBPE. To this end, increased strategic EBPE advocacy efforts that target these policy changes are needed.

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