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A School-Based, Peer Leadership Physical Activity Intervention for 6th Graders: Feasibility and Results of a Pilot Study

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Background: The aim of this study was to promote physical activity in 6th graders by developing and testing the feasibility of an enhanced Presidential Active Lifestyle Award (PALA) program comprised of a peer leadership component and innovative exercise resource toolkit including DVDs. **Methods:** A racially/ethnically diverse sample of students received the standard PALA program (2 control schools, $n = 61$) or enhanced PALA+Peers program (2 intervention schools, $n = 87$) during 2006–2007 academic year. **Results:** Compared with the control condition, the intervention was successful in increasing moderate physical activity in all students ($P = .02$) and moderate and hard physical activity among girls ($P = .03$ and $P = .04$, respectively). Teachers and students reported a high level of satisfaction and receptivity with the intervention. All teachers thought the DVDs were well-received, and 87% of students reported that they would recommend the enhanced program to peers. **Conclusion:** Coupling peer leadership and DVDs that promote physical activity may be an effective way to increase youth physical activity.

Keywords: media use, PALA program, activity-focused DVDs, process evaluation

Over the past 30 years, the rates of obesity in children have dramatically increased. Approximately one-third of U.S. children are overweight or obese.¹ Although many resources have been directed toward schools to increase physical activity and healthy eating as a means of addressing obesity, the effect on positive behavioral change or weight status has been small² with many strategies focused on changing the school curriculum or increasing activity in physical education classes. School-based interventions generally have not had an effect on increasing outside-of-school physical activity,³ a significant contributor of total physical activity in youth.

With the less than stellar results of school-based interventions to date, there is a need to implement novel strategies to increase physical activity among youth particularly outside of school. One strategy that has been effective for influencing adolescent behavior is peer leadership. Peer leadership involves same-age peers motivating their classmates to initiate, continue, and sustain a positive behavior. Peer leaders can be credible sources for social information, while teachers appear to

be more effective with factual information. Experience with other types of peer-led programs (ie, healthy eating and alcohol and tobacco use prevention) has shown that peer leaders enjoy their role, are effective cofacilitators, and significantly enhance the success of the curriculum or program.^{4,5}

Peer involvement and influence is heightened during early adolescence, and peer leadership capitalizes on this developmental reality in a way that has not been demonstrated by many physical activity initiatives. A literature review of evidence-based, state-of-the-art physical activity interventions involving 6th graders shows a void in the utilization of peer leadership frameworks for positive physical activity outcomes.⁶

Combining peer leadership with innovative programming can serve as a model for engaging youth at school and at the same time promoting physical activity outside of school. There are many ways for youth to be physically active, but one strategy that has been underutilized is the use of activity-focused DVDs. On average, American youth spend approximately 2 hours per day watching videos, DVDs, and movies (not including regular television programming which equates to an additional 2.5 hours per day).⁷ Therefore, using a DVD or computer is a daily norm for this age group, and these technologies provide opportunities for physical activity promotion.

The primary aim of this study was to develop and test the feasibility of an enhanced Presidential Active Lifestyle Award (PALA) program comprised of a peer

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leadership component and innovative toolkit including DVDs that promote physical activity. PALA is nationally promoted and encourages students in grades 3 and higher to participate in at least 60 minutes of daily physical activity during a 6-week program period. At the conclusion of the PALA program, each student that successfully achieves their physical activity goal receives an embroidered badge and certificate signed by the President of the United States.⁸ Although this program has been in existence since the 1950s, concerns with the PALA program include having sufficient motivation and support for implementation, as the program depends primarily on teachers or volunteers to lead program activities. The PALA+Peers program is designed to provide more potent and comprehensive support. This paper describes the PALA+Peers intervention, impact and process evaluation findings, and implications for future directions.

Methods

Study Design

This feasibility study was conducted in 4 elementary schools located in a large, Midwestern metropolitan area during 2006–2007 academic year. The study design was quasi-experimental with nonrandom assignment of intervention and control groups. The 2 intervention schools were 2 of 4 elementary schools that had participated in a BMI screening assessment conducted by the school district during 2005–2006 academic year and were identified as high risk because a significant proportion of their student population had a BMI greater than the 85th percentile for gender and age based on the CDC 2000 sex-specific BMI-for-age cutpoints. The control schools were chosen from the elementary schools in the district that did not participate in the BMI screening assessment during that academic year. The intervention and control schools were matched on race/ethnicity, socioeconomic status, and language literacy (percentage of students who speak English as a second language). The 2 intervention schools received the enhanced PALA+Peers program and the 2 control schools received the standard PALA program. Before the implementation of the PALA+Peers pilot program, the standard PALA program was available to elementary schools in the school district as an extracurricular activities program. However, at the start of the current study, the PALA program was not being offered by the intervention or control schools. A large proportion of students qualified for free or reduced price school meals—83 and 89% at the intervention schools and 83 and 91% at the control schools.⁹ This study was approved by the University's Institutional Review Board and the local school district's Office of Research and Development.

Students ($n = 197$) enrolled in the 6th grade at the 4 schools participated in the PALA or PALA+Peers programs as part of their regular health curriculum, and they were recruited to participate in pre- and postintervention evaluation measures. Twenty-nine students (14.7%)

refused participation and 19 (9.6%) did not return consent forms. Data were collected from a sample of 148 6th graders. Table 1 displays the baseline characteristics for study participants. Intervention students were not significantly different from control students at baseline except for weight status. A higher percentage of intervention students compared with control students were classified as overweight or obese according to CDC BMI cutpoints (54.0% vs 31.2%).

Description of the Standard PALA (Control) Program

All students participated in the standard PALA program. Intervention and control students were given the standard PALA program materials and asked to record extracurricular activities they participated in outside of school over the 6-week program period. This information included the activities they participated in (eg, swimming) and the number of minutes they were engaged in each activity (in 15 minute increments). PALA documentation was collected each week at all 4 schools. Incentives (eg, emblem, certificate, and bookmark with the USA Presidential Seal) were offered to students when they completed the 6-week program.

Description of PALA+Peers Enhanced Intervention

The enhanced PALA+Peers program integrated social learning/social cognitive theory¹⁰ including personal factors (self-efficacy, functional meanings, skills building, value expectations), social factors (norms, peer influence, social support), and environmental factors (incentives, role models, and access to physical activity support) to guide the development of the program. The primary goal of the 6-week intervention was to increase time and intensity of physical activity and included classroom, peer-led, and home components with DVDs promoting physical activity and skills building activities provided as homework. Incentives were offered to students when they completed DVDs outside of class and for PALA+Peers program homework. Examples of incentives included fashionable rubber wristbands, water bottles, and stopwatches.

Intervention Components. The PALA+Peers intervention consisted of 3 primary components: 1) 6, 25-minute physical activity DVDs, 2) 6 peer- and teacher-led classroom sessions, and 3) 6, physical activity and healthy eating homework activity sheets. Table 2 compares the program components of the standard PALA program (eg, weekly activity documentation, 3 incentives with the Presidential seal) and the enhanced PALA+Peers program (eg, classroom sessions, trainings, physically active DVDs, activity homework sheets, parental involvement, and 3 additional incentives).

Physical Activity DVDs. The DVDs were intended to increase physical activity at home and promote lifestyle

Table 1 Baseline Characteristics of Intervention and Control Participants of PALA+Peers Program

	Intervention (n = 87)		Control (n = 61)		P
	Mean	SD	Mean	SD	t test
Age (years)	11.2	0.4	11.2	0.4	0.83
Moderate physical activity ^a	2.55	2.57	3.35	2.75	0.08
Hard physical activity ^a	2.00	2.16	1.60	1.89	0.23
Very hard physical activity ^a	0.99	2.37	0.87	1.97	0.78
	n	%	n	%	Chi-square
Gender					0.67
Female	44	50.6	33	54.1	
Male	43	49.4	28	45.9	
Race/ethnicity					0.06
African American	27	31.0	13	21.3	
Asian/Hmong	25	28.7	30	49.2	
White	9	10.3	3	4.9	
Hispanic	13	14.9	4	6.6	
Other/mixed	13	14.9	11	18.0	
Weight status					0.02
BMI < 85th %ile	40	46.0	42	68.8	
BMI ≥ 85th to < 95th %ile	15	17.2	7	11.5	
BMI ≥ 95th %ile	32	36.8	12	19.7	

^a Physical activity data are presented as the number reported 30-minute blocks.

Table 2 Program Components of the Standard PALA Program and the Enhanced PALA+Peers Program

Program components	Standard PALA	Enhanced PALA+Peers
6, 45-minute, peer- and teacher-led classroom sessions		X
2 peer-leader and teacher training for classroom sessions		X
Weekly activity documentation	X	X
6, 25-minute physical activity DVDs		X
6 physical activity and healthy eating homework activity sheets		X
Parental involvement		X
Incentives (n = 3): Emblem, certificate, and bookmark with USA Presidential Seal	X	X
Incentives (n = 3): Fashionable rubber wristband, water bottle, and stopwatch		X

Note. "X" denotes that the component was a part of the program.

movement as a norm. We chose to use 'real' 6th graders (during the 2005–2006 academic year) from each of our intervention schools to be featured as role models in the DVDs. Using 'real' students served as an additional way to incorporate positive peer influence within a peer leadership model. Each student at the school had a chance to audition for physical activity and/or audio roles for the DVDs if they had parental permission. Our final

DVD participant selections included 6 male/female pairs of varying race/ethnicities, body shapes, and physical ability levels to be representative of the cohort; at least 1 boy/girl pair was featured in each DVD.

Each 30-minute DVD included a warm-up, 2 physical activity segments, a cool down, and a trailer with cast members performing spoken word or poetry and video footage of outtakes/bloopers (ie, funny segments,

mistakes or other footage not used in the final edit). The warm-up posed the thematic question for each DVD. For example, the first DVD asked the question, “What is your Best Move?” Students were challenged to go out and find their ‘best move’ by asking different people in their lives what that might be. The 5 additional DVD themes were 1) Social support, 2) Barriers and obstacles, 3) Dance routine with 5 dance formats (African, Mexican Hat, Traditional Hmong, Salsa, Hip Hop), 4) Future jobs and goals, and 5) A Day in the Life . . . (fitting movement into an ordinary 6th grader’s day).

University researchers worked with a local digital production company for the DVD creation. Each DVD featured a physical activity advocate, Ms. Movalina. She posed a question at the beginning of each DVD to promote and communicate the theme, and issued a physical activity challenge. DVD development consisted of 9 phases: 1) theme and conceptual development; 2) script writing; 3) physical activity movement assignment for each script; 4) recruitment/auditions for students included in the taping of DVDs; 5) practice with University staff and intervention school consulting staff; 6) student physical activity rehearsal with demo DVD/audio rehearsal at home; 7) filming on location at school, on playground, or in community; 8) music and graphics assignment, and 9) editing.

Peer- and Teacher-Led Classroom Lessons. From the 2 intervention schools, 28 peer leaders were identified through classroom nomination processes designed to identify social leaders. Peer leaders were male and female and represented a wide range of body sizes and race/ethnicities. Their primary role was to serve as facilitators between the teacher and their classmates in delivering the PALA classroom lessons. These leaders were trained by project staff during 2 separate trainings. The first training occurred before the PALA program began and included information on how to be a peer leader including small group facilitation and behavior trouble shooting and leadership skills, and review/rehearsal from the first 4 classroom sessions activities. The second training was held halfway through the implementation of the PALA+Peers program and included check-in and feedback on their role as peer leaders, brainstorming on challenging facilitation situations and general support from University staff.

Before the start of the program, 4 classroom teachers who delivered the program and 1 physical education teacher who was not a part of program implementation were trained by project staff on the components of the program. Teachers were provided program background information, reviewed and modeled/practiced classroom peer- and teacher-led activities, and reviewed implementation and process evaluation documentation.

The classroom curriculum included 6 45-minute sessions of peer- and teacher-led activities and featured experiential activities focused on short and long term goal setting. Each week focused on 1 physical activity that was reinforced through the classroom activities. To compliment the classroom lessons, students were given

weekly homework assignment to complete with their parents or another adult.

Measures

Primary Outcome. Physical activity was assessed using the Previous Day Physical Activity Recall (PDPAR). This instrument has been validated in elementary school-aged children¹¹ and was used to measure the types, amounts, and intensities of physical activity in which students participated. During class, students were given a list of 69 common, age-appropriate activities. Using 30-minute time blocks, students were asked which activities they performed from 6 AM to 12 AM for the previous day and to rate how physically hard it was to perform the activity (ie, light, moderate, hard, or very hard). At baseline and follow-up, 2 PDPARs were collected on separate days to gather information about activity for a weekday and a weekend day. Data from a PDPAR are usually discussed in terms of numbers of blocks of activity, but for greater understandability, in this research, the 30-minute time blocks are also translated to real time (ie, 30 minutes of activity).

Descriptive Characteristics. Trained staff administered a self-report survey to participants including socioenvironmental, personal and behavioral factors. Weight and height were measured using standard protocols. BMI (body mass index, kg/m²) was calculated and categorized using sex- and age-specific cutoff points based on national reference data for normal weight, overweight, and obese.^{12,13}

Process Evaluation. Process evaluation measures were implemented to assess program fidelity, participant receptivity, participant satisfaction, and PALA or PALA+Peers participation levels. PALA standardized documentation of student’s involvement in extracurricular physical activity was also collected weekly during the 6-week program from all intervention and control students.

The Student Feedback Form was a postintervention survey including 10 open-ended items assessing participant receptivity and satisfaction. Only intervention students completed this form. Questions asked what the students liked best and least about the program and DVDs, what messages related to physical activity they remembered learning, use of DVDs at home (how often and with whom), parents’ opinions about the program and DVDs, and would students recommend the program to others. As part of the student survey, students were asked to select (from a list of 8 items), the reasons they liked or did not like following someone doing physical activity on a DVD.

Classroom Observations assessed program fidelity. Trained University staff observed each of the 6 sessions and each of the 4 classroom teachers at least once on areas related to the percent completion of activities for each session, the level of enthusiasm of the students and teachers (on a scale of 1 to 5: 1 = not at all enthusiastic;

5 = extremely enthusiastic), the quality of activity facilitation by the peer leaders (1 = ineffective facilitate; 5 = excellent facilitation), and the effectiveness of the session (1 = not at all effective; 5 = extremely effective).

The Teacher Feedback Form was a 20-item survey that assessed program receptivity and satisfaction. The 4 teachers who delivered the enhanced PALA+Peers program completed this form which included items related to the general program and structure, DVD implementation, peer leaders, and DVD contest.

Classroom Scoreboards included PALA+Peers homework completion and DVD participation for intervention students only. These posters were located in a visible place in the classroom where students marked if they completed their weekly homework assignment and recorded the number of times they followed the DVD at home.

Data Analysis

Chi-square tests or *t* tests were conducted to assess the significance of differences between intervention and control schools at baseline. The effectiveness of the intervention was evaluated by comparing the mean amount

of change in each level of activity between baseline and follow-up of the intervention and control group. Within each condition, the difference in minutes engaged in a specific level of physical activity (ie, moderate, hard, or very hard) between baseline and follow-up was calculated. Next, *t* tests were conducted to examine the mean change differences between conditions for all participants and also for boys and girls separately. Analyses were performed using SAS version 9.2 (SAS Institute, Cary, NC).

Results

Primary Outcome

The enhanced PALA+Peers program significantly increased moderate physical activity (MPA) ($P = .02$; Table 4), with intervention students increasing in time spent in MPA by approximately one-half of a 30-minute block (14 minutes/day) versus the control students decreasing MPA by almost a 30-minute block (29 minutes/day). There was no difference by treatment group for hard or very hard physical activity (Table 3).

Table 3 Reported Physical Activity Behavior (in # of 30-Minute Blocks)^a

	Intervention		Control		P-value ^b
	Baseline	Follow-up	Baseline	Follow-up	
Total (n = 148)					
Moderate PA	2.55 (2.55)	3.01 (2.88)	3.35 (2.75)	2.38 (2.23)	0.02
Hard PA	2.00 (2.15)	1.83 (2.16)	1.60 (1.89)	1.44 (1.69)	0.52
Very hard PA	0.99 (2.37)	0.97 (2.38)	0.87 (1.97)	0.87 (2.03)	0.41
Boys (n = 71)					
Moderate PA	2.66 (2.82)	2.66 (2.63)	2.55 (2.56)	1.87 (1.55)	0.47
Hard PA	2.34 (2.17)	1.63 (1.84)	2.09 (2.31)	1.72 (1.67)	0.33
Very hard PA	1.51 (3.05)	0.94 (2.36)	1.66 (2.70)	1.48 (2.76)	0.96
Girls (n = 77)					
Moderate PA	2.48 (2.32)	3.28 (3.10)	4.03 (2.77)	2.80 (2.60)	0.03
Hard PA	1.60 (2.06)	2.01 (2.47)	1.18 (1.34)	1.21 (1.70)	0.04
Very hard PA	0.50 (1.30)	1.02 (2.45)	0.20 (0.37)	0.36 (0.93)	0.27

^a Estimates are presented as mean # of blocks (standard deviation).

^b P-value tests the intervention effect in change of activity from baseline to follow-up.

Table 4 Student Participation of Physical Activities and DVD Viewings

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6
Average # of reported physical activities per week ^a						
Intervention	7.3	7.0	5.6	6.7	6.3	6.2
Control	5.5	4.7	4.2	4.2	4.1	4.1
DVD viewings at home ^b						
Viewed at least once per week (%)	83	87	84	84	80	71
Average DVD viewings per student (#)	2.5	3.4	3.2	3.7	3.1	3.0

^a Data are from classroom scoreboards documenting standard PALA homework activities.

^b Only participants in the intervention group were included in these statistics.

Because elementary-aged girls usually have lower levels of physical activity than elementary-aged boys,¹⁴ analyses were stratified by gender. Intervention girls reported an increase in MPA and hard physical activity compared with control girls ($P = .03$ and $P = .04$, respectively). There were no differences between intervention and control boys.

Process Evaluation

Classroom observations by research staff indicated 100% completion of program components in the classrooms. The average observer rating for the student/teacher response to the session was 4.4 (on a scale of 1 to 5: 1 = not at all enthusiastic; 5 = extremely enthusiastic). The quality of the peer leader's ability to facilitate activities was rated on average as 4.2 (1 = ineffective facilitate; 5 = excellent facilitation). For effectiveness, sessions received an average rating of 4.3 (1 = not at all effective; 5 = extremely effective).

Student feedback indicated good receptivity and overall satisfaction with the intervention. On the postintervention feedback form, most students reported that their favorite component of the program was the DVDs (60%). Most students also reported that other people participated in the DVDs with them (66%) and that they would recommend the DVDs to other 6th graders (87%). When asked about the reasons why they liked participating in the DVDs, students most frequently responded that: 'it was fun' (66%), 'I liked the movements' (52%), 'I wanted to get in shape' (49%), and 'I liked trying something new' (46%). The primary reasons students did not like participating in the DVD were: 'it took too long' (22%), 'it was boring' (18%), and 'it was embarrassing to do it at home' (11%).

Teacher feedback also highlighted program receptivity and satisfaction. All teachers reported that: they liked the curriculum somewhat ($n = 1$) or very much ($n = 3$), DVDs were well-received in the classroom ($n = 4$), peer leaders increased the effectiveness of the program ($n = 4$), and peer leaders facilitated group discussion very well ($n = 3$) or OK ($n = 1$). The features that teachers liked most about the program included the peer leadership component and the overall messages about healthy eating and physical activity as normative behaviors. The most common critique of the program was that the 6-week intervention duration was too short.

Classroom Scoreboards and PALA Documentation. During the 6-week program period, intervention students completed an average of 6.5 extracurricular physical activities per week compared with an average of 4.5 extracurricular activities per week for control students (Table 4).

Intervention students reported viewing the DVDs regularly. The classroom scoreboards indicated that intervention students had 1642 extra DVD viewings. Extra DVD viewings were any viewings after the first viewing, which occurred in the classroom. The majority of extra viewings occurred outside of the classroom and averaged 3.1 extra viewings per DVD for each student.

Only 3 students reported watching the DVD only once (ie, in school).

Discussion

This study found that a peer leadership program utilizing activity-promoting DVDs was feasible and effective in increasing physical activity among 6th graders. Both teachers and students responded well to the delivery of the enhanced intervention, and student peer leaders were able to facilitate and deliver the classroom activities in an effective manner. Teachers and students further reported a high level of satisfaction and receptivity with the intervention. Although this was a pilot study with a relatively small sample size, there was an evident intervention effect on physical activity. Intervention students reported an increase in moderate physical activity, and intervention girls increased their moderate and hard physical activity compared with control students.

The success of this program may have been due to the use of the peer leadership framework or the DVDs, or the combination of these strategies. Using schools as a setting where peers heavily influence each other, as well as targeting an age group where social factors are becoming increasingly influential, it is plausible that the role modeling of student leaders had a positive effect on the other students' receptivity and participation of the PALA+Peers program. Although peer leadership frameworks have rarely been used for changing physical activity behavior,⁶ the peer leadership model has been used successfully in other areas of adolescent health behavioral change (ie, healthy eating, alcohol and tobacco prevention).^{4,5}

The DVDs incorporated both the peer leadership model and screen media as strategies to increase physical activity. Sixth graders from the 2005–2006 academic year were featured in the DVDs as both 'movers' and audio recorders. When the 6th graders participated in the enhanced PALA+Peers program during the 2006–2007 academic year, they not only saw older students whom they may have admired, but also saw faces that were familiar to them. This may have possibly added a dimension to increase self-efficacy; the students may have felt more empowered to participate in the intervention because they saw "real" people that they knew and recognized complete the activities they were asked to do.

With American youth watching almost 2 hours of prerecorded television or movies per day,⁷ the use of DVDs as an intervention strategy seems plausible to increase physical activity, especially outside-of-school physical activity. These DVDs allow for implementation in the home or after-school settings; facilitate indoor physical activity if there are neighborhood safety issues that limit regular outdoor exercise; provide opportunities for physical activity when a child may be left unsupervised and an adult cannot be present; and provide a way to combine youth's media use with physical activity. In addition, our findings suggested that this program also facilitated physical activity with others (ie, parents, other adults, and/or siblings) while using the DVDs. However,

the irony of using screen media as a means to increase physical activity must be noted. It has been well established that television use is positively associated with obesity,¹⁵ but it is inconclusive of the relationship between television use and physical activity.¹⁶ The PALA+Peers program highlights a potentially positive and healthy application of screen media technology among young people.

The PALA+Peers program was particularly effective in increasing physical activity in young adolescent girls, a population that usually has lower rates of activity than boys. Several interventions specifically targeting girls have increased physical activity using more traditional strategies (eg, teacher-led lessons) in more traditional settings (ie, during physical education and/or health class)^{17–20} and during after-school programs,²¹ but the current research offers an innovative and unique way to be active. During this developmental period of early adolescence, girls may not have as many outlets (ie, sports, free play) as boys to be active and using DVDs may be an ideal way to increase physical activity in girls.

Strengths of this study are that it is the first documented intervention to use DVDs as a means of promoting youth physical activity, particularly in coordination with a peer leadership strategy. The study also was piloted in a racially/ethnically diverse sample. A major limitation of this study is the small sample size. However, even with a relatively low degree of statistical power, our analyses detected an increase in physical activity. Physical activity was self-reported and not objectively measured, and thus these data are more subject to errors and biases. Bias could also have been introduced into the study by the non-random assignment of intervention and control schools.

Conclusions

The findings from this study are promising. With the decline of physical education within schools, this enhanced program provided a developmentally strategic, action-oriented approach to increase physical activity in a sample of low-income, racially diverse young adolescents, a population that is most susceptible to physical inactivity. This program has the potential to become a state or national model for widespread dissemination as an innovative approach to increasing physical activity. First, however, the PALA+Peers program needs to be replicated on a larger scale with the possibility of being adapted to cater to specific segments of population (ie, based on race/ethnicity, region) to make the program more culturally relevant. Secondly, physical activity from completing the DVD needs to be collected objectively to ascertain the amount of increase of physical activity due to DVD participation.

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