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A new research agenda in Sport Pedagogy for Physical Activity Promotion: Comprehensive School Physical Activity Program

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신체활동 증진을 위한 스포츠교육학의 새로운 지평: 포괄적 학교체육 프로그램

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Abstract Considerable attention has been given to Comprehensive School Physical Activity Program(CSPAP) to promote children's health and physical activity(PA) in Sport Pedagogy. This study examined the structural characteristics and effects of CSPAP using literature review analysis to comprehensively overview CSPAP model, which emphasizes the necessity of promoting PA and establishing a healthy lifestyle. Based on the results of the study, CSPAP provide health-enhancing PA in conjunction with schools, communities, and family. CSPAP suggested the importance of PA promotion in sport pedagogy via the uptake of moderate-to-vigorous physical activity(MVPA) accrual in line with the goal of high-quality physical education.

Key Words : Comprehensive School Physical Activity Program(CSPAP), Physical activity, Sport Pedagogy, School, Physical Education

요 약 최근 포괄적 학교체육프로그램은 유·청소년의 신체활동 증진을 목표로 하는 스포츠교육학의 새로운 줄기로 부각되고 있다. 이에 본 연구에서는 신체활동을 촉진하고 건강한 생활 습관 확립의 필요성을 강조하는 포괄적학교체육 프로그램의 구조적 특성과 효과를 탐색하였다. 연구 결과를 바탕으로, 포괄적학교체육프로그램은 학교, 지역 사회 및 가족과의 연대 속에 유·청소년의 적극적인 신체활동 라이프 스타일을 구축하는데 유용한 것으로 나타났다. 포괄적학교 체육프로그램은 양질의 체육교육을 목표로 하는 중고강도 신체활동 확립에 중점을 두며 스포츠교육학에서 신체활동 증진의 필요성을 제안하였다.

주제어 : 포괄적 학교체육프로그램, 신체활동, 스포츠교육학, 학교, 체육교육

1. Introduction

The prevalence of obesity in adults has increased by over 50% in the past 10 years and similar patterns are evident for children[1]. A number of studies have reported declines in the levels of physical activity in children[2] and other studies have found that both physical activity and obesity track through the lifespan[3]. These trends have led to major public health efforts to promote physical activity in children. The current national policy for available through the school

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physical education initiative reflects the importance now being placed on quality physical education programs to help reverse these trends[4]. However, school physical education alone is not easy to bring about healthy lifestyle for youth. Whole school approach is effective enhancing children's physical activity uptake. The comprehensive school physical activity program (CSPAP) is the leading national model for planning and organizing whole-of-school PA interventions[5]. Centered around the academic subject of physical education (PE) and its delivery of standards-based curricula and instruction focused on developing students' knowledge, skills, and dispositions for lifelong movement[5], the CSPAP model also includes PA during school opportunities (e.g., recess, classroom movement integration) and PA before and after school opportunities (e.g., active transportation) where staff are involved (e.g., employee wellness program) and family and community are engaged (e.g., fitness nights or homework)[5]. The CSPAP model illustrates the collective possibilities of school PA interventions to foster at least 60 minutes of daily PA, of which 30 minutes or more should be accomplished during school hours[6]. The five interactive components provide a strategic map for addressing the PE and PA aspect of the Whole School, Whole Community, Whole Child (WSCC) model via targeted points of intervention for increasing PA in schools[5]. This paper comprehensively reviewed the most promising school-based PA interventions by single CSPAP component area and multicomponent areas.

2. School-wide PA interventions

2.1 PE

PE is a subject in K-12 schools that "provides students with a planned, sequential, standards-based program of curricula and instruction designed to develop motor skills, knowledge, and behaviors for active living, physical fitness, sportsmanship, self-efficacy, and emotional intelligence"[7]. Quality PE entails sufficient time periods to engage learners at each educational level (i.e., 150 min/week at the elementary level; 225 min/week at the secondary level), full inclusion of all students regardless of individual characteristics, and at least 50% of lesson time spent in moderate to vigorous physical activity(MVPA)[7]. PE is widely acknowledged as the cornerstone of a CSPAP[6,7].

Sallis and McKenzie[8] coined the term "health-related physical education" to underline the distinct public health role for PE that included two primary objectives: (a) prepare youth for a lifetime of PA and (b) provide children with ample PA during classes. Within this approach, other traditional objectives of PE are still considered attainable but are not emphasized at the expense of health-enhancing PA engagement. In 2012, the authors revisited PE's role in public health and rephrased the approach "health-optimizing physical education" (HOPE)[9]. Over the past three decades, scholars have conceptualized how PE can meaningfully contribute to public health goals using a variety of curricular and pedagogical frameworks [10,11]. While there are a variety of curricular resources that support a public health agenda within PE, the following paragraphs discuss two highly researched evidence-based resources. SPARK was developed in the early 1990s as a health-related PE resource for the elementary school level. It emphasizes maximal PA engagement, motor skill development, and self-management skills in PE lessons. Later, the program was expanded to the middle school level and now includes early childhood and after-school components. It is one of the most researched PE resources available[12], with evidence of positive child-level outcomes such as

increased PA during PE classes[13], improved fitness, and reduced adiposity[14], along with evidence of effective dissemination and program sustainability based upon a diffusion of innovations model[15]. Child and Adolescent Trial for Cardiovascular Health (CATCH) was similarly developed in the 1990s as part of a coordinated school health program that targeted diet, physical activity, and nonsmoking intervention components among third to fifth graders. The PE resource, designed for use by both PE specialists and classroom teachers, emphasized maximal MVPA during PE classes using effective instructional/management techniques and developmentally appropriate activities[16]. Evidence has indicated that with ongoing professional development, teachers are able to increase MVPA during lessons to the recommended level of 50% [17], and positive effects are maintained for up to 5 years post intervention[18,19]. Beyond curricular resources, there are also basic strategies used by teachers to maximize PA time during PE. Weaver et al.[20] summarize them quite effectively as the LET US Play principles: reduce time waiting in Lines, avoid Elimination games, keep Team sizes small, limit the number of Uninvolved students, and adjust Space, equipment, and rules to maximize participation. These basic strategies are presented in many foundational PE textbooks and are embedded within the curricular resources for teachers mentioned earlier. Overall, systematic reviews indicate that MVPA can be increased in PE using curricular and instructional interventions, with ongoing professional development emerging as a contributing element[21,22]. However, recent evidence suggests that programs continue to struggle to achieve the 50% MVPA benchmark, with elementary schools averaging approximately 45% MVPA and secondary schools averaging around 41% [23,24], reiterates the importance of implementing PA interventions beyond PE [25].

2.2 PA Interventions during school hours

When considering infusing PA during the school day, two key intervention channels have been widely used: classroom movement integration and recess interventions.

2.2.1 Classroom Movement Integration

Classroom movement integration entails infusing movement into the academic classroom in a wide variety of ways. Generally, movement integration are conducted in general education classroom settings[26]. Teachers/schools can put into practice active transitions, energizers (also called brain breaks or activity breaks), and lessons that infuse academic content with movement in both the elementary and secondary school levels. The research of classroom movement interventions have been comprehensively reviewed[27]. Recent studies corroborate the positive findings of classroom-based PA on various outcomes including the intensity of PA[28,29], grades[30], and enhanced concentration[31] and on-task behavior [32]. Following studies have also considered the perceptions of teachers with respect to movement in the classroom. For example, Martin and Murtagh[28] demonstrated the importance of teacher satisfaction relative to increasing the probability of ongoing implementation. While teachers have positive attitude toward infusing PA in their classrooms, they also feel pressures (i.e., time and testing requirements) that affect integrating PA for their students throughout the school day[33,34]. Considering the benefits of movement incorporation, it is paramount to consider the teacher's perspective and provide the resources and tools needed to meaningfully integrate PA into the classroom.

2.2.2 Recess

Recess, lunch, and other break periods have also been identified as important opportunities

for PA during the school day. At the elementary school level, recess can be enhanced by having age-appropriate equipment and adult recess supervisors who provide encouragement or activity ideas for students[35]. At the middle and high school level, recess-like strategies can include daily schoolwide PA during morning announcements, drop-in PA sessions during lunch, and PA breaks during extended block periods[35]. Research suggests that environmental modifications to recess settings, such as creating "zones" for different activities, training recess supervisors, and providing equipment, have positive, but nonsignificant increases in PA during recess for elementary school children[36,37]. Conclusions of these studies have specifically identified the need for trained and effective recess supervisors and the consideration of school and student-level variables. Another strategy that has been less advocated, but has demonstrated positive effects on PA levels in adolescent girls, is peer-led programs that incorporate other students as motivational and emotional support for low active students[38,39].

2.2.3 Before School Interventions

Before-school PA programs are attractive because they have the added benefit of stimulating children's minds prior to the start of the school day [40], and they have the potential of contributing to the physical health of youth without sacrificing instructional time. Studies suggest that when children participate in PA before engaging in learning tasks, they tend to have better focus and perform better cognitively[41]. Research on the effectiveness of before-school PA interventions is still in its infancy, but two programs appear to hold the most promise. One program called Build Our Kids Success (BOKS) consists of 45-minute sessions 2 or 3 days per week, with a warm-up, aerobic activity, skill of the week, game time, and cool down. Session leaders utilize a formal curriculum with activity ideas and nutrition education content. Preliminary evidence indicates that elementary-aged children obtain approximately 20 minutes of MVPA during sessions[42] and can experience improvements in aerobic endurance and body composition with continued participation[43]. A second type of program, mileage clubs, consist of walking/running programs where children complete laps on a track, log their mileage, and earn incentives for reaching milestones (e.g., marathon distance). Commercial programs such as the 100 Mile Club are available, but many schools develop their own programs and systems for tracking mileage. Research suggests that children can accrue approximately 10 minutes of MVPA during 15 to 20 minute mileage club sessions [44] and tend to demonstrate better on-task behavior in the classroom after participation[45].

2.3 After School Interventions

After-school PA opportunities also offer health benefits without surrendering academic learning time. Traditional opportunities for after-school PA include childcare/enrichment programs, specialized PA clubs, intramural sports, and interscholastic sports.

2.3.1 Childcare/Enrichment Programs

Approximately 10 million children attend after-school childcare/enrichment programs in the United States[46]. As such, the public health potential of promoting PA within these programs is substantial. According to the National After School Association[47], after-school programs are recommended to devote at least 30 minutes to PA each day, with 50% of that time spent in MVPA. Strategies for maximizing PA time during afterschool programs include: (a) deliberately scheduling PA into daily routines[48], (b) having

staff members engage with children[49,50], and (c) following the LET US Play principles when facilitating activities/games [51]. Structured curricula also exist to help program staff integrate PA into after-school programs. CATCH Kids Club, SPARK AfterSchool, and Youth Fit for Life are a few programs that have been empirically tested, with mixed effects for PA participation in CATCH Kids Club[52,53] and SPARK After-School interventions[54], and positive effects for fitness and voluntary PA participation in Youth Fit for Life[55].

2.3.2 Clubs

Specialized PA clubs tend to target certain segments of the population or focus on one particular sport. For example, GoGirlGo!, Girls on the Move, and Girls on the Run are all interventions designed to promote PA and life skills to sedentary girls after school. In parallel, the SCORES program is a PA club focused primarily on the sport of soccer. Empirical evidence indicates mixed results for promoting PA behaviors among youth [56,57], with identified barriers to participation including lack of transportation, limited administrator support, and conflicting obligations, particularly in urban, high-poverty schools[58,59].

2.3.3 Sports

Intramural and interscholastic sports are additional opportunities for children to accumulate PA after school. Intramural sports are typically open to all students, while interscholastic sports are offered to the most highly skilled athletes. Sport participation is associated with a myriad of benefits for children, including improved nutritional behaviors[60], reduced depression[61], and better academic achievement[62]. A largescale study in Canada found a positive association between the number of interscholastic sports offered in schools and self-reported participation among students[63]. However, research has demonstrated that intramural sports have higher participation rates and allow for greater PA participation during sessions/practices[64]; therefore, intramurals are recommended as an effective supplement to interscholastic sports.

2.4 Multicomponent School Interventions

There are fewer attempts to implement multicomponent PA interventions than single-component PA interventions[65]. Aligned with the centerpiece of the CSPAP model, existing multicomponent PA interventions typically start with providing health-enhancing PE curricula, followed by the implementation of PA during school interventions via enhanced recess (e.g., structured activity zones, mobile PA equipment cart) or classroom movement integration (e.g., multiple 5-minute PA breaks), and PA after-school interventions (e.g., specialized PA club). Results indicate that PE +1 or +2 component interventions are modestly beneficial to children's objectively measured PA behaviors (e.g., 4–5 minutes more of MVPA per day or 1,000+ more step counts per day) and other student outcomes such as improvements in enjoyment, health-related physical fitness, classroom on-task behavior, cardiometabolic health markers (e.g., adiposity, cholesterol levels), and academic performance[66-68]. Published multicomponent school PA interventions that also include family/community engagement or staff involvement interventions are rare, as is the evidence for the impact of a full five component CSPAP model[69]. However, reviews have indicated multicomponent school-based interventions are more effective at increasing children's PA behavior during school than single-component interventions[69,70].

The main challenge of multicomponent PA interventions is that intervention efforts often occur in isolation across different segments of the school day. Applying longstanding principles

from school health promotion models (e.g., social ecological model, WSCC model)[71,72], the coordination of interconnected levels of influence are recommended for integrating multiple and, ultimately, impactful PA interventions throughout schools. The CSPAP conceptual framework depicted in Fig. 1 addresses key facilitators and the importance of coordinators, often led by a trained CSPAP champion, for multicomponent PA interventions to operate in unison and meaningfully contribute to PA opportunities and behaviors at school[73]. For maximum benefit, multicomponent school PA interventions should apply carefully tailored expansion (i.e., adding new PA opportunities), extension (i.e., increasing time allocated to existing PA opportunities), and enhancement (i.e., augmenting existing PA opportunities with evidence-based practices) strategies[74].

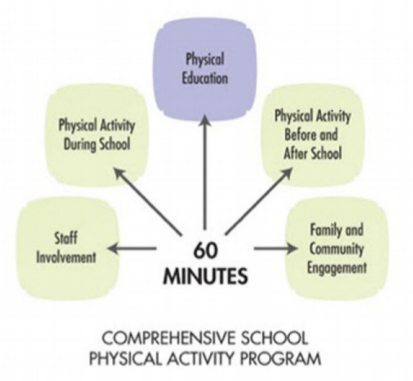

Fig. 1. CSPAP framework (CDC, 2018)

3. Current issues in school physical activity promotion

Emerging areas of practice that may inform the implementation of school-based PA interventions are presented in the following.

3.1 Professional Development

Since presented as one of the Institute of Medicine's (IOM) six recommendations for improving schoolwide PA, a growing number of professional training opportunities now exist for current and future school professionals to advance the implementation of CSPAP interventions. Most common, with modest effectiveness[75], is the continuing professional development of practicing teachers (mostly physical educators) to be trained as school-level CSPAP champions (i.e., Physical Activity Leader [PAL]). This form of training, currently known as the PAL learning system, typically starts with 1 day, in-person workshops that familiarize participants with CSPAP implementation steps[35] followed by yearlong mentorship and online resource support[76]. Comparable CSPAP-related professional training is also occurring in university PE teacher education programs where undergraduate and graduate students are provided with CSPAP learning experiences ranging from coursework assignments and field experiences to research training[77-79].

3.2 Technology Integration

Whether in the traditional classroom (e.g., computers, tablets, television, Internet videos, and applications) or in PE (e.g., heart rate monitors, accelerometers, pedometers, phone applications, smart watches, screen-based active video gaming (AVGs), technology use is infiltrated into schools. Every year, public schools spend a significant amount of money on digital content for students, of which most is for digital instruction purposes[80]. While technology has numerous benefits for schools (e.g., convenience [self-monitoring, goal setting], digital instruction), excessive screen time and sedentary behaviors are public health concerns tied to national goals to decrease the proportion of youth who exceed the daily 2-hour screen time recommendation in 2020 by 10%[79]. The paradox of limiting students' screen time while strengthening 21st century technology proficiencies may require innovative solutions.

One promising technology for increasing school-based PA participation, albeit at light-to-moderate intensity levels, has been the integration of screen-based AVGs in schools[80]. Factors inhibiting the success of AVG usage in schools include school policy for technology use, size of the gym or playground at the school, and teacher engagement with AVGs[81]. Future research should continue to examine the possibilities of novel and emerging technology applications (e.g., social media platforms, mobile devices and apps, health wearables, virtual reality, global positing systems) to increase students' PA levels during the school day[82].

3.3 Policy related issues

Local, regional, national, and international level-policy, recommendations, and standards have provided guidance on school-based PA promotion. The CSPAP framework[73] emphasizes the position of policy with respect to impacting student PA levels. While many countries have developed national PA plans that highlight the importance of schools within a comprehensive strategy for increasing PA levels across the population (i.e., United States, Ireland, Canada), it is less clear how these plans translate into policies that directly impact PA opportunities for students in schools. In the United States, schools that participate in federal Child Nutrition Programs have long been required to develop a school wellness policy[83]. The school wellness policy must include several components connected to the WSCC model, including goals specifically targeting increased PA opportunities in schools. However, the extent to which these wellness policies are implemented varies based on factors such as perceived levels of support[84]. The recently endorsed Every Student Succeeds Act (ESSA) also provides support for CSPAP implementation by including PE in the definition of a well-rounded education[85]. However, the provisions associated with the implementation of ESSA recommendations are tasked to individual schools, and consequently, the support specifically targeting PE and PA interventions will likely vary based on local-level administrators' priorities. Given school-based PA recommendations are consistent across several different countries, international efforts may consider identifying ways to translate existing guidelines and recommendations into policies to support schools. PE programs across the country diversified in nature. Three curriculuar perspectives are commonly represented in reality: public health, recreational (Happy PE), and educational (PE for learning/competence such as skills, knowledge, etc). While sole endorsing one particular perspective, Korean PE programs consider adopting CSPAP model to make children physically active for a lifetime since Korean children's PA level is exponentially very low.

4. Conclusion and Implication

There is significant evidence for school-based PA promotion. CSPAP is a practical model for both researchers and practitioners to consider the effective implementation of PA in schools. School stakeholders elicited several fruitful areas of inquiry including CSPAP education and training, technology usage for PA promotion in schools, community and family involvement in interventions, and the scalability and sustainability of school-based PA interventions. Researchers should consider developing partnerships with schools to pursue interventions that explore these inquiry areas, while school-based practitioners who are implementing PA interventions in their schools should advocate locally for their programs and connect with nearby universities for support. Schools hold great promise for building future generations of active healthy youth. The true success of PE

(promoting both learning and PA) depend on the specific context of PE classes and Korean PE needs to take CSPAP approach to make children physically active by participating in MVPA. This approach would reorient the Korean PE system and make Korean children healthier in nature.

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