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PHYSICAL ACTIVITY

Interventions to Promote Physical Activity in Young Children

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Introduction

Adequate participation in physical activity during early childhood is considered essential for normal growth and development.[1,2] Physical activity is also an important contributing factor in the prevention of overweight and obesity in young children.[1,2] In recognition of the importance of regular physical activity, national guidelines issued recommend all children from birth to age five engage in daily physical activity that promotes health-related fitness and movement skills.[3] Similar recommendations that integrate movement behaviours across a 24 hour-period have been issued by clinicians, researchers and early childhood education stakeholders in Canada,[4] Australia[5] and the United Kingdom.[6] Yet, despite the importance of regular physical activity, objective monitoring studies conducted in North America, Australia and the United Kingdom suggest that less than half of young children meet physical activity recommendations related to participation in daily moderate-to-vigorous physical activity.[7,8]

Subject

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The widespread problem of physical inactivity, taken alongside the continued rise in the prevalence of obesity in children under the age of 5, underscores the need for effective but readily translatable policies and programs to promote physical activity in young children. This brief provides an updated review to summarize current knowledge on interventions to promote physical activity in early childhood settings.

Problem

Despite there being an increased number of rigorously evaluated interventions to promote physical activity in children aged 5 years and under, there remains inconsistent evidence of their effectiveness. The scientific evidence to advise policy makers, service planners and providers suggests that educator led physical activity interventions delivered in centre-based childcare settings may be effective in increasing movement competence and physical activity. However, variations in intervention delivery, fidelity, evaluation methodologies and study outcomes make it difficult to provide explicit recommendations about what works or doesn't work, when it comes to getting young children more physically active.

Research Context

A large percentage of children under the age of 5 are in some type of regular child care arrangement,[9] intervention studies have, therefore, been primarily implemented and tested in center-based early childhood education settings.[10-12] Notably, however, physical activity interventions targeting other types of childcare settings such as family child care homes, and those including parental involvement, are emerging in the research literature with greater regularity.[13-17]

Key Research Questions

Published studies in this area have primarily addressed the question of whether curricula emphasizing structured physical activity, movement skill training or reductions in screen time are effective at increasing physical activity. Other studies have investigated the impact of environmental or policy changes on physical activity levels during childcare.

Recent Research Results

A growing number of studies have employed experimental study designs to evaluate interventions to increase physical activity in young children. Sixteen studies tested the

effectiveness of specialized physical activity curricula or movement training programs.[18-33] Nine additional studies tested multi-component interventions targeting physical activity promoting policies and practices strategies,[34-40] including the effects of increasing free-play opportunities during child care attendance.[41,42]

Of the 16 trials testing curriculum-based approaches, activities ranged from highly prescriptive exercise training regimens (jumping, hopping, skipping, circuit training) to developmentally-appropriate, physically active imagination games.[18-33] Eight of these investigations included strategies to improve fundamental movement skills.[19,22,24,26,27,32] Childcare staff, research staff/experts or a combination of both implemented the planned activity sessions or lessons. Children participated in the intervention activities lessons for as little as 10 to 60 minutes between two and five days per week. The duration of these interventions ranged from 2 days,[25,36] 4- to 8-weeks,[28,31] between 3 and 5 months[18,19,24,26,27,30] and longer interventions of 6 to 18 months.[22,23,37] Accelerometers were used to measure physical activity in 10 of the studies, with nine using count cut offs to categorize time spent in different physical activity intensity levels.[22,23,25,27-31,33] Data collection times included, during child care hours,[21,27,28,33] total daily activity2[2,31] or combinations of both.[23,25,29,30]

Of the 16 trials, 10 reported significant increases in physical activity level [21,25,27-30] or significant improvements in fundamental movement skills.[22-24,32] These studies were highly structured interventions that involved repetitive physical activity regimes performed by trained childcare staff who received professional development and ongoing support to implement the programs.

The nine studies that evaluated environmental or policy interventions to promote physical activity have reported mostly positive findings.[34-42] Five studies incorporated modifications to the built environment or outdoor playtime,[34,36-38,41,42] 2 studies included parent involvement,[37,38] and 5 studies incorporated staff training or facilitated feedback to increase implementation of physical activity promoting policies.[35,37,38,40,42] The interventions ranged from 2-5 days,[34,36,39] 8-weeks to 6 months[35,37,38,40-42] and 12 months.[39] One ongoing study plans to report outcomes after 18 months.[40] Eight studies used accelerometers to measure physical activity via count cut offs to categorize time spent in different physical activity intensity levels.[34-38,40-42] Data collection times included during childcare[34,35,37,40,42] and total daily activity.[36,38,41] Significant increases in objectively measured daily physical activity were seen in 5 studies where a focus was primarily on the addition of portable playground equipment, providing multiple bouts of unstructured play, and training teachers to incorporate physical activity into regular learning experiences in literacy,

numeracy, and science.[34,35,38,41,42]

Research Gaps

To advance our understanding in this area, some key research questions would include: 1) What are the key behavioural settings for promoting physical activity in young children? 2) Are programs to promote movement or physical activity in infants and toddlers warranted, and if so, what settings and strategies would be effective? 3) Are modifications to the childcare environment such as incorporating natural playground design and improving service provider's physical activity leadership skills effective in increasing physical activity in young children? 4) Are structured physical activity programs led by physical education specialists or community-based physical activity providers feasible, sustainable, and effective in promoting physical activity in other behavior settings? 5) How can childcare providers engage and motivate parents and other caregivers to promote and support physical activity at home?

Conclusions

There is now a significant number of studies examining the effectiveness of interventions to promote physical activity in young children. Overall, the evidence suggests that physical activity interventions implemented in early childhood education and care settings are effective at improving child physical activity levels. The challenge now is determining how such programs can be scaled up and implemented as routing practice in early childhood settings.

The available evidence, although still limited, suggests that simple modifications to the outdoor play environment such as modified outdoor playtime schedules and the provision of "off the shelf" portable play equipment can increase physical activity behaviour. Additionally, training teachers to incorporate movement into the standard classroom curriculum appears to be effective in increasing physical activity levels during the preschool day. However, providing multiple short bouts of free-play capitalizes on the natural tendency for children to be active at the start of free-play session, and may be a simple option of changing policy and practice without the requirement for additional skills, training expertise or resources for centre staff. Nevertheless, more translational design studies to replicate these results, including ongoing educator support and resources, in larger cluster randomized trials are required. Of note, trials that include multiple constructs of practices or policies, within an intervention, create difficulty to independently assess the effect of a single practice or policy.

To date, providing curricula that offer opportunities for developmentally-appropriate moderate-to-vigorous active play and fundamental movement skill development have moderate effects in promoting physical activity. It may be that such approaches are simply ineffective and that alternative strategies require exploration. Nonetheless, it should be noted that these studies: 1) focused on obesity prevention rather than physical activity, 2) provided activity sessions that were relatively brief in duration (~ 30 min) and low in frequency (three days per week); 3) were implemented over a relatively short time period (≤6 months); and 4) employed physical activity measurement protocols with limited sensitively to detect changes in physical activity behaviour.

Adult-led physical activity programs delivering highly structured exercise training sessions on a daily basis resulted in higher levels of physical activity. However, it is important to note that these studies were primarily exercise training studies in which physical activity was the factor being changed, not the outcome of the change. Thus, it is questionable whether these findings can be generalized to public health approaches to promoting physical activity in young children.

Implications for Parents, Services and Policy

For policy makers and service providers, the extant research literature provides limited guidance as to what approaches are effective in promoting physical activity in young children. The research suggests that training childcare staff to increase opportunities for physical activity in the classroom and during recess may be an effective strategy. The challenges being in intervention compliance, where increased fidelity may result in higher levels of physical activity when outcomes are assessed. Interventions requiring multiple health policies or practices in these settings may require additional or different types of implementation support. From a public health perspective, the focus on childcare provider training is particularly attractive, since the trainings could be mandated as a licensure requirement and delivered through existing childcare worker education and training networks.

Based on the evidence, policy makers and service providers should be wary of adopting stand-alone curricula offering structured physical activity and movement skill training, as there is mixed evidence to support their effectiveness. However, it should be noted that structured programs are not likely to do harm to young children; and in practice, such programs may offer substantial benefit to children when they are implemented in a responsible, developmentally-appropriate manner.

While the evidence related to physical activity interventions in child care settings is not definitive, it is well-established that parents play a significant role in shaping and supporting their children's physical activity behaviour.[2,13-17,38] In the constraints of evidence-based programs to promote physical activity in childcare settings, parents must be willing to take responsibility for encouraging and supporting their children's physical activity behaviour. The development of programs to educate and support parents in this endeavour should therefore be a priority.

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