ABSTRACT

Background: It is widely recommended that children engage in at least 60 minutes of moderate-to-vigorous physical activity (MVPA) per day for health, well-being and development benefits. However, few Hong Kong children are physically active. Environmental factors unique to Hong Kong, such as dense population, highly urbanized, and high level of outdoor air pollution, suggest need to develop indoor PA programs. Active video games (AVGs) may provide an innovative approach to designing such indoor programs.

Aim: This thesis sought to identify opportunities for interventions using AVGs to promote PA among children, and to develop and evaluate the effect of an AVG intervention on PA among Hong Kong Chinese children. We also intended to clarify the mechanisms of the intervention.

Methods: Three studies were undertaken for the aim of the thesis. First, a systematic review was conducted to evaluate the effects of AVGs on PA and PA-related outcomes (i.e. psychosocial factors and fitness) among healthy children. Secondly, a validation study was conducted that examined the validity and reliability of three scales used to measure PA-related self-efficacy, social support, and enjoyment among Hong Kong Chinese children aged 9-12 years (n=273). Third, a quasi-experimental study was conducted that examined the effects of a school-based AVG intervention on PA, sedentary time, body composition, and psychosocial factors (self-efficacy, social support, and enjoyment) among Hong Kong children aged 9-12 years (n=87). Moderation and mediation effects of psychosocial factors on PA were also tested in the study.
Results: In the first study, fifty-four articles were identified in the review. AVG led to light to moderate intensity PA among children. No effect was identified of AVG on PA in the home setting. Structured AVG play (i.e. AVG play of participants organized by teachers or researchers) may improve PA. However, none of the previous school-based AVG interventions have measured habitual PA objectively. In the second study, confirmatory factor analyses supported the one-factor structure of the tested scales. All of the psychosocial factors (self-efficacy, social support from family, social support from friends, and enjoyment) were significantly (p<0.01) associated with self-reported PA (r ranged from 0.23-0.40). All of the scales suggested acceptable internal consistency (Cronbach’s alpha>0.7) and test-retest reliability (intraclass correlation coefficient>0.7). The third study found that an AVG intervention delivered during after-school hours, approximately twice a week, significantly (p<0.05) increased total PA (counts per minute) and reduced sedentary behavior at week 8. However, this treatment effect was not maintained at 15 weeks when the frequency of AVG play decreased to approximately once a week during weeks 9-15. No significant differences were noted on body mass index z score and percentage body fat, and PA related psychosocial factors. The measured psychosocial factors did not act as mediators or moderators in this intervention.

Discussion: AVGs may be useful to promote PA of children when it is structured. Future interventions should consider the frequency of AVG play in order to increase PA. AVG play should occur at least twice a week based on current research. Other components may be necessary to enhance the treatment effects of AVG interventions on PA among children.
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