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REVIEW ARTICLE

Active School Travel Intervention Methodologies in North America: A Systematic Review

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Context: As children's lifestyles have become increasingly sedentary, active school travel can be a relatively accessible way to increase their daily physical activity. In recent years, several different models of interventions have been utilized to promote children participating in active school travel. This review documents and analyzes the different active school travel intervention methodologies that have been used in North America (Canada or U.S.) by collecting, organizing, and evaluating data relating to all phases of active school travel interventions.

Evidence acquisition: This systematic review developed a key word search and applied it in six databases (BIOSIS Previews, GeoBase, PubMed, SCOPUS, SPORTDiscus, Web of Science) to gather scholarly literature. A total of 22 studies evaluating children's active school travel interventions in a North American setting (four Canada, 18 U.S.) were identified for the period between January 2010 and March 2017.

Evidence synthesis: Applying the Safe Routes to School Education, Encouragement, Enforcement, Engineering, Equity, and Evaluation ("6 E's") framework, interventions were thematically assessed for their structure and organization, approaches and methods, and outcomes and discussions. Encouragement and education were the most commonly observed themes within the different methodologies of the studies reviewed. Details relating to intervention approaches and methods were common; whereas data relating to intervention structure and organization received much less attention.

Conclusions: Kingdon's multiple streams approach was applied to frame the findings for program facilitators and evaluators. Within the multiple streams approach, several considerations are offered to address and potentially improve active school travel intervention conceptualization, partnerships, organization, and evaluation.

CONTEXT

Obesity rates among children aged 3–19 years in Canada and the U.S. have more than doubled since the late 1970s.[1] Although childhood obesity is a complex issue, one important contributing factor has been physical inactivity.[2] Among children aged 5–17 years in Canada, just 13% of males and 6% of females meet their recommended physical activity guidelines by participating in a minimum of 60 minutes of moderate to vigorous physical activity per day.[3] Similarly, more than 80% of adolescents in the U.S. do not meet their recommended guidelines for aerobic physical activity.[4]

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Coinciding with the rise in physical inactivity among children has been a decline in active school travel (AST). AST, which is any form of human-powered transportation, such as walking or cycling to/from school, has seen a marked drop in participation in recent decades.[5] Longer travel distances have been strongly connected to the decline in AST, as an increase in the distance between home and school leads to fewer children using AST.[6–8] Concurrently, parental perceptions of safety have also limited children's opportunities to participate in AST.[9] Developments such as the rise of the automobile as the natural mode of travel for children illustrate the impact of social control barriers on AST.[10] Toronto, Ontario—Canada's largest city—provides a telling case of the eventual outcome: the proportion of children being driven to school has more than doubled in the past 30 years.[11] Motivating children and families to reverse this trend has considerable potential for children's health.

Increasing AST has many physical, developmental, and social benefits. Evidence connecting youth participation in AST has shown improvements in physical fitness and social development,[12] as well as academic performance and preparedness.[13] In fact, when directly compared with children who more frequently use passive modes of transportation, those who participate in AST are more likely to be more active overall, expend more energy, meet their prescribed daily moderate to vigorous physical activity recommendations,[14] and build richer social lives.[15] To increase participation levels, several different AST intervention models have been implemented throughout North America.

Active School Transportation Interventions

Active school transportation interventions generally follow a collaborative, multistep methodology. School Travel Planning, for example, utilizes a collaborative and structured process between a school and the local community to facilitate the building of support for AST, auditing of existing facilities and local infrastructure, development and implementation of an action plan, and ongoing monitoring.[16] Interventions to address AST, however, can take many forms. Intervention models include health promotions (e.g., walk to school days), community enforcement/safety initiatives (e.g., walking school bus), and infrastructure changes (e.g., building of sidewalks).[17] Although all forms have potential, there is still uncertainty over which AST intervention designs may be the most effective.[18,19] Because of its appropriateness, and to account for the methodologic variety within AST models, the Education, Encouragement, Enforcement, Engineering, Equity, and Evaluation ("6E's") of the Safe Routes to School (SRTS) National Partnership framework[20] will be used to categorize and analyze the interventions in this review.

Current State of Reviews and Justification

There are a few reviews covering active transportation, with Chillón et al.[9] providing the first review on this specific topic of AST interventions. Pang and colleagues[21] provided an update on this initial review, conducting a global search and providing comparative results, while also examining the use of theory in AST interventions. Expanding on this base, there are some important points to justify this review. First, this review focuses on a specific geographic area (North America) to provide a focused, contextually consistent review. Context is important when considering AST research, as social norms,[22] environments,[23] and policy[24] have been suggested to influence AST behavior. Second, this review provides a comprehensive documentation of all aspects related to intervention design and methodology. The focus is centered on methodology for a few reasons; principally, because recent research has discussed the importance of intervention sustainability,[25] programming,[26] and collaboration[27] in relation to improving AST. Finally, this review generates a pragmatic discussion for practitioners. Analysis is conducted utilizing the AST-specific SRTS 6E's framework[20] to organize findings thematically, whereas the subsequent discussion is framed in Kingdon's agenda-setting multiple streams approach (MSA).[28]

Review Question and Objective

In conducting this review, the research team asked: what are the supporting designs, methodologies, and reported outcomes of the most modern AST interventions? To ensure the quality of this question, Petticrew and Roberts'[29] "PICOC" model was applied. The question breaks down as follows:

- population: school-aged children (generally aged ≤14 years, but up to 19 years in some cases);
- intervention: interventions that support/promote AST;
- comparison: none;
- outcome of interest: supporting designs and methodology characteristics, and outcome foci and discussion relating to AST; and
- context: elementary, middle, or high school setting.

There were two primary objectives in this review. Foremost, this review documents the different AST intervention methodologies. This includes characteristics relating to organization, design, implementation, and reported outcomes and discussions. In addition, this