The effectiveness of Indigenous knowledge-based lifestyle interventions in preventing obesity and type 2 diabetes mellitus in Indigenous children in Canada: a systematic review

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INTRODUCTION

The rates of obesity and type 2 diabetes mellitus (T2DM) are rising in Indigenous communities in North America (1,2). Indigenous children in Canada have one of the highest incidence rates of T2DM and obesity (2.6/1000 persons/year) across children and youth (3, 4). The increase in T2DM is mainly driven by obesity, which manifests early in life and rises with age (3). As such, there is a critical need for prevention and treatment strategies that address T2DM and related comorbidities in Indigenous children. It is recommended that sustainable interventions for Indigenous populations are controlled and owned by local communities to maximize their success (5). The Indigenous peoples of Canada can be categorized into three main groups: First Nations, Métis, and Inuit, each with unique beliefs and cultures. Interventions that incorporate Indigenous knowledge and practices, and encompass the holistic vision of physical, mental, emotional, and spiritual health, will increase buy-in by communities (6).

AIM

This systematic review aimed to answer the following research question: In Indigenous children in Canada, are traditional knowledge-based lifestyle interventions effective in preventing obesity and T2DM?

METHOD

Literature Search: A literature search was conducted in May 2020 across multiple databases. The primary outcomes for this systematic review were changes in Body Mass Index (BMI) z-score with the implementation of the Indigenous knowledge-based diagnosis of T2DM. The secondary outcomes included changes in total adiposity (fat mass), central adiposity (waist circumference (WC), waist-to-height ratio, waist-to-height ratio and skinfold thickness), and lifestyle factors (nutrition and physical activity).

Eligibility Criteria: The study designs we aimed to include in this review were randomized control trials (RCTs), non-RCTs, and uncontrolled pre-post-test studies. Studies that recruited Indigenous boys and girls ≥18 years of age were included. Studies were included if they reported quantifiable outcomes of the outcome measures, namely WC, BMI, and weight gain.

Analysis: An exploratory meta-analysis was conducted for two studies. The chi-square test of homogeneity and inconsistency indices were used to evaluate the heterogeneity of the meta-analysis results. Risk of Bias & GRADE: Risk of bias was assessed using the Risk of Bias in Non-Randomized Studies – of Interventions (ROBINS-I) tool for non-RCTs and University of Alberta Evidence-based Practice Center (UAPEC) tool for uncontrolled studies. The GRADE guideline was used to assess the overall confidence in the reported evidence.

RESULTS

Ten studies were included in this systematic review, with four non-RCTs and six uncontrolled pre-post-test studies. Nine studies were conducted in First Nations children, and one study was conducted in Métis children. Across all studies, there were a total of 1,328 children recruited in the intervention group (n=654), and 382 children in control groups. Four studies aimed to evaluate diabetes prevention programs, notably the Sandy Lake Health and Diabetes Project and the Kawakwe Health Diabetes Prevention Project. An exploratory analysis was conducted for BMI z-score and WC (7, 8). The pooled mean difference was -0.10 (95% CI -0.16, -0.04) for BMI z-score and -2.10 (95% CI -3.68, -0.50) for WC. Involving the intervention group, four studies involved school-based programs with peer-led components that promoted healthy living, behaviours and self-efficacy (7, 8). However, one uncontrolled study reported no change in BMI z-score and an increase in WC with the intervention (9). Notably, this study aimed to evaluate a school-based program that did not have peer-led components. Another uncontrolled study reported an increase in both BMI z-score and WC with the intervention (10). A peer-led component was only one aspect of the intervention delivery. There were no significant changes with the intervention to lifestyle factors across the included studies. Nine of the included studies reported changes in diet with the intervention, with two uncontrolled studies (11, 12) reporting some improvements in diet and the

CONCLUSIONS

This systematic review suggests that the implementation of Indigenous knowledge-based lifestyle interventions with the controlled trial design (n=654) resulted in significant improvement in BMI z-score and WC among Indigenous children in Canada. However, there is a lack of randomization lowered confidence in the evidence, and suggest the need for Indigenous RCTs to establish culturally appropriate interventions to ensure the success of interventions in preventing obesity and T2DM.

ACKNOWLEDGMENTS

We would like to acknowledge that McMaster University, the affiliated institution for this research, is located on the traditional territories of the Mississauga and Haudenosaunee nations and within the lands protected by the “Dish with One Spoon” wampum agreement.

REFERENCES