CONTEXT AND POLICY ISSUES

Canadian populations in rural and remote areas experience increased vulnerability with chronic diseases such as cardiac, pulmonary diseases, and diabetes, in particular type 2 diabetes.\(^1\) Compared to the general population, Canadian aboriginal people have higher incidence of diabetes. According to the Public Health Agency of Canada, “Age-standardized rates show the prevalence of diabetes was 17.2% among First Nations individuals living on-reserve, 10.3% among First Nations individuals living off reserve, and 7.3% among Métis, compared to 5.0% in the non-Aboriginal population”.\(^2\) Canadian aboriginal people also have earlier onset of the disease, greater severity at the time of diagnosis, higher rates of complications and are less likely to have completed high school.\(^2\)\(^-\)\(^5\)

As part of the Canadian Diabetes Strategy, the Aboriginal Diabetes Initiative (ADI) was created in 1999 with a phase 1 (1999-2004) budget of C$115 million, a phase 2 (2005-2010) budget of C$190 million, and a phase 3 (2010-2015) budget of C$275 million, to help improve the health status of First Nations and Inuit communities through health promotion, diabetes prevention activities, improvement of screening, and treatment services.\(^6\)\(^,\)\(^7\) Using local knowledge, the ADI encourages Aboriginal populations to develop targeted interventions comprising of culturally relevant approaches to increase community wellness and reduce the burden of type 2 diabetes.

This Rapid Response report aims to review the clinical evidence regarding optimal blood glucose monitoring frequency and clinical effectiveness of targeted interventions to improve diabetes care for disadvantaged populations with type 2 diabetes, focusing on Canadian Aboriginal groups. Guidelines associated with blood glucose monitoring frequency and targeted interventions in this population will also be examined.

RESEARCH QUESTIONS

1. What is the clinical evidence regarding an optimal blood glucose monitoring frequency for indigenous populations with type 2 diabetes?

Disclaimer: The Rapid Response Service is an information service for those involved in planning and providing health care in Canada. Rapid responses are based on a limited literature search and are not comprehensive, systematic reviews. The intent is to provide a list of sources of the best evidence on the topic that CADTH could identify using all reasonable efforts within the time allowed. Rapid responses should be considered along with other types of information and health care considerations. The information included in this response is not intended to replace professional medical advice, nor should it be construed as a recommendation for or against the use of a particular health technology. Readers are also cautioned that a lack of good quality evidence does not necessarily mean a lack of effectiveness particularly in the case of new and emerging health technologies, for which little information can be found, but which may in future prove to be effective. While CADTH has taken care in the preparation of the report to ensure that its contents are accurate, complete and up to date, CADTH does not make any guarantee to that effect. CADTH is not liable for any loss or damages resulting from use of the information in the report.

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2. What are the evidence-based guidelines regarding blood glucose monitoring frequency for indigenous populations with type 2 diabetes?

3. What is the clinical effectiveness of targeted interventions to improve diabetes care for indigenous populations with type 2 diabetes?

4. What are the evidence-based guidelines regarding targeted interventions to improve diabetes care for indigenous populations with type 2 diabetes?

KEY FINDINGS

Findings from systematic reviews and meta-analyses showed that targeted interventions that focused on culturally tailored diabetes education lead to more diabetes knowledge and better glycemic control than usual care in short and medium term. The intervention is most beneficial at 6 months follow up, when it is given at clinic- or hospital-based education centers or to patients with lower HbA1c levels. The majority of trials included in the systematic reviews are on African Americans, Hispanic Americans and Asians. Findings on different ethnic minorities such as First Nations are lacking. There were no studies or guidelines found on the optimal blood glucose monitoring frequency for indigenous populations with type 2 diabetes. The Canadian Diabetes Association recommended the use of culturally appropriate prevention and management programs for children and adults in Aboriginal communities, with respect to specific risk factors, particular language and cultural beliefs, and geographic issues.

METHODS

Literature Search Strategy

A limited literature search was conducted on key resources including PubMed, The Cochrane Library (2014, Issue 1), University of York Centre for Reviews and Dissemination (CRD) databases, Canadian and major international health technology agencies, as well as a focused Internet search. No filters were applied to limit the retrieval by study type. Where possible, retrieval was limited to the human population. The search was also limited to English language documents published between January 1, 2006 and January 21, 2014.

Selection Criteria and Methods

One reviewer screened citations and selected studies. In the first level of screening, titles and abstracts were reviewed for relevance. Full texts of any relevant titles or abstracts were retrieved, and assessed for inclusion. The final article selection was based on the inclusion criteria presented in Table 1.

<table>
<thead>
<tr>
<th>Population</th>
<th>Indigenous populations with type 2 diabetes, with a focus on First Nations, Inuit, Metis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intervention</td>
<td>Blood Glucose Monitoring</td>
</tr>
<tr>
<td></td>
<td>Targeted interventions to improve diabetes care</td>
</tr>
<tr>
<td>Comparator</td>
<td>Different frequencies of monitoring</td>
</tr>
<tr>
<td></td>
<td>Standard care</td>
</tr>
<tr>
<td>Outcomes</td>
<td>Clinical effectiveness (e.g. improved HbA1c, reduction in diabetes)</td>
</tr>
</tbody>
</table>
Exclusion Criteria

Articles were excluded if they did not meet the selection criteria in Table 1, if they were published prior to January 2006, if they were duplicate publications of the same study, or if they were referenced in a selected systematic review.

Critical Appraisal of Individual Studies

The quality of the included systematic reviews and guidelines was assessed using the AMSTAR® and AGREE® checklists, respectively. Numeric scores were not calculated. Instead, the strengths and limitations of the study are summarized and presented.

SUMMARY OF EVIDENCE

Quantity of Research Available

The literature search yielded 494 citations. After screening of abstracts from the literature search and from other sources, 32 potentially relevant studies were selected for full-text review. Two studies and one guideline met the inclusion criteria and were included in the review. The PRISMA flowchart in Appendix 1 details the process of the study selection.

Summary of Study Characteristics

A detailed summary of the included study is provided in Appendix 2.

Study design

Two systematic reviews/meta-analyses of RCTs10,11 and one clinical practice guideline12 were included in the report.

Population

The first systematic review10 included 12 RCTs (total 1495 participants) that assessed the effects of culturally tailored diabetes education intervention (CTDEI) in ethnic minority groups with type 2 diabetes, with a mean age of 63.6 years and 68% female. Four studies included American Americans, three studies included Hispanic Americans, four studies included Asians, and one study included Canadian-Portuguese. The second systematic review11 included 11 RCTs (total 1603 participants) that assessed the effects of culturally appropriate health education in ethnic minority groups with type 2 diabetes (participants characteristics not reported). Four studies included African Americans, three studies included Asians, one study included Mexican-Americans, one study included Puerto Ricans, one study included Hispanic Americans, and one study included Pakistanis. The clinical practice guideline is on type 2 diabetes in Canadian Aboriginal peoples.12
*Interventions and comparators*

CTDEI (also called culturally appropriate health education) is an intervention that had been tailored to the cultural or religious beliefs and linguistic and literacy skills of the community being studied, and incorporates family participation, culturally specific educational materials, and health practices.\(^{10,11}\) Interventions were usually weekly group sessions and the duration of intervention ranged from 1 week to 12 months (median of 3 months). The control groups included usual education, without CTDEI or culturally appropriate health education. Intervention providers varied from nurses, dieticians, diabetes educators, other professionals (e.g., pharmacists, physiotherapists, psychologists, and social workers), and non-professional staff. Follow-up duration ranged from three months to one year (mean of 6.4 months).

*Outcomes*

The two systematic reviews reported glycemic control (change of HbA\(_1c\) levels), knowledge of diabetes, and diabetes management changes between intervention and control groups.\(^{10,11}\) The included guideline provided recommendations for Aboriginal children with type 2 diabetes in Canada.\(^{12}\)

**Summary of Critical Appraisal**

The included systematic reviews\(^{10,11}\) were meta-analyses, and provided an a priori design and performed a comprehensive literature search. Both systematic reviews included only RCTs. In both reviews, considerable heterogeneity was found in the provider of the interventions among the included trials. Neither review included a list of excluded studies. One review did not perform an analysis of publication bias.\(^{11}\)

The included guidelines\(^{12}\) had scope and purpose clearly defined, and listed recommendations that are specific and unambiguous. The guidelines were based on searching of multiple bibliographic databases, but the strategies used were unclear, and strategies for individual clinical questions were not described. Recommendations were developed and reviewed by an expert committee, and external expert peer review was performed. The health benefits, side effects, and risks associated with the interventions were not stated in the recommendations and potential cost implications of applying the recommendations were not included.

Details of the strengths and limitations of the included studies are summarized in Appendix 3.

**Summary of Findings**

Main findings of included studies are summarized in detail in Appendix 4.

1. **What is the clinical evidence regarding an optimal blood glucose monitoring frequency for indigenous populations with type 2 diabetes?**

   The literature search did not identify any evidence on optimal blood glucose monitoring frequency for indigenous populations with type 2 diabetes.

2. **What are the evidence-based guidelines regarding blood glucose monitoring frequency for indigenous populations with type 2 diabetes?**
The literature search did not identify any guideline regarding optimal blood glucose monitoring frequency for indigenous populations with type 2 diabetes.

3. What is the clinical effectiveness of targeted interventions to improve diabetes care for indigenous populations with type 2 diabetes?

The literature search found two systematic reviews/meta-analyses that compared targeted interventions to usual care in ethnic minorities with type 2 diabetes.\(^{10,11}\) Both systematic reviews had similar study selection criteria but different language restrictions and publication times, with eight RCTs common to both reviews. In general, targeted interventions that focused on culturally tailored diabetes education lead to more diabetes knowledge and better glycemic control than usual care. The effect was greatest and statistically significant at 6 months follow up, and was lost at 12 months follow up. The intervention was most beneficial when it was given at clinic- or hospital-based education centers or to patients with lower HbA\(_{1c}\) levels.

The first systematic review\(^{10}\) performed meta-analyses on 12 RCTs (total 1495 participants) that assessed the effects of CTDEI in ethnic minority groups with type 2 diabetes. The duration of intervention ranged from 1 session to 12 months. The settings of the interventions were hospital-based outpatient clinics or hospital diabetes education centers, and community-based settings. The control group included usual education, without CTDEI. The studied outcomes were glycemic control (i.e. HbA\(_{1c}\) levels change from baseline to follow up time, between intervention and control groups). Pooled estimates showed a 29% decrease in HbA\(_{1c}\) levels in the intervention group compared to the control group, and the difference was statistically significant. Tests for heterogeneity showed no evidence of heterogeneity across included trials. Subgroup analyses according to duration of intervention showed that the effect of intervention is greatest and statistically significant at 6 months follow up (41% decrease in HbA\(_{1c}\) levels), and is smaller and not statistically significant at 3 months and 12 months follow up. Subgroup analyses according to settings showed that interventions given at clinic- or hospital-based diabetes education centers provided statistically significant improvement in glycemic control compared to usual care, while the difference was not statistically significant for participants who attended community-based education centers. Subgroup analyses according to baseline HbA\(_{1c}\) levels showed that participants with baseline HbA\(_{1c}\) levels ≤8.5% showed statistically significant improvement in glycemic control compared to usual care, while the difference was not statistically significant for participants with baseline HbA\(_{1c}\) levels > 8.5%.

The second systematic review\(^{11}\) performed meta-analyses on 11 RCTs (total 1603 participants) that assessed the effects of culturally appropriate health education in ethnic minority groups with type 2 diabetes. The control group included usual education, without culturally appropriate health education. The studied outcomes were glycemic control (i.e. HbA\(_{1c}\) levels change from baseline to follow up time, between intervention and control groups), and participant knowledge of diabetes and nutrition. Consistent with the findings from the first systematic review, targeted interventions led to a statistically significant improvement in glycemic control compared to usual care, with greatest effect at 6 months follow up (60% decrease in HbA\(_{1c}\) levels). Participant knowledge in diabetes and nutrition also improved at 3 months, 6 months and 1 year follow up compared to usual care. The differences were statistically significant.

4. What are the evidence-based guidelines regarding targeted interventions to improve diabetes care for indigenous populations with type 2 diabetes?
The Canadian Diabetes Association recommended the use of culturally appropriate prevention and management programs for children and adults in Aboriginal communities. According to the recommendations, prevention programs should assess and mitigate the environment risk factors such as geographic and cultural barriers, food insecurity, psychological stress, insufficient infrastructure, and settings that are not conducive to physical activity. In addition to following the same clinical practice guidelines as those for the general population, it was recommended that management of pre-diabetes and diabetes in Aboriginal peoples should respect particular language and cultural beliefs, and geographic issues in Aboriginal communities across Canada. The recommendations above were from the consensus of the Canadian Diabetes Association Clinical Practice Guidelines Expert Committee and had grade D evidence (there is fair evidence to recommend).

Limitations

While one review searched for articles published in multiple languages, the systematic reviews only included published English language articles. Only one systematic review performed funnel plot, which is slightly asymmetrical, indicating a possible publication bias. The exclusion of unpublished studies may have influenced the results. The wide range of intervention providers among trials makes interpretation of the results and choice of optimal providers for these interventions difficult. The majority of trials included in the systematic reviews are on African Americans, Hispanic Americans and Asians. Findings on different ethnic minorities such as First Nations are lacking. Cost implications were not reported in the Canadian Diabetes Association Clinical Practice Guidelines on type 2 diabetes in Aboriginal peoples. There were no studies or guidelines found on the optimal blood glucose monitoring frequency for indigenous populations with type 2 diabetes.

CONCLUSIONS AND IMPLICATIONS FOR DECISION OR POLICY MAKING

Targeted interventions that focused on culturally tailored diabetes education led to more diabetes knowledge and better glycemic control than usual care in short and medium term. The intervention is most beneficial at 6 months follow up, and when it is given at clinic- or hospital-based education centers, or to patients with lower HbA1c levels. The majority of trials included in the systematic reviews are on African Americans, Hispanic Americans and Asians.

Challenges are numerous in prevention and management of type 2 diabetes in Canadian Aboriginal peoples. Adherence to screening guidelines, gaps between risk factors and prevention, and gaps between disease and treatment are among the main issues.

Health care providers may face barriers that fall into four categories: patient factors (e.g., patients’ responsibility and control over their diabetes), provider factors (e.g., knowledge and skills), systemic factors (e.g., service funding and accessibility) and environment factors (e.g., running water, unpaved roads). Many lessons can be learned in using Community-Based Participatory Research (CBPR) principles to build a national diabetes collaborative in Canada, in particular building collaborative relationships, culture and ethics consideration, collaboration and partnership, and innovative avenues of data management and dissemination. It is critical that members of the remote Aboriginal communities such as First Nations are given enough information to enable them to support the programs and desire their success, that trust has been developed between the community and investigators, that ethical issues are considered, and that issues of access and travel for the health care team are addressed.
Despite the challenges, many programs addressing type 2 diabetes in Aboriginal populations in Canada have shown promising results. Narrative inquiry together with dialogue and conversations with Aboriginal people living with type 2 diabetes have expanded our understanding of diabetes in a specific cultural context. The Sandy Lake Health and Diabetes Project (SLHDP), a community-based intervention that targets type 2 diabetes and its risk factors in a First Nation community has shown to be beneficial and sustainable. A socio-ecological framework to understand weight-related issues in Aboriginal children in Canada was developed, focusing on environmental issues during childhood, history of colonization, and inequities in the social determinants of health. A school-based strategy for addressing obesity and diabetes in First Nations children, the Healthy Buddies™ First Nations (HB) program, has been shown to promote healthy eating habits, physical activity, and self-esteem, leading to a reduction of body mass index and waist circumference.

In summary, there is room for improvement in diabetes care among Canadian Aboriginal populations. An integrated diabetes prevention and management program for Canadian Aboriginal populations with targeted interventions, focusing on patient engagement, provider skills, and cultural, linguistic, and socioeconomic considerations may help to reduce the prevalence rate and the burden of the condition.

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Canadian Agency for Drugs and Technologies in Health
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REFERENCES


Appendix 1: Selection of Included Studies

- 494 citations identified from electronic literature search and screened
  - 464 citations excluded

- 30 potentially relevant articles retrieved for scrutiny (full text, if available)
  - 2 relevant reports retrieved from other sources (grey literature, hand search)

- 32 potentially relevant reports
  - 29 reports excluded (irrelevant designs, population, interventions or outcomes)

- 3 reports included in review
## Appendix 2: Characteristics of Included Studies

### Table A1: Characteristics of Included studies

<table>
<thead>
<tr>
<th>First Author, Year, Country,</th>
<th>Literature Search Strategy</th>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
<th>Studies included</th>
<th>Main outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Systematic reviews</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nam, 2012, US</td>
<td>&quot;We searched PubMed, CINAHL, ERIC, and PsycINFO for published studies and ProQuest database for dissertations and theses using the following key words: type 2 diabetes, diabetes mellitus, health education, diabetes education, counseling, minority, ethnic minority, race, and behavioral intervention. We limited our search to English-language, both published and unpublished studies between 1980 and 2009.&quot; (p 506)</td>
<td>&quot;Randomized controlled trials (RCTs) that had diabetes educational interventions (no drug intervention) performed only in ethnic minority groups with type 2 diabetes and that reported both preintervention and postintervention glycosylated hemoglobin (HbA1c) values were included.&quot; (p 506)</td>
<td>Studies not fulfilling inclusion criteria. Quasi-experimental studies (ie, studies with lack of comparison group) were excluded.</td>
<td>12 RCTs were included.</td>
<td>Intervention: culturally tailored diabetes educational intervention (CTDEI) CTDEI: “For our meta-analysis, culturally tailored diabetes interventions refer to incorporating the following factors into the interventions: cultural beliefs, family participation, values, customs, food patterns, language, low literacy, culturally specific educational materials, and health practices.” (p 506) Outcomes Glycemic control: HbA1c change from baseline between control and treatment groups</td>
</tr>
<tr>
<td>Hawthorne, 2010, UK</td>
<td>&quot;The following databases were searched: the Cochrane Library, Issue 3, 2007; Medline (Ovid; 1966), Embase, PsycINFO, CINAHL, ERIC, and SIGLE. We also searched databases of ongoing trials such as Current</td>
<td>&quot;Only RCTs were included in this review. Studies had to describe the intervention of culturally appropriate diabetes HE in at least one of its trial arms aimed at an ethnically defined minority group of adults &gt; 16 years of age, with Type 2 diabetes, resident in a middle-income or high-income country.” (p 614)</td>
<td>Studies not fulfilling inclusion criteria</td>
<td>11 RCTs were included.</td>
<td>Intervention: culturally appropriate health education ‘Culturally appropriate health education’ was defined as HE (health education)</td>
</tr>
</tbody>
</table>
### Table A1: Characteristics of Included studies

<table>
<thead>
<tr>
<th>First Author, Year, Country,</th>
<th>Literature Search Strategy</th>
<th>Inclusion Criteria</th>
<th>Exclusion Criteria</th>
<th>Studies included Main outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Controlled Trials (<a href="http://www.controlled-trials.com">http://www.controlled-trials.com</a>) and The National Research Register (<a href="http://www.update-software.com/National/nrr-frame.html)%E2%80%9D">http://www.update-software.com/National/nrr-frame.html)”</a> Studies published in any language were included” (p 614)</td>
<td></td>
<td>that had been tailored to the cultural or religious beliefs and linguistic and literacy skills of the community being studied” (p 614)</td>
<td>Outcomes: - Glycemic control: HbA1c change from baseline between control and treatment groups - Knowledge (diabetes and nutrition)</td>
</tr>
</tbody>
</table>
## Appendix 3: Summary of Critical Appraisal of Included Study

### Table A2: Summary of Critical Appraisal of Included Study

<table>
<thead>
<tr>
<th>First Author, Publication Year</th>
<th>Strengths</th>
<th>Limitations</th>
</tr>
</thead>
<tbody>
<tr>
<td><em><em>Critical appraisal of included systematic reviews (AMSTAR</em>)</em>*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| Nam, 2012                     | • a priori design provided  
                                • all included studies are randomized controlled trials  
                                • independent study selection and data extraction procedure in place  
                                • comprehensive literature search performed  
                                • list of included studies, study characteristics provided  
                                • quality assessment of included studies provided and used in formulating conclusions  
                                • assessment of publication bias performed  
                                • conflict of interest stated | • list of excluded studies not provided  
                                                                 • considerable heterogeneity in different providers among the included trials |
| Hawthorne, 2010                | • a priori design provided  
                                • all included studies are randomized controlled trials  
                                • independent study selection and data extraction procedure in place  
                                • comprehensive literature search performed  
                                • list of included studies, study characteristics provided  
                                • quality assessment of included studies provided and used in formulating conclusions  
                                • conflict of interest stated | • list of excluded studies not provided  
                                                                 • considerable heterogeneity in different providers among the included trials  
                                                                 • unclear whether assessment of publication bias was performed |

### Critical appraisal of included guidelines (AGREE*)

<table>
<thead>
<tr>
<th>Canadian Diabetes Association, 2013</th>
<th></th>
<th></th>
</tr>
</thead>
</table>
|                                     | • scope and purpose of the guidelines are clear  
                                • the recommendations are specific and unambiguous  
                                • the method for searching for the evidence reported  
                                • methods used for formulating the recommendations reported  
                                • target users of the guidelines clearly defined  
                                • the guideline was piloted among target users  
                                • procedure for updating the guidelines provided | • unclear whether patients’ views and preferences were sought  
                                                                 • health benefits, side effects and risks not stated in the recommendations  
                                                                 • potential cost implications of applying the recommendation not included  
                                                                 • search and selection criteria not reported for individual clinical questions, only for the guidelines as a whole, which leaves some ambiguity for how each chapter was developed |
### Table A3: Main Study Findings and Authors’ Conclusions

<table>
<thead>
<tr>
<th>First Author, Publication Year</th>
<th>Main Study Findings</th>
<th>Authors’ Conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Research question 1</strong> (clinical evidence regarding an optimal blood glucose monitoring frequency for indigenous populations with type 2 diabetes)</td>
<td>No evidence found</td>
<td></td>
</tr>
<tr>
<td><strong>Research question 2</strong> (evidence-based guidelines regarding blood glucose monitoring frequency for indigenous populations with type 2 diabetes)</td>
<td>No evidence found</td>
<td></td>
</tr>
</tbody>
</table>
| **Research question 3** (clinical effectiveness of targeted interventions to improve diabetes care for indigenous populations with type 2 diabetes) | Nam, "" 2012  
Glycemic control: change of HbA1c levels between intervention and control groups  
SMD -0.29 (95% CI -0.46, -0.13)  
No significant heterogeneity across trials (I-squared: 50.2%)  
Subgroup analyses  
Time to follow up  
The effect of intervention is greatest and statistically significant at 6 months follow up: SMD -0.41 (95% CI -0.61, -0.21)  
The effects of intervention at 3 months and 12 months follow up are smaller and not statistically significant  
Settings  
For participants who attended clinic- or hospital-based diabetes education centers: SMD -0.26 (95% CI -0.44, -0.09)  
For participants who attended community-based education centers: SMD -0.34 (95% CI -0.069, 0.01)  
Baseline HbA1c levels  
For studies with baseline HbA1c ≤ 8.5%: SMD -0.31 (95% CI -0.52, -0.09)  
For studies with baseline HbA1c > 8.5%: SMD -0.29 (95% CI -0.58, 0.01) | "Based on this meta-analysis, CTDEI is effective for improving glycemic control among ethnic minorities. The magnitude of effect varies based on the settings of intervention, baseline HbA1c level, and time of HbA1c measurement. More rigorous RCTs that examine tailored diabetes education, ethnically matched educators, and more diverse ethnic minority groups are needed to reduce health disparities in diabetes care." (p 505) |
| Hawthorne, "" 2010  
Glycemic control: change of HbA1c levels between intervention and control groups  
At 3 months: SMD -0.32 (95% CI -0.63, -0.01)  
No significant heterogeneity across trials (I-squared: 37.2%)  
At 6 months: SMD -0.60 (95% CI -0.85, -0.35)  
No significant heterogeneity across trials (I-squared: 31.7%)  
At 1 year: no effect (meta-analysis not performed) | "Culturally appropriate health education was more effective than 'usual' health education in improving HbA1c and knowledge in the short to medium term" (p 613) |
### Table A3: Main Study Findings and Authors’ Conclusions

<table>
<thead>
<tr>
<th>First Author, Publication Year</th>
<th>Main Study Findings</th>
<th>Authors’ Conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge: change of knowledge scores between intervention and control groups</td>
<td></td>
<td></td>
</tr>
<tr>
<td>At 3 months: SMD 0.53 (95% CI 0.22, 0.84)</td>
<td>No significant heterogeneity across trials (I-squared: 55.5%)</td>
<td></td>
</tr>
<tr>
<td>At 6 months: SMD 0.36 (95% CI 0.01, 0.70)</td>
<td>Some heterogeneity across trials (I-squared: 66.3%)</td>
<td></td>
</tr>
<tr>
<td>At 1 year: SMD 0.35 (95% CI 0.13, 0.57)</td>
<td>No significant heterogeneity across trials (I-squared: 0%)</td>
<td></td>
</tr>
</tbody>
</table>

#### Research question 4 (evidence-based guidelines regarding targeted interventions to improve diabetes care for indigenous populations with type 2 diabetes)

**Canadian Diabetes Association, 2013**

**RECOMMENDATIONS** (p S194)

1. Starting in early childhood, Aboriginal people should be evaluated for modifiable risk factors of diabetes (e.g. obesity, lack of physical activity, unhealthy eating habits), prediabetes, or metabolic syndrome [Grade D, Consensus, see Type 2 Diabetes in Children and Adolescents, p. S163].

2. Screening for diabetes in Aboriginal children and adults should follow guidelines for high risk populations (i.e. earlier and at more frequent intervals depending on presence of additional risk factors) [Grade D, Consensus, see Screening for Type 1 and Type 2 Diabetes, p. S12; Type 2 Diabetes in Children and Adolescents, p. S163].

3. Culturally appropriate primary prevention programs for children and adults should be initiated in and by Aboriginal communities with support from the relevant health system(s) and agencies to assess and mitigate the environmental risk factors, such as:
   - geographic and cultural barriers
   - food insecurity
   - psychological stress
   - insufficient infrastructure
   - settings that are not conducive to physical activity
   [Grade D, Consensus].

4. Management of prediabetes and diabetes in Aboriginal peoples should follow the same clinical practice guidelines as those for the general population with respect for, and sensitivity to, particular language, cultural history, traditional beliefs and medicines, and geographic issues as they relate to diabetes care and education in Aboriginal communities across Canada. Programs should adopt a holistic approach to health that addresses a broad range of stressors shared by Aboriginal peoples [Grade D, Consensus].

5. Aboriginal peoples in Canada should have access in their communities to a diabetes management program that would include an interprofessional nurse-led team, diabetes registries, and ongoing quality assurance and surveillance programs [Grade D, Level 4].

6. Aboriginal women should attempt to reach a healthy body weight prior to conception to reduce their risk for gestational diabetes [Grade D, Level 4].

7. Programs to detect pre-gestational and gestational
<table>
<thead>
<tr>
<th>First Author, Publication Year</th>
<th>Main Study Findings</th>
<th>Authors' Conclusions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>diabetes, provide optimal management of diabetes in pregnancy, and timely post-partum follow-up should be instituted for all Aboriginal women to improve perinatal outcomes, manage persistent maternal dysglycemia, and reduce type 2 diabetes rates in their children [Grade D, Level 4, see Diabetes and Pregnancy, p. S168].</td>
<td></td>
</tr>
</tbody>
</table>

SMD: standardized mean difference
Grade D: Best evidence was reported to be Level 4 or expert consensus
Level 4: Evidence other than RCTs, non-randomized clinical trials, cohort studies, or systematic review of these designs