



# Perceptions of a Culturally Tailored Adapted Program to Prevent Type 2 Diabetes

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### Abstract

**Objective:** To explore African and Caribbean immigrants' perceptions of a culturally tailored intervention to prevent type 2 diabetes.

**Methods:** Using a purposive sampling scheme, 29 participants (26 women and 3 men, mean age 48 years and average length of residency of 22 years in Canada) participated in this study. The researchers used in-depth focus groups and individual surveys to collect qualitative data from participants. Following these interviews, participants individually reviewed the intervention and provided written feedback on their perceptions of the intervention. Data were analyzed using thematic analysis.

**Findings:** Three themes emerged from the data: motivating factors to engage in physical activity and healthy eating, barriers that prohibit engaging in physical activity and increasing knowledge about food selection and modification of diet. In addition to the themes, participants had positive perceptions of the intervention. Eighty six percent rated the intervention as very useful and 83% were very satisfied with its contents. They reported that the intervention was culturally consistent with their beliefs, values and cultural practices in preventing type 2 diabetes.

**Conclusion:** Perceptions of this culturally tailored intervention provided valuable evidence to assist the researchers in moving forward to the next level of research development such as evaluating the effectiveness of the intervention on the targeted groups' outcomes: self-care knowledge, performance of physical activity, healthy eating practices and self-efficacy.

### Keywords

Perceptions of an intervention, Culturally tailored intervention, Type 2 Diabetes, Prevention, African immigrants and Caribbean immigrants

### Abbreviations

CTI: Culturally Tailored Intervention, T2D: Type 2 Diabetes, BMI: Body Mass Index, PA: Physical Activity, DSME: Diabetes Self-Management Education

### Introduction

Type 2 Diabetes (T2D) affects over 3 million people of all ages in Canada [1], resulting in significant morbidity, mortality and

economic burden estimated above \$7.0 billion in Ontario alone [2]. Three hundred and forty seven million people world-wide have diabetes [3] and T2D is one of the fastest growing chronic diseases in Canada with 60,000 new cases diagnosed yearly and thus is a major public health problem [4]. There is a higher prevalence of T2D among immigrants which is associated with their genetic predisposition [5,6], cultural beliefs and health practices [7,8]. These practices influence self-management behaviors related to the prevention of T2D. There is a dearth of research that focuses on prevention of T2D among ethnic minorities in Canada. Evidence shows that culturally-tailored interventions (CTIs) are more effective with ethnic minorities [9-13] than standard programs targeting the general population. However, most CTIs have focused on the management of T2D [10-13] rather than its prevention; are not theory-based [10,14] and have been evaluated in studies with small samples [9,12,13]. Given the growing prevalence of T2D, prevention is a high priority. Thus, building on the strengths of Culturally-Tailored Interventions (CTIs) and participatory approach to intervention design, the investigators developed a CTI for preventing T2D among Caribbean and African immigrants, which was reviewed by them prior to its implementation.

### Purpose of the study

Using qualitative methods, this study explored adult African and Caribbean immigrants' perceptions of a culturally tailored adapted intervention to prevent T2D. The research questions were: 1) what are your perceptions of the culturally tailored adapted intervention to prevent type 2 diabetes? And 2) what factors will motivate you to attend or prevent you from attending this intervention?

### Background

The prevalence rate of diabetes in Ontario was 6.0% in 2008/09 [1]. Three million Canadians have diabetes and this rate is expected to increase to 3.7 million by 2020 [2]. Risk factors of T2D are non-modifiable (increasing age, family history), modifiable (physical activity, unhealthy eating, central obesity and hypertension) and social (socio-economic factors, stress and the environment [1,3,15,16]). Evidence demonstrates that focusing on modifiable lifestyle factors, targeting increased physical activity and improved diet reduced the risk of T2D by nearly 60% [17,18] in the general population. However, there is limited evidence on the uptake, adherence, and effectiveness

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of physical activity and dietary interventions for Caribbean and African populations who reside in Canada.

## Diabetes and culture

Creatore et al. [19] found that the prevalence rate of diabetes is three times higher for South Asians and nearly double for Latin Americans, Caribbean and Sub-Saharan Africans as compared to rates for persons of other cultural groups such as Western Europeans and North Americans. After controlling for age, Creatore et al. [19] found that the risk for diabetes was elevated among immigrants in Ontario for South Asians (odds ratio (OR) = 4.01 for men, 3.22 for women), Latin America and the Caribbean (OR = 2.18 for men, 2.40 for women), and Sub-Saharan Africa (OR = 2.3 for men, 1.83 for women). Although these groups are at high-risk for T2D, the proposed study focused on two groups, Caribbean and African immigrants, from Durham Region, Ontario. Caribbean and African men and women are the largest group of visible minorities in Durham (13% in Ajax, 11% in Pickering and 6.1% in Whitby) [20].

## Health beliefs and cultural practices of African and Caribbean immigrants

Researchers in England, Sweden, Canada and the United States [21-27] found that African and Caribbean immigrants held specific cultural beliefs that were different to the general population. For example, immigrants believed in the effectiveness of herbal medicines, traditional foods, and folk medicines, which were integral to their wellness [21,22,28-30]. Participants who held strong religious beliefs viewed traditional health practices such as faith healing, prayer and fasting, as effective for curing diabetes or reducing its effects [22,28,29]. Other participants reported taking herbs like bitter melon, cinnamon bark, aloe vera, and mauby bark to treat T2D [22,23,27,31] and engaged in a practice called “washouts” [31]. “Washouts” involves taking laxatives at varying intervals with the aim of purging and cleansing the body to get rid of waste impurities, relieving lethargy and keeping the body healthy. Participants also had difficulty incorporating dietary advice on treating diabetes within their traditional diet and doubted the value of health professionals’ advice if it conflicted with their beliefs about eating natural foods [31]. These findings indicated that immigrants from the Caribbean and Africa retained traditional beliefs and practices that influenced their health and management of T2D. Health beliefs and cultural practices of the target population should be accounted for when developing interventions designed to improve health and incorporated into a theory-based intervention in order to increase its uptake and efficacy.

## Culturally tailored interventions (CTIs)

Given the increasing rate of T2D in ethnic minorities, investigators [9-14,32] have focused on designing CTIs to self-manage T2D. According to Nam et al. [10], CTIs have been more effective in achieving health outcomes in ethnic minorities than traditional programs that are not culturally-tailored. CTIs incorporate cultural beliefs, family participation, values, customs, food patterns, language, low literacy, culturally specific educational materials and health practices into the interventions [10]. These researchers have used two basic steps in designing CTIs: 1) conducting focus groups or surveys to gain an understanding of target groups’ cultural beliefs, food patterns or preferences, customs or health practices and priorities on specific areas of interest (e.g. physical activity, eating behaviors and diabetes self-care) and 2) incorporating the target groups’ priorities, cultural beliefs and values into the interventions.

In a meta-analysis on 12 randomized controlled trials (RCTs), Nam et al. [10] found that most CTIs produced a decline in glycemic control (HbA<sub>1c</sub>) among African Americans, Asians, Hispanic Americans, and Portuguese living with T2D. Components of the interventions were culturally tailored in the following ways: teaching or counseling about dietary change by modifying ethnic foods and recipes; teaching/counseling of activity change using culturally appropriate activities (e.g. dancing); delivering of interventions and translating educational resources in preferred language; attendance by

family members to elicit home-based support; and using visual aids to tailor low-literacy needs. Four of the 12 studies were conducted with African Americans in community settings (churches) and reported the interventions to be more effective than those given in a hospital clinic. Although the results were statistically significant, the pooled effect size (ES) (0.29) was small which may be due to low intervention doses (ranging from 1 session up to 12 months, median of 3 months), high attrition rates (30%-40%), and moderate attendance.

Hovell et al. [32] and Laberge et al. [14] evaluated the effectiveness of culturally tailored physical activity interventions that involve dance for Latino women or dance and multisport for 94 multiethnic Canadian, middle schools children respectively. They found that the interventions were successful in increasing performance of vigorous exercise and attention/concentration in the respective target groups. Similarly, Stretcher et al. [33] found that CTIs were effective in promoting the adoption of healthy behaviors: physical activity, reducing dietary fat intake, increasing fruit and vegetables consumption. Hovell et al. [32], Laberge et al. [14] and Stretcher et al. [33] culturally tailored their interventions by incorporating participants’ cultural values, social norms and preferred activities/foods into the interventions. For example, Hovell et al. [32] included dance accompanied by salsa/merengue music, used bilingual community staff to deliver the intervention in Spanish, adapted the content for low-literacy participants, addressed cultural myths and barriers to attending the program and used incentives (small gifts and raffle draws) to minimize attrition. Laberge et al. [14] incorporated culturally relevant and gender specific physical activities (PAs) for boys and girls by including different types of physical activity such as Kung Fu, Hip Hop and African dance for girls and multisport (basketball and soccer) for boys. They also addressed barriers to attending the intervention by offering it during lunch hour because participants were not available or interested in staying after school. Since attrition rate was low in Hovell et al. [32] study and moderate in Laberge et al. [14] study, the present study used incentives to reduce attrition and culturally tailor gender specific PAs for men and women. Men preferred baseball, soccer, tennis and football and weight resistance exercises while women preferred dance, Zumba, walking, aerobic and weight resistance exercises [23,24].

Utz et al. [12] evaluated two formats (group vs individual) for delivering culturally tailored diabetes self-management education (DSME) for African American adults. They found that the group format was more effective in achieving the outcomes (i.e., self-efficacy, appropriate foot care and carbohydrates spacing) than the individual format. These researchers culturally tailored the content of the interventions, which was based on the American Association of Diabetes Educators’ seven areas of self-management (healthy eating, being active, monitoring blood glucose, taking medications, problem solving, reducing risks and healthy coping). They modified the delivery of the intervention by using figurative language in educational materials, using story-telling and skits to relay information and having African American community workers provide the interventions. Lastly, Williams et al. [13] tested the feasibility of a culturally tailored, community-based, group DSME for 25 rural African Americans. They found that the intervention was effective in decreasing body mass index (BMI), increasing level of exercise and knowledge about diabetes (all  $p$ 's < .01). The strategy applied in tailoring the DSME was followed to culturally customize the CTI, which was reviewed by Caribbean and African immigrants in the present study.

## Combination of physical activity and healthy eating interventions

Sanz et al. [34] reviewed five studies from China, Finland, US, India and Japan to determine the effects of exercise in the prevention of T2D. The interventions included aerobic and aerobic plus resistance training three times per week or diet plus exercise three times per week. They found that the interventions were effective in preventing T2D. However, in participants with impaired glucose tolerance, programs that included exercise and diet led to a more significant decrease ( $p < .01$ ) in the incidence of diabetes over a 6-year

period. Madden et al. [35] conducted an integrative literature review on programs implemented between 1996 and 2007 in preventing T2D, to determine the most effective lifestyle intervention. Results showed that the most effective interventions comprised of exercise plus diet, which resulted in the lowest incidence of T2D. These studies suggested that multi-component interventions addressing different risks factors of T2D were more effective in preventing T2D than single component interventions. Multi-component interventions were included in the proposed intervention.

Satterfield et al. [36] conducted a systematic review of 16 community-based diabetes prevention interventions, implemented between 1990 and 2001. These interventions targeted risk factors such as: dietary habits, physical inactivity and weight. The target population included the following ethnic groups: Pima Indians, Native Hawaiians, Mexican Americans, and African Americans from the US, Sweden, Canada, Australia and New Zealand. Interventions ranged in length from half-day workshops to 10-year. All interventions except one combined diet and exercise strategies. Results indicated variable levels of effectiveness in increasing physical activity, improvement in healthy food intake and reduction in waist circumference and BMI in adults. The variability may be due to the differences in intervention doses and participants' attrition rates. Overall, they also found that diet and diet plus exercise significantly reduced ( $p < .001$ ) weight and decreased incidence of T2D. These studies provided processes for culturally tailoring interventions. Thus, the current investigators culturally tailored adapted intervention to prevent T2D, which was reviewed by Caribbean and African immigrants.

## Methods

### Research design

This study used focus groups and individual surveys to collect data. The authors conducted in-depth focus group interviews with participants to solicit information on motivators and barriers to attending a culturally tailored intervention to prevent T2D. Questions asked in the focus groups and individual surveys were: 1) What factors would motivate you in attending the culturally tailored adapted program? 2) What barriers would prevent you from not attending the culturally tailored adapted program? 3) What would be the best format for delivering this program? Focus groups are one of the most efficient methods for in-depth exploration of beliefs and are effective with ethnocultural communities [22,37]. Additionally, participants individually reviewed the culturally tailored intervention and provided feedback in writing of its usefulness. Participants answered the following questions in their review: 1) How useful was the culturally tailored adapted program in informing you about your health beliefs and cultural practices to prevent T2D? 2) What are your perceptions of the culturally tailored adapted program? 3) How can this program be improved.

### Sample and setting

Using a purposive sampling scheme, 29 participants (6 from Jamaica, 7 from Trinidad, 2 from Barbados, 11 from Nigeria and 3 from Ghana) were recruited from the community (community health centres, doctors' offices and churches). Eighteen respondents participated in three focus groups and 11 were surveyed. Group interviews were held on the premises of three participating churches located in Durham Region in Ontario, Canada. An attempt was made to have the sample representative of the population by age, ethnicity, subgroup and geographical region. Participants' inclusion criteria were: healthy individuals who had not received formal education on T2D prevention; 35-70 years of age; ability to speak, read and understand English, self-reported of being immigrants to Canada for 5 or more years and self-identification as being from the Caribbean and African community. Exclusion criteria were individuals diagnosed with T2D, renal and heart disease.

## Barrera and Castro Model of Cultural Adaptation

The researchers used Barrera and Castro's [38] model of cultural

adaptation to culturally tailor Goodpaster et al. [39] intervention for the prevention of T2D. This model has four steps: 1) Gathered information (literature review to understand common and unique risk factors in the target population and to identify main components of evidence-based interventions); 2) Developed recruitment strategies and modified the intervention from step 1 by incorporating empirical findings from previous studies [21,22,25-27] to make it consistent with the beliefs, customs and preferences of the target groups related to physical activity and healthy eating, 3) Conducted a content review of the modified intervention with 29 participants (14 African and 15 Caribbean immigrants) and 4) Modified the intervention based on results of the review.

## Description of Goodpaster et al. Intervention

Goodpaster et al. intervention [39] consisted of diet and physical activity for six months. All participants received a behavior lifestyle booklet which comprised of intervention topics and content on healthy eating, health beliefs, awareness of risks factors and consequences of type 2 diabetes and physical activity engagement. During the first three months participants attended three group meetings to learn about healthy eating, awareness of risks factors and consequences of type 2 diabetes and physical activity. From the onset they were encouraged to engage in a progressive physical activity and healthy eating program for six months as well as to implement information gained from each session into their lives. In the following three months, each participant received one individual telephone call or email each month (months 4, 5 and 6), to reinforce what was learned in the first three months of the program. The adapted intervention is described next.

## Culturally Tailored Adapted Program to Prevent Type 2 Diabetes (T2D)

The culturally tailored adapted intervention comprised of six sessions.

**Session 1:** The healthy eating session focused on health beliefs and health-related practices obtained from research findings on Caribbean and African people [21,22,26,27,40]. The traditional diet was modified to make it healthier using eating well with Canada Food Guide [41].

This 2-hour session will be delivered using small group discussion, story-telling and a power-point presentation. The purpose of this session is to increase participants' knowledge of healthy eating behaviors and to enhance self-efficacy or confidence in daily self-care. A Registered Dietitian (RD) will discuss barriers, facilitators and benefits of healthy eating, food preparation, portion sizes, label reading and modifying of recipes. Other strategies the RD will use are preparing healthy snacks, batch cooking and freezing to facilitate meal planning.

**Session 2:** The purpose of this session was to increase participants' awareness of the influence of health beliefs on behaviors, preventing T2D, reducing risk factors and consequences of T2D. The 2-hour session will start with an "ice breaker exercise" followed by the interactive educational session to facilitate participants' motivation to adapt a healthy lifestyle. Participants will discuss cultural belief models about T2D such as prevention, causes, symptoms and complications of T2D; the use of traditional Caribbean and African medicines (bitter lemon, cinnamon bark, and mauby bark) to treat T2D and awareness of risk factors and consequences of T2D [26,27]. This session will be delivered by an African/Caribbean healthcare professional (HP) using small group discussions and story-telling.

**Session 3:** Physical Activity (PA). The purpose of this session is to increase participants' knowledge of physical activity and to enhance self-efficacy or confidence in daily self-care. In this 2-hour session, participants will discuss physical activity in preventing T2D as well as focus on culturally acceptable exercises/activities based on participants' feedback. A Physiotherapist will discuss barriers and facilitators to exercise and demonstrate a number of selected priority

physical activities as well as tailored gender specific PAs. Participants will be encouraged to engage in moderate physical activity five days a week for a minimum of 30 minutes per day, which may be done in 10 minutes sessions, three times per day. Other activities will include: a) Exploring work-related physical activities for fulltime employees such as walking during breaks or engaging in exercises after work, b) Using self-help behavioral booklet for clients who were unable to attend the intervention sessions, and c) Finding a ‘buddy system’ comprised of co-workers, friends or family to support and encourage engagement in physical activity. It will be delivered using a power-point presentation and demonstration of safe ways to exercise to avoid injury.

**Sessions 4-6:** Three booster sessions will be delivered by telephone calls or emails at one month, two months and three months respectively, following session 3 of the program, to provide participants with support, encouragement and advice on how to manage setbacks in behaviors [42,43]. During these sessions the interventionist will reinforce contents from sessions 1-3 and encourage participants to continue engagement of physical activity and healthy eating. Each booster session will last 10-15 minutes in duration.

## Procedure for Data Collection

This study received ethical approval from the University Research Ethics Board in June 2013. Two methods were used to recruit participants such as advertising the study on bulletin in the community and word of mouth by peers, family members and colleagues to participate in the study. A research assistant (RA) received two-days training on how to recruit participants, collect and transcribed the focus group data. The RA arranged to meet interested persons at participating churches to describe the study and what was expected of them as participants, i.e. to complete the demographic sheet and participate in the focus group interviews. Once individuals agreed to participate in the study, the RA asked questions to determine their eligibility for the study (length of residency in Canada, age, members of the Caribbean/ African community, lived in Durham Region and were not diagnosed with T2D).

After obtaining written consent, eligible participants were invited to the focus group sessions. At the beginning of the session, each participant completed the demographic form and returned the questionnaire in a sealed envelope to the RA. The investigator facilitated the group sessions using open-ended questions and prompts as needed to elaborate on ideas/ points. Data were audio-recorded and transcribed for data analysis. Immediately following the interviews, field notes were made to document nonverbal cues, the psycho-social environmental contexts of the interviews and interpretation of findings. The researcher also maintained an audit trail of the sequence of the research process.

Following the focus groups interviews, participants reviewed the culturally tailored adapted intervention. Each participant individually reviewed and provided feedback of his/her perception of the intervention in writing, which was returned in a sealed envelope to the researchers. Similarly, the researcher invited 11 community leaders who were interested in the study to complete an individual survey and consent form to participate in the study, delivered to them at participating churches, with a self-addressed stamped envelope to return the questionnaire to the researcher. They also reviewed the culturally tailored intervention and returned it in sealed envelopes to the researcher.

## Data Analysis

Data from focus group sessions and survey findings were transcribed and coded using an immersion and crystallization approach [44] to identify themes and Sandelowski and Leeman’s [45] approach (using subject and predicate) to formulate themes. The researchers read whole transcripts and survey results several times to immerse them in the data. They independently reviewed the transcripts and survey results to develop themes from the data; compared accuracy of findings and interpretation of the data,

answered questions, explored and resolved (through consensus) any inconsistencies in coding among them. Segments of data, an idea or word conveying an idea were identified before they were subsumed under a theme. A theme included configuration of segments of data. Thus, three themes emerged from the focus group data and reached saturation at the completion of focus group two (n= 15). Similarly, three themes with sub-themes were identified from the survey findings. Since the sub-themes were similar to those in the focus groups, all the sub-themes and themes were combined. The investigators use bracketing by setting aside personal biases, personal knowledge and perspectives [46]. Thus, they readily came to agreement on the findings.

Lincoln and Guba’s [47] trustworthiness criteria were used to evaluate the rigor of the findings. Confirmability of the data was achieved by members checking, where each participant verified the researchers’ transcripts and themes with supportive quotes, several weeks following the interviews. Members checking allowed participants to clarify any misconceptions, add information, confirm individual points and ensured accuracy of data. Validity of the data was confirmed by secondary review (feedback on transcripts and themes by six community leaders and pastors).

Lastly, dependability of the data was obtained by triangulating the data [47,48]. The researchers used two forms of data collection: focus group interviews and survey methods to provide a holistic understanding of the phenomenon. They also independently reviewed the transcripts, used audit trail and field notes to document the research process.

## Findings

### Characteristics of participants

Twenty six participants (89.6%) were female and three were males (10.3%) with an average age of 48 years (range = 35-70 years, SD = 63.4). Their average length of residency in Canada was 22 years (range = 5-51, SD = 38.5). [Table 1](#) provides socio-demographic characteristics of participants.

### Perceptions of the intervention

Findings from the intervention review were positive. Twenty five participants (86%) reported that the intervention was very useful and four participants (14%) said the intervention was useful. Twenty four respondents (83%) were very satisfied with the intervention while five participants (17%) were satisfied with it. Participants reported that the intervention contents were culturally consistent with their beliefs, values and cultural practices in preventing T2D, which were published elsewhere [23,24]. They appreciated that the intervention included healthy eating and physical activity practices; signs and symptoms of T2D and its complications; methods to modify cultural diets to make them healthier; and the sessions being offered in group format. A few participants recommended that the intervention can be improved by dividing session 1 into two components because of the amount of content included in this session. Lastly, they added a few topics that should be included in the intervention such as causes of resistance to insulin and other factors that contribute to T2D such as stress, genetics and medications.

The researchers found that the social environment during the focus groups was lively, positive and cordial with participants respecting one another’s input. Three themes emerged from the data: Motivating Factors to Engage in Physical Activity and Healthy Eating; Barriers that prohibit Engaging in Physical Activity and Increasing Knowledge about Food Selection and Modification of Diet.

### Theme 1: Motivating Factors to Engage in Physical Activity and Healthy Eating

Many participants were motivated to engage in physical activity and healthy eating habits because they wanted to prevent the occurrence of chronic diseases such as diabetes, heart disease and stroke as well as enhance their quality of life. Two sub-themes were subsumed under this theme: intrinsic factors (physical and emotional

**Table 1:** Demographic Characteristics of Participants.

Variable	n (%)	mean	range	SD
Age (in years)		48	35-70	63.4
Gender				
Male	3(10.3)			
Female	26(89.7)			
Canadian residency (in years)		22	5-51	38.5
Marital status				
Married	21(72.4%)			
Unmarried	4(13.8%)			
Widowed	1(3.5%)			
Divorced	3(10.3%)			
Country of Origin				
Jamaica	6(20.7%)			
Trinidad	7(24.1%)			
Barbados	2(6.9%)			
Nigeria	11(37.9%)			
Ghana	3(10.3%)			
Employment				
Employed	21(72.4%)			
Retired	7(24.1%)			
Unemployed	1(3.5%)			
Education				
High School Diploma	1(3.4%)			
College diploma	5(17.2%)			
Undergraduate degree	13(44.8)			
Graduate degree	10(34.5%)			
Individual Annual Income (USD)				
\$20,000.00 - \$29,000.00	1(3.4%)			
\$30,000.00 - \$39,000.00	3(10.3%)			
\$40,000.00 - \$49,000.00	5(17.2%)			
\$50,000.00 - \$59,000.00	2(6.9%)			
\$60,000.00 - \$69,000.00	4(13.7%)			
\$70,000.00 - \$79,000.00	5(17.2%)			
\$80,000.00 - \$89,000.00	5(17.2%)			
\$90,000.00 - \$99,000.00	2(6.9%)			
Over \$100,000.00	2(6.9%)			
Diabetes Education				
Informal education	14(48.3%)			
No education	15(51.7%)			

wellbeing, long life, health reasons, and commitment to self and peers) and extrinsic factors (having a buddy or group to exercise, walkability or safe physical environment to walk in). Intrinsic factors referred to those factors that were inherent or essential to the individuals' wellbeing while extrinsic factors were due to external circumstances outside their control.

"I want to live long and be around for my boys so that was my major motivator for staying healthy".

"Physical activity helped me sleep well. I slept well, felt good and looked younger". "You also wore smaller sizes and looked 10 years younger than your age".

One participant said, "I am committed to myself and peers to play tennis twice a week, so I made the effort to go". Another participant added, "Having a group to do exercise with and having a routine made the difference".

"Having a friendly safe environment was conducive to walking. Every day we walked around where we lived".

"Physical activity helped me to sleep well and reduced my stress. I felt good and looked younger".

"I engaged in physical activity to improve the quality of my health." Another participant said, "It was euphoric at the end of exercise. It was beautiful since it purged my body from toxins. A third participant said, "It kept you healthy and prevented chronic diseases".

One participant said, "I eat healthily to prevent the occurrence of chronic diseases such as diabetes, heart disease and stroke". Another participant said, "I eat healthily to improve my mood and quality of life". Others eat healthily to "staying in shape" while others wanted to "perform well in sports, look good and feel great". Another participant said, "She ate healthily to prevent excessive weight gain, to be healthy and active".

### Theme 2: Barriers that Prohibit Engaging in Physical Activity

This theme comprised of two sub-themes, which were physiological factors (physical disability, knee or joint problems and feeling tired after work) and psycho-social (lack of a companion to walk with, time constraints, family obligations, kids and work-life imbalance, shift work, time and money to attend a program or join a Gym).

Many participants said, "Working hours prevented me from attending a program or engaging in physical activity". Others participants said, "I felt tired after work" while another participant said, "Work schedule and shift work prohibited me from exercising on a regular basis".

Another participant said, "I lack money to buy a Gym membership and I don't have a companion to walk with".

Other participants reported that they lacked education about proper exercises and the benefits of physical activity. "If you did not know what to do and how to do it, you were reluctant to try".

Two participants said, "I had a physical disability. I felt pain in my knees following a walk or using a treadmill".

### Theme 3: Increasing Knowledge about Food Selection and Modification of Diet

Increasing knowledge about food selection and modification of diet meant that participants had a keen interest in learning more about selecting and purchasing their cultural foods as well as modifying them to make them healthier. They enjoyed the African and Caribbean cuisine and were not willing to give them up. However they wanted to know how to modify and prepare foods as well as the amount of food eaten during a meal. Two sub-themes were under this theme: knowledge of food selection and knowledge on diet modification. The knowledge of food selection subtheme comprised of: portion size and fluid intake per day; learning about the nutritional value in foods; learning about the important spices and herbs from the Caribbean and Africa; learning to read labels and what to look for; learning about the nutritional value in foods from other countries and knowing what was the best fluid to drink (water versus soda and other canned drinks). Under knowledge on modification of diet were the following topics: how to modify Caribbean and African foods to make them healthier; how to balance a diet with focus on the amount of carbohydrates compared to meat and vegetables; and food preparation to get the best nutritional value from foods.

## Discussion

This qualitative study explored Caribbean and African immigrants' perceptions of a culturally tailored intervention to prevent T2D. Findings showed that participants had positive perceptions of the intervention. Eighty six percent of them rated the program as very useful and 14% rated it as useful. Additionally, 83% were very satisfied with its contents and reported that it was culturally consistent with their beliefs, values and cultural practices in preventing T2D while 17% said they were satisfied with its contents. These findings were helpful to the investigators to further assist them in modifying the intervention. However, there is a dearth of qualitative studies on the perceptions of culturally tailored interventions to support these findings.

McGee et al. [49] using focus group findings have developed a culturally tailored intervention for African Americans to make it most acceptable to them and increase their adherence to it. Participants provided their perceptions of the program pertaining to knowledge and skills (eating right/healthy, exercising, resting/sleeping, watching their portions sizes) as well as identified challenges they experienced in meeting the physical activity guidelines, which were being busy, lack of time, weather, and available safe facility to exercise in. Alternatively, Jack et al. [50] provided an illness narrative framework that healthcare providers can use to obtain insight into the perceptions and experiences of their patients living with diabetes. They proposed that understanding cultural perspectives may help explain patients' health behaviors and lead to more effective partnering between healthcare provider, patients and community resources, which support adherence and improve outcomes. Based on these findings, the investigators will evaluate the effectiveness of the culturally tailored adapted intervention to prevent T2D among Caribbean and African immigrants.

Apart from individual participant's perceptions of the culturally tailored intervention, three themes emerged from the focus groups and survey data. They were motivating factors to engage in physical activity and healthy eating, barriers that prohibit engaging in physical activity and increasing knowledge about food selection and modification of diet. These findings will be discussed in subsequent paragraphs.

Participants of the present study reported several motivating factors for attending the physical activity and healthy eating components of the culturally tailored intervention. Some of these factors included physical and emotional wellbeing, health reasons, having a buddy or support group to exercise with and safe physical environment to engage in physical activity. These findings were consistent with previous research results. In a qualitative systematic review of 24 studies on children and adults' participation or non-participation in sports or physical activity, adult participants reported that they were motivated by social support, health benefits of being active, and enjoyment of physical activity [51]. Similarly, Martyn-Nemeth, Vitale and Cowger [9] found social support and improving health were strong motivators of physical activity.

In addition to motivators, participants identified several barriers for not attending the proposed culturally tailored intervention. Some of these included, physical disability (knee problems), feeling tired after work, lack of social support, shift work, time constraints, time and money to attend an exercise program or join a Gym. These findings were substantiated by other researchers [51-54]. For example, Egan et al. [52] found that obese Irish patients with a diagnosis of T2D reported barriers to exercise such as tiredness, physical discomfort, and lack of time, lack of social support from family and friends, too expensive to exercise and embarrassment about physical appearance. Additionally, in a systematic review on 13 studies, Korhonen, Alahunta, and Laitinen [55] found two types of barriers: internal barriers (lack of time, exercise was uncomfortable, physical health, feeling lazy and stress) and external barriers (lack of social support, lack of knowledge about exercise, religious and cultural barriers, cost and lack of facilities to exercise). Internal factors referred to those factors that may be influenced by the individual's own decision making while external factors were outside the control of the person. Dutton et al. [54] findings also substantiated Korhonen, et al. [55] results. Based on these findings, health care professionals should assist participants who are high risk for T2D to identify barriers to regular exercise or physical activity; so they can develop strategies to solve these problems. For instance, participants who lacked social support can speak to peers and family members about their desire to engage in physical activity in order to get their support. On the other hand, respondents who reported lack of time to engage in exercises/physical activity may identify time slots for exercise at a Gym or add physical activity to their daily routine such as walking during breaks at work or exercising after work.

Lastly, participants identified many different topics they would like to learn about in a culturally tailored intervention such as

modification of diet, food preparation, reading of labels and portion size. These topics were identified through focus group and survey interviews, which preceded content review of the culturally tailored intervention. Many of the topics suggested by participants were already included in the culturally tailored intervention. For example, the researchers included topics such as teaching participants about dietary change by modifying Caribbean and African foods to make them healthier, replacing saturated fats like butter with olive oil or adding cooked apples to cakes to make them moist and applying recommendations from Eating Well with Canada's Food Guide [41]. Other topics participants suggested that should be incorporated into the intervention were fluid intake per day; nutritional value in foods; learning about the important spices and herbs from the Caribbean and Africa and learning about the nutritional value in foods from other cultures. Since these topics were important, they will be included into the culturally tailored intervention to further modify it.

## Implications for Practice and Research

The researchers learned valuable information from the present findings. They learned that the intervention was useful and participants were satisfied with its contents. Participants also provided motivators to attending and barriers for not attending the intervention. These findings were crucial for further modifying and implementing the intervention, which would facilitate uptake of the contents to enhance participants' outcomes such as knowledge about diabetes, increasing physical activity, and healthy eating [10-13].

This study has implications for practice and research. Healthcare professionals should gain formal education and training to provide culturally tailored interventions to immigrants and minority groups [23,24]. Future research studies should evaluate the effects of the culturally tailored intervention to prevent T2D with Caribbean and African immigrants, using control and intervention groups. Lastly, this study should be adapted and implemented to other high risk minority groups such as South Asian, Latin Americans and Native People.

## Limitations

This study may have limitations that influenced the findings, since it used qualitative methods and not objective quantitative measures of participants' perceptions of the intervention. Additionally, participants' socio-demographic factors may have influenced their responses. The majority of participants (62%) had incomes > US \$60,000 per year and higher education levels (13 Bachelor and 10 Graduate Degrees), which may have impacted their perceptions. Barnard, Wexler and Berkowitz [56], found that socio-economic status, particularly income level was associated with excess diabetes prevention. Although, both men and women were targeted during recruitment, fewer men than women participated in this study. Thus, findings may not reflect the perceptions of most men in the African and Caribbean community.

## Conclusion

Caribbean and African immigrants reviewed a CTI to prevent T2D and provided perceptions of the intervention. The researchers gained valuable evidence from the study to assist them in moving forward to the next level of research development: 1) To determine the effects of the CTI on outcomes of self-care knowledge, performance of physical activity, healthy eating practices and self-efficacy and 2) To examine the level of adherence to the CTI defined as the percentage of treatment recommendations performed by the target population in the control and intervention groups.

## Ethical Approval

The study was approved by the University of Ontario Institute of Technology Ethics Board in June 2013. The university is located at 2000 Simcoe St North, Oshawa, Ontario, Canada.

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